Appendix H Evidence tables

H.1 2006 evidence table

Assessment and investigation

History taking and physical examination

Accuracy of history vs urodynamic findings (i.e. urodynamic testing is the reference standard)

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Lagro-Janssen 1991[49]	Diagnostic study (DS) EL = III	103	UD diagnosis: 58% SUI, 18% MUI, 18% DO, 6% normal	F 20–65 years, presenting to GPs with UI (≥ 2 episodes per month) Exclusions: prior continence surgery, neurological UI, diabetes mellitus, temporary cause for UI, UTI	5-item questionnaire; abdominal and vaginal exam	Complete urodynamic evaluation (static and dynamic UPP, cystometry, uroflowmetry)	Sensitivity (%): SUI 78 (66, 87) MUI 68 (46, 85) UUI 61 (39, 80) Specificity (%): SUI 84 (70, 92) MUI 79 (69, 86) UUI 95 (89, 98)	PPV (%): SUI 87 (76, 94) MUI 42 (26, 59) UUI 73 (48, 89) NPV (%): SUI 73 (60, 84) MUI 92 (83, 96) UUI 92 (84, 96)	Funding: none declared. History taken by GP researcher, and urodynamics by nurse. Not clear if both parties blinded. ICS criteria used for UD diagnosis. Values quoted in paper.

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Summitt 1992[50]	DS EL = III	87	UD diagnosis: 44% SUI, 28% MUI, 20% DO, 9% normal	F mean age 53 years (21–76) evaluated for primary complaint of UI	7-item questionnaire and 24 h voiding diary	Medium-fill single-channel cystometogram (standing) to diagnose DO Multichannel urodynamics*; static and stress urethral pressures taken supine and standing; multichannel cystometry standing to diagnose SUI/MUI	Sensitivity (%): SUI 82 (67, 91) MUI 67 (47, 82) UUI 71 (47, 87) Specificity (%): SUI 84 (71, 91) MUI 89 (79, 95) UUI 96 (88, 99)	PPV (%): SUI 79 (64, 89) MUI 70 (49, 84) UUI 80 (55, 93) NPV (%): SUI 85 (73, 93) MUI 88 (77, 94) UUI 93 (85, 97)	Funding: none declared. *done 1 week after the history. ICS criteria used for UD diagnosis. Not stated who took the history or undertook UD.
Sand 1988[51]	DS EL = III	218	UD diagnosis: 52% SUI, 17% MUI, 14% DO, 17% normal	F mean age 52 years (18–80) with lower urinary tract symptoms	Structured urogynaecology history form	UCP at rest and with rectal squeeze in sitting and standing positions with 150 ml saline in bladder, and in sitting position for max. cystometric capacity. Simultaneous medium-fill urethrocystometry performed in sitting and standing positions using saline at 38 °C	Sensitivity (%): SUI 22 (15, 30) MUI 79 (64, 89) UUI 33 (19, 51) Specificity (%): SUI 83 (74, 89) MUI 43 (36, 51) UUI 98 (95, 99)	PPV (%): SUI 58 (43, 72) MUI 23 (16, 31) UUI 77 (50, 92) NPV (%): SUI 49 (42, 56) MUI 91 (83, 95) UUI 90 (85, 94)	Funding: none declared. ICS criteria used for UD diagnosis.

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Ouslander 1987[52]	DS EL = III	135	UD diagnosis: 46% SUI, 19% MUI, 27% DO/hyperreflexia, 8% other	F ≥ 65 years (65–95) referred to outpatient clinic for evaluation of UI. 20% had neurological disorder; 62% had hysterectomy, 30% prior cystocele repair and/or bladder neck suspension. 16% had stress UI symptoms, 64% MUI, 16% urge UI	Detailed medical history form and checklist; pelvic, rectal, neuro exam; urine cultures	Water cystometogram (rate 100 ml/min), with cough and stress provocation; pressure flow study, UPP with a dual-channel microtip transducer	Sensitivity (%): SUI 23 (14, 34) MUI 72 (52, 86) UUI 33 (20, 50) Specificity (%): SUI 89 (80, 94) MUI 34 (25, 43) UUI 90 (82, 94)	PPV (%): SUI 64 (43, 80) MUI 20 (13, 29) UUI 55 (35, 73) NPV (%): SUI 58 (48, 66) MUI 84 (71, 92) UUI 79 (70, 85)	Funding: National Institute on Aging, National Institutes of Health. ICS criteria used for UD diagnosis.
De Muylder 1992[53]	DS EL = III	408	UD diagnosis: 34% SUI, 25% MUI, 32% DO, 8% other	F mean age 48 years (18–78). Clinical diagnosis: 42% stress UI, 28% MUI, 30% UUI	Structured questionnaire designed for the study, urogynae exam, urine culture and analysis	Combined filling and voiding cystometry with multichannel pressure recording; UCPP, Valsalva and coughing	Sensitivity (%): SUI 50 (42, 58) MUI 43 (34, 53) UUI 65 (57, 73) Specificity (%): SUI 63 (57, 68) MUI 77 (72, 81) UUI 87 (82, 90)	PPV (%): SUI 41 (33, 48) MUI 39 (30, 48) UUI 70 (62, 78) NPV (%): SUI 71 (65, 76) MUI 80 (75, 84) UUI 84 (79, 88)	Funding: none declared. ICS criteria used for UD diagnosis.
Diokno 1987[54]	DS EL = III	200	UD diagnosis: 61% SUI, 17% MUI, 7% DO, 16% normal/other	F mean age 69 years (55–90), who consulted the continence program clinic	'Thorough medical history' and complete physical exam	Multichannel UD: uroflowmetry, cystometry, stress cystourethrography, provocative full-bladder stress testing	Sensitivity (%): SUI 76 (68, 83) MUI 42 (27, 59) UUI 14 (4, 40) Specificity (%): SUI 49 (39, 60) MUI 77 (70, 82) UUI 97 (93, 99)	PPV (%): SUI 70 (61, 77) MUI 26 (16, 40) UUI 25 (7, 59) NPV (%): SUI 57 (46, 68) MUI 87 (81, 92) UUI 94 (89, 96)	Funding: National Institute on Aging. ICS criteria used for UD diagnosis.
Iosif 1980[55]	DS EL = III	401	UD diagnosis: 53% SUI, 10% MUI, 12% DO, 24% other	F with UI referred to hospital for assessment. Clinical diagnosis: 45% SUI, 50%, 6% UUI	Clinical assessment – no further details	Urethrocystometry; UPP	Sensitivity (%): SUI 64 (57, 70) MUI 85 (72, 93) UUI 35 (23, 50) Specificity (%): SUI 78 (71, 83) MUI 54 (49, 60) UUI 98 (96, 99)	PPV (%): SUI 77 (70, 82) MUI 18 (13, 23) UUI 74 (54, 87) NPV (%): SUI 65 (59, 71) MUI 97 (94, 99) UUI 92 (96, 99)	Funding: none declared. ICS criteria used for UD diagnosis.

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Umstad 1991[56]	DS EL = III	168	UD diagnosis: 40% SUI, 14% MUI, 24% DO, 21% other	F mean age 47 years (22–72) undergoing urodynamic assessment for the first time for assessment of UI	'detailed history and thorough physical exam'	UD with empty bladder, during filling, and at capacity	Sensitivity (%): SUI 76 (65, 85) MUI 58 (39, 76) UUI 45 (31, 60) Specificity (%): SUI 66 (56, 75) MUI 82 (75, 87) UUI 81 (74, 87)	PPV (%): SUI 60 (50, 70) MUI 35 (22, 50) UUI 43 (29, 58) NPV (%): SUI 80 (71, 88) MUI 92 (86, 96) UUI 83 (75, 88)	Funding: none declared. ICS criteria used for UD diagnosis.
Ishiko 2000[57]	DS EL = III	198	UD diagnosis: 63% SUI, 21% MUI, 15% DO, 2% other	F mean age 59 years (27–73) visiting hospital clinic for evaluation	Scored 15-item questionnaire (Gaudenz) completed by pts	Urethrocystometry	Sensitivity (%): SUI 83 (76, 89) MUI 61 (46, 74) UUI 86 (69, 95) Specificity (%): SUI 92 (83, 96) MUI 87 (80, 91) UUI 96 (92, 98)	PPV (%): SUI 95 (89, 97) MUI 54 (40, 68) UUI 81 (64, 91) NPV (%): SUI 76 (66, 84) MUI 89 (84, 93) UUI 98 (94, 99)	Funding: none declared. Not stated whether ICS recommendations for UD followed.
Sandvik 1995[58]	DS EL = III	236	UD diagnosis: 54% SUI, 24% MUI, 17% DO, 5% other	F referred from primary health care owing to UI	History from structured questionnaire designed for the study; single questions used to establish whether F had stress or urge UI, with mixed being positive response to both	Medium-fill water urethrocystometry with pt in semi-supine position	Sensitivity (%): SUI 66 (58, 74) MUI 84 (72, 91) UUI 56 (41, 70) Specificity (%): SUI 88 (81, 93) MUI 66 (59, 73) UUI 96 (92, 98	PPV (%): SUI 87 (78, 92) MUI 44 (35, 53) UUI 74 (57, 86) NPV (%): SUI 69 (61, 76) MUI 93 (87, 96) UUI 91 (87, 94)	Funding: none declared. ICS recommendations followed for UD.
Fitzgerald 2002[59]	DS EL = III	293	UD diagnosis: 51% SUI, 21% MUI, 13% DO, 16% other	F mean age 57 years (15–87) evaluated at tertiary referral clinic; 31% had advanced stage POP	Presenting UI symptom	Multi-channel UD	Sensitivity (%): SUI 17 (12, 24) MUI 85 (74, 92) UUI 27 (15, 43) Specificity (%): SUI 91 (85, 95) MUI 36 (30, 43) UUI 92 (88, 95)	PPV (%): SUI 66 (50, 79) MUI 26 (20, 32) UUI 32 (19, 50) NPV (%): SUI 52 (46, 58) MUI 90 (83, 95) UUI 90 (85, 93)	Funding none declared ICS recommendations followed for UD.

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Sunshine 1989[60]	DS EL = III	109	UD diagnosis: 60% SUI, 20% MUI, 2% DO, 18% other	F aged 20–79 years evaluated for UI	Detailed history and physical exam	Cystometry, UPP, cystourethroscopy	Sensitivity: SUI 78% MUI 100% UUI 22% Specificity: SUI 72% MUI 83% UUI 100%	PPV: SUI 83% MUI 18% UUI 100% NPV: SUI 66% MUI 100% UUI 91%	Funding: none declared. Results as reported in paper. UD done within a month of the initial history. Not stated whether ICS recommendations for UD were followed. DO diagnosed when unprovoked contractions occurred at detrusor pressure > 10 cmH_2O
Weidner 2001[61]	DS EL = III	950	UD diagnosis: 51% SUI, 14% MUI, 19% DO, 6% normal, 11% other	F mean age 55 years referred for UD investigations for UI; presenting symptom 30% SUI, 52% MUI, 14% UUI, 4% constant leakage Exclusions: stage 3–4 POP; F undergoing repeat examinations	Standardised history, physical exam (incl. stress test, urethral axis determination), 7 day diary	Multichannel urodynamics	Sensitivity: SUI 39% MUI 49% Specificity: SUI 86% MUI 57%	PPV: SUI 74% MUI 53% NPV: SUI 58% MUI 53%	Funding: none declared. The 535 women included in the Cundiff 1997 study are also in this study population.[936] Study = retrospective analysis of data. Methods and terminology used conformed to ICS recommendations.
Carey 1997[62]	DS EL = III	863	UD diagnosis: 39% SUI, 27% MUI, 34% other (no SUI)	F referred to urogynaecology clinic with stress and/or urge UI or other urinary symptoms. Clinical diagnosis: 23% SUI, 56% MUI, 11% UUI, 10% no UI	History using a standardised questionnaire, physical exam	Subtracted dual-channel cystometry, filling rate 100 ml/min; UPP	Sensitivity (%): SUI 33 (29, 39) MUI 68 (61, 73) Specificit (%)y: SUI 83 (80, 86) MUI 48 (44, 52)	PPV (%): SUI 56 (49, 62) MUI 33 (29, 37) NPV (%): SUI 66 (63, 70) MUI 80 (76, 84)	Funding: none declared. Not stated whether definitions conformed to ICS (DO diagnosed if pressure incr. of 15 cmH_2O or more)

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Cantor 1980[63]	DS EL = III	214	UD diagnosis: 55% DO (45% 'stable')	F 16–84 years with UI and suspected DO or excluding DO prior to surgery Exclusions: under 16 years; neurological disease	Urological and gynaecological history taken (not stated how)	VCU, detrusor pressure calculated by subtracting rectal from urogynaecological pressures	Sensitivity (%): UUI 91 (84, 95) Specificity (%): UUI 45 (35, 55)	PPV (%): UUI 67 (59, 94) NPV: UUI 80 (67, 88)	Funding: none declared. Pressure increase of > 15 cmH_2O on bladder filling taken as diagnosis of DO; or detrusor pressure incr. on coughing or standing.
Awad 1983[64]	DS EL = III	108	UD diagnosis; 78% DO	F mean age 75 years (65–93) referred to a urodynamic unit owing to UI; 8% had clinical diagnosis of SUI, 71% MUI, 20% UUI Exclusions: significant cystitis; specific lesions at cystoscopy	No information on how clinical diagnosis reached	Liquid cystometography in 91; gas cystometography in 17; filling rate 60 ml/min for both methods	Sensitivity (%): UUI 24 (16, 34) Specificity (%): UUI 92 (74, 98)	PPV (%): UUI 91 (72, 97) NPV (%): UUI 26 (18, 36)	Funding: Medical Research Council, Canada. Not stated whether ICS criteria for UD diagnosis followed.
Walter 1982[65]	DS EL = III	303	UD diagnosis: 16% overactive detrusor, 4% underactive, 79% normal, 1% inconclusive	F median age 54 years (19–82) referred to urology or gynaecology departments with provisional diagnosis of UI (43% SUI, 36% MUI, 21% UUI)	Questionnaire covering gynaecological, neurological, and urological symptoms; physical examination	Flowmetry; medium-fill water cystometry (30 ml/min)	Sensitivity (%): UUI 57 (43, 70) Specificity (%): UUI 86 (81, 90)	PPV (%): UUI 44 (33, 57) NPV (%): UUI 91 (87, 94)	Funding: Danish Foundation for Medical Research and Carl Petersen's Foundation. ICS criteria used for UD diagnosis. UD diagnosis only reported as overactive or underactive or normal
Petros 1992[66]	DS EL = III	169 (70 UUI)	UD diagnosis not reported	F mean age 50 years (35–71), with UI	Standard questionnaire	Supine filling cystometry at 100 ml/min, 'sink test' cystometry	Sensitivity:* UUI 40% Specificity:* UUI 74%	PPV:* UUI 53% NPV:* UUI 63%	Funding: Swedish Research Council; Goran Gustafssons Foundation; University of Uppsala; Royal Perth Hospital. *values reported in the paper (but no raw data so unable to calculate 95% CI). ICS criteria used for UD diagnosis.

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Digesu 2003[67]	DS EL = III	4500 (843 having OAB formed study grp)	UD diagnosis: 21% SUI, 15% MUI, 39% DO, 8% voiding difficulty, 17% other	F mean age 55 years (22–73), lower urinary tract symptoms referred to a tertiary urodynamic clinic (28% OAB) Exclusions: neurological disorders	Self-completed questionnaire and FVC; 'complete' history and vaginal exam	VCU	Sensitivity: OAB 28% Specificity: OAB 86%	PPV: OAB 54% NPV: OAB 68%	Funding: none declared. Calculations made by authors (incomplete raw data, hence unable to calculate 95% CI). ICS criteria used for UD diagnosis.
Glezerman 1986[68]	DS EL = III	128	UD diagnosis: SUI (alone) 75%, mixed 6%, 5% DO, 13% other/ normal	F mean age 48 years (22–74), stress UI symptoms	21-symptom questionnaire for urological history; pelvic, gross neuro, exam; urine culture, Bonney test	Cystomanometry	Sensitivity (%): 100 (96, 100)*	PPV (%): 77 (69, 83)	Funding: none declared. ICS criteria used for UD diagnosis. *assuming that all F enrolled had SUI symptoms only (no MUI); no info on MUI symptoms given.
Versi 1991[69]	DS EL = III	252	UD diagnosis: 47% SUI (other % not specified)	F, age unknown, symptom of stress UI	20-item questionnaire; midstream urine Clinical diagnosis determined by computer	Uroflowmetry, subtracted provocative fluid fill cystometry, VCU	Sensitivity (%): SUI 100 (97, 100)	PPV (%): SUI 47 (41, 53)	Funding: Birthright (RCOG) [in part]. UD SUI diagnosis made if > 1 g increase on pad test and evidence of urethral sphincter incompetence during the VCU study. ICS criteria used for UD diagnosis.
Fischer-Rasmussen 1986[70]	DS EL = III	212	UD diagnosis: 39% SUI, 61% 'other'	F mean age 55 years (29–84), referred to gynaecology dept owing to UI	History, symptoms, pelvic exam from initial consultation	Cystometry in supine position, continuous water filling rate of 30 ml/min. Valsalva manoeuvre with bladder vol. of 300 ml; cough in supine and erect positions	Sensitivity (%): SUI 52 (44, 61) Specificity: SUI 85 (76, 91)	PPV (%): SUI 85 (76, 91) NPV: SUI 53 (45, 61)	Funding: none declared. Calculations made by authors. Not stated whether ICS criteria used for UD diagnosis, although detrusor contractions > 15 cmH_2O regarded as abnormal.

Study	Study type and EL	No. of patients	Prevalence (UD diagnosis)	Patient characteristics	Type of test (clinical diagnosis)	Reference standard (urodynamics)	Sensitivity and specificity All values % (95% CI)	Positive and negative predictive value All values % (95% CI)	Additional comments
Hastie 1989[71]	DS EL = III	89	UD diagnosis: 93% 'stable', 7% 'unstable'	F referred to urology dept for assessment; main presenting complaint stress UI (61% SUI only, 28% SUI and frequency, 11% SUI with urgency)	Structured questionnaire for history; physical examination	Multichannel filling (50–100 ml/min) and voiding cystometry with subtracted detrusor pressure	Sensitivity (%): SUI 100 (93, 100)	PPV (%): SUI 61 (50, 70)	Funding: none declared. ICS criteria used for UD diagnosis. Retrospective analysis of data.
Videla 1998[72]	DS EL = III	74	UD diagnosis: 82% SUI*, 15% MUI, 1% DO, 1% normal	A retrospective review of women mean age 54 years (30–86) who satisfied 4 criteria for a clinical diagnosis of stress UI: SUI as the main presenting complaint, urine loss on cough stress test, residual vol. ≤ 50 ml, functional bladder capacity ≥ 400 ml on 24 h FVC	Clinical diagnosis based of SUI	Multichannel UD	Sensitivity (%): SUI 85 (75, 91)	PPV (%): SUI 82 (72, 89)	Funding: none declared. ICS criteria used for UD diagnosis. *calculated from data given.
Swift 1995[73]	DS EL = III	108	UD diagnosis: 44% SUI, 17% MUI, 9% DO, 31% other (sensory urge UI, urethral diverticula, interstitial cystitis, urethral syndrome)	F mean age 58 years with lower urinary tract symptoms	History and physical exam, catheterised urinalysis for culture and PVR urine	Observed urine loss with cough during multichannel UD	Sens* 91% Spec 100%	PPV 100% NPV 88%	Funding: none declared. Calculations made by authors. *all results for SUI with or without urge (SUI+MUI). ICS criteria used for UD diagnosis.
						Stress LPP	Sens 78% Spec 100%	PPV 100% NPV 84%	
						Cough stress test following negative cystometogram	Sens 77% Spec 100%	PPV 100% NPV 76%	
						Equalisation through cough UPP	Sens 49% Spec 98%	PPV 82% NPV 44%	

Pelvic floor muscle assessment

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Romanzi 1999[75]	Case series EL = 3	Assess reliability and reproducibility of a digital pelvic muscle rating scale*, from results of 2 raters (a general gynaecologist who had never used a PFM rating tool, and a subspecialist urogynaecologist who routinely used the tool) Assess test–retest reproducibility of EMG, and evaluate score correlation to EMG findings	57 (37 had second evaluation)	F, self-selecting volunteers; mean age 44 years (SD 14), 62% had urinary symptoms (37% SUI, 31% MUI, 45% UUI, 46% frequency, 49% urgency, 37% urinary flow problems)	Inter-rater results for PFM rating scale (Pearson correlation coefficients) Intra-rater results for PFM rating scale (for test–retest) EMG test–retest EMG vs PFM rating scale results	1st test $r = 0.79$, $P < 0.001$ Retest $r = 0.81$, $P < 0.001$ Gynaecologist: $r = 0.85$, $P < 0.001$ Urogynaecologist: $r = 0.84$, $P < 0.001$ $r = 0.86$, $P < 0.001$ 1st test: $r = 0.46$, $P = 0.002$ (gynaecologist), $r = 0.51$, $P < 0.001$ (urogynaecologist) Retest: $r = 0.45$, $P = 0.006$ and $r = 0.57$, $P < 0.001$	Funding: in part by BARD Inc. *4-point scale (0–3) that rates pressure (max. pressure from levator contraction), duration (length of time able to hold a maximal contraction), and displacement (caudal/anterior rotation of examining fingers by the contracting muscle beds); total score possible = 9. Clinicians alternated examination order; both performed the digital assessment blind to the result of the other. EMG: single-user vaginal surface EMG sensor. Retest done after 1–4 weeks. r = Pearson correlation coefficient.
Laycock 2001[76]	Case series EL = 3	To develop a digital technique to assess PFM*; to validate the technique and test for validity and reliability; to translate the assessment into an exercise-based regimen	20	F with UI	Test–retest agreement	Power: 9/20 exact, 10 differed by 0.5, 1 by 1 grade; $r = 0.93$, $P < 0.001$ Endurance: 14/20 exact, variation of 1 s in 6, and 1 in 1; $r = 0.99$, $P < 0.001$	Funding: none declared. *the PERFECT scheme; Power, Endurance, Repetitions, Fast, Every, Contraction, Timed. Power measured on a modified Oxford grading system (0–6, no to strong contraction, with + and – used to augment existing grades). Endurance measured as duration a voluntary contraction can be sustained before strength falls by ≥ 35% (muscle starts to fatigue); up to 10 s. Assessment done prior to cystometry, repeated after 2–5 weeks. r = Spearman's rank correlation coefficient
Bo 2001[77]	Case series EL = 3	Evaluate inter-rater reproducibility of the modified Oxford grading system for vaginal palpation, and to compare these results with vaginal squeeze pressure	20 (7 with symptoms of SUI)	F physical therapy students, mean age 25 years (21–38). 8 were exercising PFM 'now and then'; 1 exercising PFM 1–2×/week; 1 never; 8 tried once before; no data for	Inter-tester reproducibility of Oxford grading system*	Agreement for 9 of 20; in 10 the disagreement was 1 category, and 3 categories in 1 $r = 0.70$, $P < 0.01$ (Spearman's) Kappa score 0.37 (SEM 0.16)	Funding: none declared. Two experienced physiotherapists conducted the study. Palpation test done in random order; contraction classified qualitatively, then using the modified *Oxford grading system (0 = no contraction, 1 flicker, 2 weak, 3 moderate, 4 good, 5 strong). Test repeated after 5 min by second physiotherapist. After vaginal palpation, PFM strength measured by

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
				2 Exclusions: pelvic surgery, neurological or pelvic diseases	Mean muscle strength (cmH_2O) based on vaginal squeeze pressure vs Oxford grading results	Mean 17.5 (95% CI –6.4 to 41.3) for Oxford grade 'weak' (*n* = 3) Mean 17.9 (95% CI 14.2 to 21.5) for 'moderate' (*n* = 7) Mean 21.5 (95% CI 14.6 to 28.2) for 'good' (*n* = 8) Mean 22.6 (95% CI –42.8 to 88.1) for 'strong' (*n* = 2)	vaginal squeeze pressure using vaginal balloon, size 1.6×1.7 cm, connected to transducer. Middle of balloon located 3.5 cm inside introitus vagina. 6 maximal contractions performed. Overall mean maximal strength (mean of 6 maximal contractions) 19.7 (95% CI 16.5 to 22.9). *P* = NS for weak, moderate, good or strong muscle contractions when comparing results from vaginal squeeze pressure.
Jeyaseelan 2001[78]	Case series EL = 3	Determine inter-rater reliability for the modified Oxford grading system	30	F with 'varying types of incontinence' attending a hospital clinic for routine treatment appointment	Inter-rater agreement	Results presented in graph only. Clinicians 2 and 4 did not agree on any values; agreement improved after training. % agreement of clinicians 1, 2, 3 vs clinician 4 were 77.8, 80, 70 (after clinician 2 given training); underestimation 22.2, 10, 20; overestimation 0, 10, 10	Funding: University of Manchester Medical Bequest Fund. Clinicians 1,2,3 compared with clinician 4 (an expert in digital vaginal assessment).

Assessment of prolapse

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Swift 2003[79]	Cross-sectional EL = 3	Evaluate correlation of POP symptoms with the degree of pelvic organ support as defined by the POP-Q examination	497 (477 had complete data)	F mean age 44 years (18–82), undergoing gynaecological exam 4% stage 0 POP, 45% stage I, 48% stage II, 3% Stage III, 0 stage IV	No. of positive responses* per pt for questions re symptoms and bother of symptoms per stage of support	stage 0 (symptoms/bother): 0.27/0.19 stage I: 0.55/0.35 stage II: 0.86/0.56 stage III : 2.07/1.36 (*P* = NS for linear trend by stage)	Funding: none declared. F examined by physicians familiar with POP-Q system. POP-Q classification: stage 0 no prolapse; stage I leading edge of prolapse > 1 cm above hymen; stage II leading edge ≤ 1 cm proximal or distal to plane of hymen; stage

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
					No. of positive responses* per pt for questions re symptoms and bother of symptoms per leading edge of support	–3 cm (symptoms/bother): 0.27/0.19 –2 cm: 0.55/0.35 –1 cm: 0.87/0.57 0 (at hymen): 0.75/0.47 +1 cm: 1.40/1.11 +2 cm and +3 cm: 2.0/1.56 +4 to +7 cm: 2.2/1.8 (*P* = 0.005 for linear trend by leading edge)	III, leading edge > 1 cm below plane of hymen but protrudes no further than 2 cm less than the total vaginal length; stage IV essentially complete eversion of the total lower genital tract. *7-item questionnaire used to establish symptoms related to POP; sense of something falling out of vagina, ability to see/feel bulge, low back or groin pain after standing#, UI, anal incontinence, straining to defecate. Possible responses yes/no/sometimes. If yes or sometimes, also asked about bother factor. #low back/groin pain later excluded from analysis because was present in 48%, in similar proportions for all prolapse stages.
Samuelsson 1999[80]	Cross-sectional EL = 3	Investigate age-specific prevalence of POP among women 20–59 years and to study possible related factors	487	F mean age 39 years (20–60) scheduled for gynaecological health exam	POP prevalence	30.8% (5% [*n* = 8] of these had prolapse that reached introitus when straining)	Funding: none declared. Examination undertaken by midwives using standardised form designed for the study. POP = presence of uterine prolapse, cystocele, rectocele, absence of urethrovesical crease (alone or any combination).
					POP symptoms	Sense of heaviness in abdomen in women with POP vs no POP 9.7 vs 7.5%, *P* = NS Voiding difficulties 7.1 vs 3.9% (cystocele vs no cystocele grp), *P* = NS Difficulty emptying bowel 17.6 vs 12.8% (rectocele vs no rectocele), *P* = NS	
Bradley 2005[81]	Cross-sectional EL = 3	To measure associations between symptoms (individual and grouped) with anterior, posterior,	270	Postmenopausal women enrolled at one site of the Women's Health Initiative clinical trial completed a questionnaire modified	Prolapse stage (POP-Q)	2.2% stage 0 33.3% stage I 62.6% stage II 1.9% stage III 0 stage IV	Funding: National Center for Research Resources and National Institute of Child Health and Human Development. POP-Q exam performed by 2 experienced urogynae nurses. Points Ba and Bp used to

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		uterine, and maximum vaginal descensus in older women; and determine presence or absence of specific symptoms in care-seeking women Symptoms gathered from modified Pelvic Floor Distress Inventory questionnaire		from the Pelvic Floor Distress Inventory on pelvic floor symptoms and underwent a Pelvic Organ Prolapse Quantification (POP-Q) examination. Mean age 68 years (57–84), mean BMI 30 (range 16–48). 3% prior surgery for UI or prolapse. 12% currently treated for a pelvic floor disorder, usually with pelvic muscle exercises Exclusions: women without intact uterus	Symptoms reported	Median 4 (0–19) from possible 30 'At least 25%' reported: stress UI (53%) urge UI (49%) frequency (29%) urgency (29%) intermittent urinary stream (26%) straining for bowel movements (25%) sense of incomplete bowel movements (35%) involuntary loss of gas (35%)	represent anterior and posterior vaginal descensus, respectively. Few patients had POP-Q points less than –2 or greater than +1 so categorical prolapse variables were created, giving 4 levels for anterior prolapse (Ba ≤ –2, –1, 0 and ≥ +1 cm from hymen); and 3 levels for posterior prolapse (Bp ≤ –2, –1, and ≥ 0 cm). *dichotomous definition for prolapse; present when POP-Q point of interest (Ba, Bp, or maximal point of descensus) was measured at or past the hymen (≥ 0 cm).
					Association of symptoms with prolapse*	For anterior prolapse: changing position to urinate and seeing/feeling a bulge, $P \leq 0.01$ For posterior prolapse, incomplete bladder emptying, weak stream and intermittent stream, $P \leq 0.01$ For apical prolapse difficulty emptying bladder and seeing/feeling bulge, $P \leq 0.01$ 'See or feel a bulge' was reported by 11 women (4%), and all had maximal point of prolapse at hymen or beyond; 57 (21%) with this level of descensus on exam did not report this symptom	Median symptoms scores were compared in women with varying levels of vaginal descensus. Results were re-examined after adjusting for age, and coffee drinking using multiple logistic regression models.

Urine testing

Study	Study type and EL	No. of patients	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity	Positive and negative predictive value	Additional comments
Buchsbaum 2004[82]	DS EL = II	265	F with UI, attending a university urogynaecology clinic Excluded: ≥ 2 UTIs within 12 months, dysuria or frequency with no UI, haematuria (frank or microscopic)	Urine reagent strips* (Chemstrip)	Urine culture (urine collected by catheterisation for post-void residual immediately after voiding; or by clean catch technique if PVR provided insufficient vol.)	Sensitivity 29% Specificity 99%	PPV 82% NPV 92%	Funding: no extramural financial support. *observed for 2 min; considered positive if leucocytes and/or nitrites present. Culture kept for 20 h before considered negative; results positive if > 10000 of a single organism present on a urine specimen obtained by single catheterisation. No info on whether comparison was blind

Impact of treating UTI on UI

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Ouslander 1995[83]	Cohort study (though pts randomised to immediate or delayed tx, the comparisons were for pts with or without bacteriuria) EL = 2+	191 (71% F) 10 (5%) excluded as misclassified as having bacteriuria 90 overall had bacteriuria and were randomised to tx; 2 dropped out	M/F nursing home residents with chronic UI and bacteriuria* (incontinent on a regular basis, defined as several times per week or several times per day) Exclusions: daytime UI not documented by random wet checks; permanent	Pts treated for bacteriuria: Immediate tx with norfloxacin 400 mg b.d. for 7 days; *n* = ** Delayed tx (2–3 weeks after immediate	Pts without bacteriuria, receiving no treatment (*n* = 88)	3 days assessment after antibiotic treatment	Eradication of bacteriuria in treated grp Incontinence (% wet checks that were wet); change from baseline	81% (of all 88 pts treated, whether immediate or delayed tx) Pts with bacteriuria at baseline (*n* = 88) Change from 34% (95% CI 30% to 38%) to 35% (95% CI 31% to 39%) Pts without bacteriuria at baseline (*n* = 88) Change from 29% (95% CI 26% to 32%) to 30% (95% CI 27% to 34%)	Funding: none declared. *cultured specimens that grew > 50000 colony forming units were considered to have significant growth. If significant growth of ≥ 1 urinary pathogens occurred on a second specimen, the patient was considered to be bacteriuric. Wet checks done hourly from 7 am to 7 pm; total = 33. During these hours pts wore disposable briefs or pads. Vol. > 5 ml or pad

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		owing to illness (3 from non-bacteriuric grp withdrew owing to illness)	indwelling bladder catheter; failed a cognitive status screening test;severe behavioural disturbance during wet-checking procedures; poor prognosis; care reimbursed by Medicare	grp); *n* = ** Total *n* = 88			% pts with ≥ 33% reduction in incontinence frequency (wet checks)	Pts with bacteriuria vs those without: 16% vs 19%, *P* = NS	weight > 5 g considered wet. Fewer checks done in practice owing to meal time, etc. Wet episode = volume > 5 ml or increase in pad weight of > 5 g. **because of no sig. differences between variables between the immediate tx and delayed tx groups, the data were presented for the bacteriuric grp as a whole.

Assessment of residual urine

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity	Positive and negative predictive value	Additional comments
Ding 199684	DS EL = 1 b	46 (74% women)	59% had PVR > 100 ml and 37% had PVR > 200 ml	M/F age range 40–95 years, inpatients of geriatric hospital dept or outpatients attending continence clinic	Portable bladder ultrasound	Catheterisation (12 Fr catheter)	If PVR > 100 ml regarded as positive: Sens 90% Spec 88% If PVR > 200 ml regarded as positive: Sens 92% Spec 83%	If PVR > 100 ml regarded as positive: PPV 91% NPV 86% If PVR > 200 ml regarded as positive: PPV 76% NPV 95%	Funding: none declared; Advanced Medical Systems provided Bladder Scan BVI-2500 for duration of study. Bladder Scan BVI-2500 used. Blind assessment made. PVR ranged from 5 to 1150 ml. R = 0.96 for comparison of catheter and ultrasound volumes Setting: hospital geriatric medicine dept.

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity	Positive and negative predictive value	Additional comments
Goode 200085	DS EL = II	95	–	F mean age 67 (32–92) community-dwelling seeking assistance owing to UI	Portable bladder ultrasound	Catheterisation (12 Fr catheter)	Sens* 67% Spec 97%	Unable to calculate from data	Funding: none declared. Bladder Scan BVI-2500 used. No info on whether comparison was blind. *PVR urine vol. > 100 ml regarded as 'positive. Other findings: mean PVR by US 49 ml (SD 50) vs 32 ml (SD 42) by catheterisation; post-catheterisation US mean vol. 22 ml (SD 25), added to PVR by catheterisation was not sig. different to PVR by US. Setting: hospital outpatient dept.
Ouslander 199486	DS EL = 1 b	201 (74% F); 186 had both tests	–	M/F mean age 85 years (SD 8), nursing home residents	Portable bladder ultrasound	Catheterisation (14 Fr)	If PVR < 50 ml regarded as positive (n = 70): Sens 90% Spec 71% For PVR < 100 ml (n = 118): Sens 95% Spec 63% For PVR > 100 ml (n = 68): Sens 63% Spec 95% For PVR > 150 ml (n = 37): Sens 59% spec 97% For PVR > 200 ml (n = 26): Sens 69% Spec 99%	Unable to calculate from data	Funding: National Institute on Aging. Bladder Scan BVI-2000 used in 140 and BVI-2500 in 61 (owing to availability of BVI-2500 device during the study). Test–retest reliability reported: r = 0.98 for 1 observer (187 pairs), and r = 0.97 for second observer (143 pairs)

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity	Positive and negative predictive value	Additional comments
Nygaard 199687	DS EL = Ib	47	–	F mean age 61 years (27–86) presenting for UI evaluation	Bimanual exam	Catheterisation (12 Fr catheter)	Sens* 14% Spec 67%	PPV 7% NPV 82%	Funding: none declared. *PVR urine vol. > 50 ml regarded as 'positive'. Setting: secondary care.

Symptom scoring and QOL assessment

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Avery 2004[90]	Case series EL = 3	Report on development and evaluation of the ICIQ	144 (84% F)	ICIQ tested in several samples (men and women), in clinics and in the community, age range 20–101 years. Test–retest reliability measured in pts from the clinic sample who repeated the questionnaire within ~2 weeks; mean age 58 years (25–91)	Agreement between test–retest responses for the 9 symptom items*	Frequency of leakage*: 92%, *k* = 0.73, 3.1–3.5, 3.0–3.5 Frequency of leakage – bother: 89%, *k* = 0.68, 6.1–7.1, 5.6–6.7 Frequency of protection use: 96%, *k* = 0.9, 1.6–2.0, 1.7–2.1 Usual amount of leakage: 92%, *k* = 0.71, 1.4–1.7, 1.4–1.6 Worst amount of leakage: 90%, *k* = 0.67, 1.7–2.0, 1.7–2.0 Interference with everyday life: 90%, *k* = 0.74, 5.3–6.4, 5.2–6.2 Interference with social life: 88%, *k* = 0.7, 4.4–5.6, 4.4–5.5 Interference with sex life: 89%, *k* = 0.75, 3.0–4.7, 2.8–4.5 Overall QOL: 85%, *k* = 0.58, 5.0–6.1, 5.0–6.0 *P* < 0.001 for all items	Funding: none declared. *crude agreement (%), kappa value, 95% CI for test and retest

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Jackson 1996[91]	Case series EL = 3	Develop a questionnaire that is sensitive to changes in symptoms of the female urinary tract especially UI (= BFLUTS)	85 (test–retest reliability in 50)	F mean age 51 years (24–80) attending hospital for UD assessment	Test–retest reliability*	Kappas for each symptom question ranged from 0.32 to 0.82 78% of questions had identical answer on both occasions, and 97% within one category; no response changed by more than 2 categories Correlation for symptom score between tests: $r = 0.86$, $P < 0.001$ (95% CI 0.76 to 0.93), and for the problem score $r = 0.90$, $P < 0.001$, (95% CI 0.79 to 0.96)	Funding: none declared. *retest in 2 weeks, analysed using chi-square test, kappa statistic, and Spearman's correlation coefficient.
Kulseng-Hanssen 2003[92]	Case series EL = 3	Design and validate a short questionnaire (the SUIQQ) to assess severity of symptoms and QOL in women with stress and mixed UI	65 (59 completed both questionnaires)	F with stress or mixed UI	Differences in mean results from test–retest	None sig. different from zero difference (results presented in a graph, some data in text) Cronbach's alpha: 0.75 stress incontinence 0.77 urge incontinence 0.72 QOL	Funding: none declared. Stress incontinence index composed of 3 items (activities that cause UI, how often SUI experienced). Urge incontinence index composed of 2 questions (frequency and extent of UUI). Questionnaires completed at home, mean interval 22 days (SD 14).
Patrick 1999[93]	Case series EL = 3	Report results of further development of I-QOL	288	F aged 18–76+ years with UI (49% stress, 51% mixed), participating in an RCT evaluating duloxetine for UI tx	Test–retest reliability (Cronbach's alpha)	I-QOL summary score: alpha = 0.95 For each subscale: behaviour alpha = 0.87, psychosocial impacts alpha = 0.93, social embarrassment alpha = 0.91 [test–retest scores not quoted]	Funding: Eli Lilly and Co. Retest measured after 2 weeks, during the placebo run-in period. Cronbach's alpha measure of > 0.7 considered reliable.
Wagner 1996[94]	Case series EL = 3	Develop a self-report QOL measure specific to UI (I-QOL) that could be used as an outcome measure in clinical trials and in patient care centres	62 (of whom 60 provided test–retest data)	M/F (68% F) with UI who were interviewed about their condition* Mean age 64 years (SD 14) 25% had mild UI, 28% moderate, and 39% severe	Test–retest reliability	Intraclass correlation coefficient $r = 0.93$ No numerical data	Funding: Eli Lilly and Co. *the 'I-QOL' questionnaire was developed from interviews of 20 individuals with urinary incontinence. Refining the questionnaire was accomplished by structured interviews of 17 individuals with urinary incontinence. Test–retest interval mean 18 days (SD 4)

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Bushnell 2005[95]	Case series EL = 3	To report the psychometric performance of 15 different language versions of the Incontinence Quality of Life (I-QOL) measure	1901	F aged > 18 years treated with duloxetine in 1 of 4 RCTs across 15 countries	Test–retest data (intraclass correlation coefficient results)	Range: 0.72–0.91 for the total score, median 0.87	Funding: none declared. Test–retest reliability was assessed across the 2 week interval between randomisation visit and baseline from the trials (or from baseline to the 2 or 3 week visit in 2 countries). The intraclass correlation coefficient was used, with 0.7 considered to be the recommended level for grp comparisons.
Stothers 2004[96]	Case series EL = 3	Determine the reliability and further validate the SEAPI-QMM quality of life index	315 (68% F) +35 controls (71% F)	M/F mean age 63 years (18–92) with UI Controls: referred to clinic for evaluation of urological disease unrelated to UI	Test–retest reliability	Cronbach's alpha correlation for domains: 0.88 social interaction, 0.81 personal strain, 0.73 for global health and QOL (Item-specific correlation ranged from 0.4 to 0.72)	Funding: none declared. Questionnaire self-administered by pts in a clinic 5 days apart. Controls scored 0 on both test and retest. Scores for UI pts not reported.
Kelleher 1997[97]	Case series EL = 3	Assess KHQ for validity and reliability	293 (97% completed questions correctly) 110 completed test–retest	F mean age 51 years (17–85), referred to tertiary urogynae centre for UD investigation UD diagnosis: 48% stress UI, 29% DO, 4% mixed UI, 10% low compliance, 4% sensory urgency, 5% normal UD	Limitations domain of KHQ (role, physical, social, personal	Test–retest values, *r*: Role: 35.89/37.84 (r = 0.94) Physical: 42.79/44.29 (r = 0.96) Social: 20.32/22.87 (r = 0.80) Personal*: 10.51/12.61 (r = 0.87) Cronbach's alpha: 0.785, 0.725, 0.758 and 0.892, repectively	Funding: none declared. Questionnaire completed at home prior to UD, repeated at UD clinic (n = 110) after mean 9.2 days (2–16). Reliability assessed by its internal consistency (Cronbach's alpha statistic where ≥ 0.7 considered acceptable). Test–retest reliability measured by Spearman's correlation coefficient. Retest values tended to be higher than test but differences 'not statistically significant'. *58% and 51% scored 0 on this q on test–retest.
					Emotional problems	37.34/39.16 (r = 0.92) Cronbach's alpha: 0.876	
					Sleep/energy disturbance	46.40/48.10 (r = 0.88) Cronbach's alpha: 0.784	
					Severity measures	44.44/47.0 (r = 0.94) Cronbach's alpha: 0.778	
Hagen 2002[98]	Case series EL = 3	Test–retest reliability; concurrent and construct validity; sensitivity to	237	3 groups of women with UI: (1) community-dwelling with stable, unspecified UI; mean age 76 years (n = 79)	Test–retest reliability of UDI*	Mean change in score –6.1 (95% CI –11.0, –1.5, P = 0.01) Kappa score for each q ranged from 0.699 to 0.350 (1 q: pain on urinating kappa score < 0.04)	Funding: none declared. Questionnaires designed to be self-completed; 33% needed a nurse to read the questions and note responses. Test–retest done median 3 days apart (IQR 3–

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		change of UDI and IIQ		(2) F attending outpatient clinic for UI assessment; stress, mixed or urge UI, mean age 60 years (*n* = 75) (3) F on waiting list for colposuspension, mean age 50 years (*n* = 83)	Test–retest reliability of IIQ*	Mean change in score –9.7 (95% CI –15.5, –3.9, *P* = 0.001) Kappa score for each q ranged from 0.732 to 0.381 (2 questions: effect of leakage on entertainment activities, or on having friends visit at home kappa score < 0.04)	7). *Assessed using paired *t* tests and kappa statistics (kappa score < 0.4 indicating poor agreement). Kappa score of 1 indicates absolute agreement.
Wyman 1987[99]	Case series EL = 3	Analyse psychosocial impact of UI in women (IIQ); examine relationship between psychosocial impact and UD diagnosis; investigate relationship between psychosocial impact and objective measurement of UI severity	69	F, community-dwelling recruited to participate in clinical study of behavioural management; ≥ 55 years (mean 68), capable of independent toileting, ≥ 1 leakage episode/week, UD diagnosis of SUI (68%) or DO with/without SUI (32%)	Test–retest reliability of IIQ*	No numerical data reported *r* = 0.73, *P* = 0.0001 at 1 week *r* = 0.65, *P* = 0.001 at 6 weeks	Funding: none declared. UDI and IIQ questionnaires completed after clinical evaluation and prior to randomisation. *Pearson's correlation coefficient.

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Stach-Lempinen 2001[100]	Case series EL = 3	Psychometric assessment of the Urinary Incontinence Severity Score (UISS) and Visual Analogue Scale (VAS) in urinary incontinent women	82 and 29 control grp (overall 51 provided test–retest data)	F, with UI recruited for a study that included baseline investigation and re-evaluation 13 months (range 6–21 months) after treatment. 67% genuine stress UI, 13% mixed, 16% urge UI, 4% normal UD and no UI symptoms Control grp: F mean age 55 (44–68) with urinary leakage but did not require medical intervention Exclusions: diabetic neuropathy, recently diagnosed cancer, neurogenic UI, continence surgery within 5 years	Test–retest reliability (Spearman's rank correlation)	$r = 0.88$, $P < 0.001$ No test–retest scores reported	Funding: Emil Aaltonen Foundation, and grant from Medical Research Fund of Tampere University Hospital. Retest done after ~1 week (when awaiting post-treatment visits). 29 control women who had UI but were not bothered by it completed the HRQoL measurements.
Matza 2005[101]	Case series EL = 3	Evaluate test–retest reliability of 4 patient-reported outcome instruments designed for use with OAB pts (OAB-q; Urgency questionnaire; Primary OAB symptom questionnaire; Patient perception of bladder condition)	47 (75% F)	M/F mean age 66 years, from 5 urology clinics; clinical diagnosis of OAB	Difference in test–retest score, and agreement for OAB-q* items	Symptom bother: 5.8 ($P = 0.01$), $r = 0.83$ Coping: 2.4 (P = NS), $r = 0.93$ Concern: 4.1 (P = NS), $r = 0.85$ Sleep: 0.8 (P = NS), $r = 0.94$ Social interaction: 2.1 (P = NS), $r = 0.80$ HRQOL total score: 2.1 (P = NS), $r = 0.92$ ($P < 0.001$ for all r values)	Funding: Pfizer Inc. Retest after 2 weeks. *Spearman's correlation coefficient.

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Hanley 2001[102]	Case series EL = 3	Evaluate reliability, validity, and sensitivity to change of the severity index in a wide range of women in Scotland	237	F, from 3 'groups'; community-dwelling with stable incontinence; F undergoing initial assessment and non-surgical tx at a continence clinic; F awaiting surgical tx for stress UI (colposuspension)	Kappa scores for each question*	For Q1 (frequency of leakage): $k = 0.69$ For Q2 (quantity of leakage): $k = 0.83$ $P < 0.001$ for both [Severity index scores on test–retest not reported]	Funding: none declared. *Severity index derived by multiplying the frequency by the amount of leakage; this gives an index of 1–8 (1–2 = slight, 3–4 moderate, 6–8 severe)[10] Revised index splits severe in 2 categories; this index given to women 3 days apart.
Radley 2006[937]	Case series EL = 3	Develop and evaluate a new web-based, electronic pelvic floor symptoms assessment questionnaire	126 (62% of 204 whom completed the first questionnaire)*	A cross-section of F attending primary care (two general practices, and two community health clinics, who were recruited without knowledge of any pre-existing pelvic disorders). Mean age 53 years (SD 13) (A further 228 F attending a urogynaecology clinic were also included in this study, but retest was not undertaken in this group because they were typically offered interventions after their clinic visit)	Intraclass correlation coefficient	Significant correlation reported within all domains Urinary (intraclass correlation coefficient range 0.73–0.90) Bowel (range 0.80–0.88) Vaginal (range 0.70–0.91) Sexual (range 0.50–0.95)	Funding: grants from University of Sheffield (medical division devolved funding), and Jessop Wing small grants scheme. Retest after 7 days for F in primary care; F also asked whether there had been any change in their health since the original test; retest only undertaken in F who reported 'no change at all'. *reasons for no retest in 38% were not given.

Bladder diaries

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Larsson 1992[103]	Case-series EL = 3	To compare the findings of frequency–volume charts in women with genuine stress UI vs women without lower urinary tract symptoms (some reproducibility data of chart also reported for women with SUI)	80 (women with genuine stress UI)	F mean age 47 years (31–69)	Limits of agreement for differences* for FVC parameters (day 1, day 2)	Total voided volume 0.53–1.89 Frequency 0.60–1.67 Mean voided volume 0.56–1.79 Largest single voided volume 0.47- 2.13	Funding: none declared. *i.e. 2 SDs; for every 95% of cases, the second measurement lies between the quoted multiple of the first.
Groutz 2000[104]	Case series EL = 3	Test–retest reliability of 72 h voiding diary and pad test, and compare test–retest reliability of 24, 48, and 72 h tests. Tests repeated after 1 week	106 (84% women)	M/F 22–84 years referred for evaluation of lower urinary tract symptoms; 34% urge UI symptoms, 22% stress UI, 26% mixed UI, 16% frequency-urgency syndrome (no UI) Exclusions: UTI, drugs affecting voiding, restricted mobility, grade 3–4 prolapse, daily urine output > 2500 ml, nocturnal output > 35% total output	Voiding diary (mean/72 h, 1st and 2nd diary results)	frequency (overall): 31.5 ± 11.8; 30.7 ± 10.9 (CCC 0.826) day frequency: 26.9 ± 10.3; 26.2 ± 10.3 (CCC 0.797) night frequency: 4.6 ± 3.8; 4.5 ± 4.3 (CCC 0.605) leakage episodes: 7.6 ± 9.0; 7.7 ± 9.8 (CCC 0.860) urgency episodes: 8.0 ± 11.0; 6.6 ± 10.0 (CCC 0.702) voided vol. (ml): 1820 ± 1013; 1849 ± 961 (CCC 0.872)	Funding: Zeneca Pharmaceuticals; Institute for Bladder and Prostate Research. CCC = Lin's concordance correlation coefficient. 0.7 taken as 'minimum test–retest reliability. Compliance with 72 h tests: 97% across all diary parameters; voided volume compliance 92% at 24 h, 76% at 72 h; pad test 96% at 24 h, 90% at 72 h. CCC, but not test results, also reported for 24 and 48 h: frequency (overall): days 1, 2, 3: 0.673, 0.704, 0.690 days 1–2, 2–3: 0.781, 0.770 leakage episodes: days 1, 2, 3: 0.810, 0.758, 0.787 days 1–2, 2–3: 0.839, 0.827 urgency episodes: days 1, 2, 3: 0.577, 0.698, 0.633 days 1–2, 2–3: 0.688, 0.709 No. pads: days 1, 2, 3: 0.737, 0.726, 0.729 days 1–2, 2–3: 0.856, 0.828 Pad weight gain (g): days 1, 2, 3: 0.721, 0.889, 0.890 days 1–2, 2–3: 0.877, 0.946
					Pad test (mean/72 h, 1st and 2nd test results)	No. pads: 6.86 ± 3.98; 6.87 ± 4.11 (CCC 0.875) Weight gain (g): 172.4 ± 317.0; 159.7 ± 316 (CCC 0.935)	

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Nygaard 2000[105]	Case series EL = 3	Assess reproducibility of leakage episode and frequency data from a 7 day diary; test repeated after 4 weeks	138	F 27–78 years, stress UI, who were enrolled in a study evaluating the FemSoft device.	Frequency (mean /24 h, 1st and 2nd diary results)	7.99 ± 2.76 (1st diary), 8.02 ± 3.05 (2nd diary); difference 0.03; correlation coefficient 0.831	Funding: Rochester Medical Inc. *data from 1 outlier not used. Correlation coefficients for first 3 and last 4 days of the 7 day diary: 0.887 for leakage episodes, and 0.908 for frequency (results shown in graphs only).
					Leakage episodes/week* (mean, 1st and 2nd diary results)	20.8 ± 17.8 (1st), 19.1 ± 17.9 (2nd); difference 1.7; correlation coefficient 0.906	
Wyman 1988[106]	Case series EL = 3	(1) Test–retest variability and correlations of frequency and leakage episodes based on a 7 day diary; (2) assess effect of urodynamic diagnosis on test–retest analysis; (3) investigate relationship between history and diary*	50	F 55–86 years recruited to a trial of behavioural therapy. ≥ 1 leakage episode/week. Urodynamic stress UI 68%, DO ± stress UI 32% Exclusions: permanent catheterisation, persistent UTI, reversible causes of UI	Diurnal frequency (mean/week)	Diary test; retest: SUI: 61.0 ± 21.7; 58.2 ± 20.9, r = 0.92 DO: 59.7 ± 16.9; 62.9 ± 17.7, r = 0.85 r = 0.89 for total grp, P < 0.0001	Funding: National Institute on Aging, National Center for Nursing Research, National Institutes of Health. Test–retest reliability reported by urodynamic diagnostic group. Diary kept for 2 consecutive weeks. R = Pearson's correlation coefficient; P value from paired t tests. No statistical differences found between test–retest results or correlations when assessed by urodynamic diagnostic group. *not relevant to the UI guideline questions therefore results not reproduced here.
					Nocturnal frequency (mean/week)	Diary test; retest: SUI: 8.1 ± 5.8; 7.7 ± 5.6, r = 0.92 DO: 9.6 ± 4.9; 9.4 ± 4.7, r = 0.65 r = 0.86 for total grp, P < 0.0001	
					Leakage episodes (mean/week)	Diary test; retest: SUI: 20.4 ± 21.6; 19.9 ± 23.1, r = 0.92 DO: 12.6 ± 13.0; 12.4 ± 11.4, r = 0.89 r = 0.91 for total grp, P < 0.0001	

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Locher 2001[107]	Case series EL = 3	Investigate reliability of a 14 day diary for assessing frequency of leakage episodes and to determine the number of consecutive days needed to obtain adequate internal consistency	214	F, community-dwelling enrolled in 1 of 2 RCTs investigating behavioural treatment; leakage episodes ≥ 2× week. In 1 study (*n* = 138), mean age 66 years (55–90); 71% urge UI, 29% mixed UI; 23% 2–5 leakage episodes/week, 29% 5–10, 49% > 10. In 2nd study (*n* = 78), mean age 60 years (40–73); 53% stress UI, 47% mixed UI; 26% 2–5 episodes/week, 26% 5–10, 48% > 10	Women with predominant urge UI	Mean leakage episodes/day (14 day diary): 2.2 Leakage days 1–3 sig. higher than 14 day mean; days 7,8,9,11 sig. less than mean Mean week 1: 2.4, week 2: 2.0, *P* < 0.0001 Correlation between weeks 1 and 2: *r* = 0.93, *P* < 0.0001 Internal consistency*: > 0.9 (0.924) after 5 days	Funding: National Institutes on Aging; National Institute of Diabetes and Digestive and Kidney diseases. Urge or stress UI indicates urodynamic diagnosis. *Cronbach's alpha measure of internal consistency as a function of days; 0.90 considered adequate internal consistency for reports of leakage episodes.
					Women with predominant stress UI	Mean leakage episodes/day (14 day diary): 2.1 Leakage day 1 sig. higher than 14 day mean; days 5, 10 sig. lower than mean Mean week 1: 2.2, week 2:2.1, *P* = NS Correlation between weeks 1 and 2: *r* = 0.86, *P* < 0.0001 Internal consistency*: > 0.9 (0.912) after 7 days	

Pad testing

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Fantl 1987[114]	Case series EL = 3	Reproducibility of standardised pad test in ambulatory, community-dwelling women	67	F referred for evaluation of UI. Urodynamic diagnosis stress UI (*n* = 46), DO ± SUI (*n* = 21); mean age 48 ± 11.5 years (SUI), 57 ± 9.9 years (DO ± SUI)	Test–retest differences in urine loss (mean, g)	SUI: 9.1 (SD 21.0) *P* < 0.01; *r* = 0.97 DO ± SUI: 12.1 (SD 35.0), *P* = NS; *r* = 0.84	Funding: National Institutes of Health, National Institute on Aging, National Center on Nursing Research. Bladder filled to capacity with normal saline, exercise involved 50 yard walk, climbing a step, coughing, a heel-bounce, sitting/standing, and hands under running water; total duration 10–15 min.
					Test–retest differences in filing vol. (mean, ml)	SUI: 17.8 (SD 42.3), *P* < 0.01; *r* = 0.86 DO ± SUI: 31.4 (SD 55.0), *P* < 0.02, *r* = 0.82	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
					Test–retest differences in Urine loss/filling vol. (%)	SUI: 2.4 (SD 6.0), $P < 0.02$; $r = 0.98$ DO ± SUI: 0.8 (SD 13.7), P = NS; $r = 0.90$	Retest followed immediately. R = Pearson's correlation coefficient; P values from t test
Simons 2001[109]	Case series EL = 3	Test–retest reliability of standardised (ICS) 1 h pad test when bladder volumes attained by natural diuresis	56	F median age 56 years (IQR 44.5–66) presenting with UI	Test–retest differences in urine loss (mean, g)	9.7 (SD 29.7), 95% CI –66,+46* $P = 0.017$ for difference (from median 4 [0.5–15] to 16 [4–31.5])	Funding: none declared. Serial ultrasound measurements of the 2nd test performed in an attempt to duplicate the natural fill bladder volumes. Retest done in 3–10 days. Correlation test used not stated. *excluding one outlier gave mean difference 4.1 g SD 19.5 (95% CI –43,+34).
					Bladder volume at 1st and 2nd test (median, ml)	433 (IQR 331–568); 541 (IQR 377–603) $P < 0.001$ for difference	
Kinn 1987[108]	Case series EL = 3	Determine whether a fixed bladder vol. during physical exercise can improve accuracy of a 1 h pad test; and feasibility of performing test as part of routine urodynamic evaluation	33	F mean age 56 years (38–83), stress UI (mixed in 24%)	Urinary leakage during test and retest	No numerical data presented; leakage greater during retest (as seen on graph) Sig. correlation reported between test and retest, $P < 0.001$, $r = 0.74$	Funding: none declared. Retest done on same day, same investigator. Correlation test used not stated. Pad tests done as part of cystometry. Cystometry done using two-channel 12 Ch soft catheter, perineal pad applied with bladder vol. 75% of max. bladder capacity. Exercises undertaken during pad test took 12–15 min).
Devreese 1996[115]	Case series EL = 3	Reliability and sensitivity of 'modified' 1 h pad test (more fluid consumed prior to test; 1 litre within 15 min followed by 0.5 litre in 1 h)	16 (of 25 enrolled)	F mean age 47 years (25–71) referred to physio dept for PFMT owing to UI	Test–retest differences	Mean urine loss 12 vs 10 g: $r = 0.73$* ($P < 0.001$) Mean end vol.: 554 vs 648 ml, $P < 0.05$ for difference: $r = 0.67$* ($P < 0.01$)	Funding: none declared. 14 exercises undertaken during pad test. Retest in 1–7 days. *Spearman rank correlation coefficient.

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Lose 1988[116]	Case series EL = 3	Reproducibility of modified 1 h pad test (as ICS except saline ≡ 50% of cystometric bladder capacity instilled into the bladder at the start of the test rather than drinking 500 ml liquid)	25	F mean age 53 years (40–79) referred for stress (*n* = 18) or mixed UI (*n* = 7) Exclusions: DO	Test–retest differences in urine loss	Mean test–retest differences up to 24 g *r* = 0.97, *P* < 0.001 (results shown in graph only)	Funding: none declared. Retest interval ranged from 1 to 85 days. Correlation test used not stated. Test duration 45 min. Median instilled vol. 193 ml (59–461) 14 exercises undertaken as part of the test.
Lose 1986[110] Jorgensen 1987[111]	Case series EL = 3	Reproducibility of 1 h pad test (as ICS)	18	F mean age 49 years (27–82) referred for stress (*n* = 13) or mixed (*n* = 5) UI Exclusions: DO	Test–retest differences in urine loss	Median 4 g (range 0–172) Mean 23 g *r* = 0.68,* *P* < 0.01	Funding: none declared. Range of differences in initial bladder vol. 0–354 ml; and in diuresis 4–464 ml. Retest in 1–15 days. Correlation test used not stated. *if initial bladder vol. and diuresis taken into account, *r* = 0.96, *P* < 0.001.
Klarskov 1984[112]	Case series EL = 3	Reliability and reproducibility of the 1 h pad test	50 (78% women); only 19 performed test retest	M/F median age 52 years (17–75), stress, urge or mixed UI Exclusions: menstruating women	Test–retest differences in urine loss (*n* = 19)	*r* = 0.96 (numerical data for g difference not given)	Funding: none declared. Test interval 1–36 days. Correlation test used not stated. ICS standardised 1 h pad test used.
					Urine loss as % bladder vol. for test–retest (*n* = 15)	*r* = 0.80 (numerical data for difference not given)	
Christensen 1986[113]	Case series EL = 3	To evaluate inter- and intra-departmental reproducibility of the 1 h pad test	20	F median age 54 years (31–81); 5 stress UI, 11 mixed UI, 4 urge UI	Test–retest correlation (within 1 dept)	Median weight gain: Test 24 g (0–199) Retest 21 (0.185), *P* = NS between tests *r* = 0.77, *P* < 0.05	Funding: none declared. ICS standardised 1 h pad test used. Retest done after 1 week. Correlation test used not stated. Differences in inter-departmental results were significant, *P* < 0.05.

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Rasmussen 1994[117]	Case series EL = 3	Evaluate the possible influence of high vs low fluid intake/level of activity on the results of a 24 h pad test. Also includes reproducibility data for 'normal ' days	13	F median age 54 years (43–75); 10 stress UI, 13 mixed UI	Test–retest differences in urine loss	Mean 5 g, *P* = NS Retest leakage 28% to 365% of first test	Funding: none declared. Retest done on following day. Linear regression analysis.
Lose 1989[118]	Case series EL = 3	To establish the normal range for the 24 h pad test; assess reproducibility of the test; determine whether 24 h test more sensitive than a 1 h test, in patients with mild UI	31	F mean age 57 years (20–79) referred owing to UI (23 stress UI, 8 urge UI) Exclusions: DO and/or severe urine loss (≥ 10 g at the 1 h pad test)	Median weight gain (for all 24 h tests) Test–retest correlation for 24 h test*	17 g (range 2–438) *r* = 0.82, *P* < 0.001	Funding: Molnlycke Hospital Products Denmark supplied pads and plastic bags. Methods, definitions and units conform to ICS standards. Test–retest done consecutively. 23 asymptomatic women acted as controls. Pad weight gain in this grp: Urine loss in this grp on 24 h pad test median: *test–retest differences shown in graph only. Correlation test used not stated.
Karantanis 2005[119]	Case series EL = 3	To determine whether pad test leakage would be greater on active days, and whether test repeatability would be improved by a particular level of activity	108 (104 of whom completed 7 pad tests)	F median age 57 years attending a tertiary urogynae unit with UI. Urodynamic finding: 65% stress UI, 29% mixed UI, 6% DO and 'others' (sensory urgency, voiding difficulty, or a mixture thereof) F undertook 7 consecutive 24 h pad tests at home	Mean pad weight for 7 days Deviation from severity grading No. pads needed to obtain same degree of repeatability as 7 tests*	44.2 g (95% CI 38.5 to 49.9) SD between women 78.9 g SD within women 32.0 g Incomplete information (data show in graphs but incomplete numerical data) Pearson's correlation coefficient between first 24 h and 7 days = 0.881, *P* = 0.000 Authors claimed that 3 days was the 'optimal number of pad-test days required to approach the repeatability seen in 7 days'; data shown in graph, no numerical data given	Funding: none declared. Analysis of data from activity charts not possible owing to poor patient compliance (only 77% were completed). *r* = Pearsons's correlation coefficient. *optimal considered to be where correlation coefficient 'began to level' (gradient < 45°).

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Victor 1987[120]	Case series EL = 3	To evaluate 48 h pad test	46 (15 did retest)	F mean age 50 years (21–73) scheduled for surgery or further investigation for UI	Test–retest correlation for total leakage (24 h)	$r = 0.66$, $P < 0.001$	Funding: grants from LIC Hygien, Sweden. Test repeated after 6–28 days. Correlation test used not stated. In 46 who had 48 h pad test, the leakage ranged from 3.5 g to 267 g. 17 F also did 1 h pad test. Actual results of leakage not reported.
					Test–retest correlation for total leakage (48 h)	$r = 0.9$, $P < 0.001$	
Versi 1996[121]	Case series EL = 3	Evaluate reproducibility, ease of use, acceptability and compliance with a home pad test (Inco-Test)	112	F with lower urinary tract symptoms	24 h test	Test–retest difference (% of mean): 6.9 ± 155 Correlation coefficient 0.9 (95% CI 0.87 to 0.94)	Funding: none declared. Molnlycke supplied pads and scales. Pre-weighed pads given to women. Pads not used during menstruation.
					48 h test	Test–retest difference (% of mean): 1.6 ± 136 Correlation coefficient 0.94 (95% CI 0.93 to 0.95)	Test repeated after 1 week in women whose circumstances had not changed and who complied fully with 1st test. *R* = Pearsons' correlation coefficient.

Urodynamics

Does urodynamic testing affect outcome?

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Ramsay 1995[123]	RCT EL = 1–	60 (48 completed and analysed)	F with frequency, urgency, nocturia, urge and stress UI Exclusions: previous tx for UI haematuria, recurrent dysuria or voiding difficulty, UTI	Urodynamic investigation then tx tailored to diagnosis* (*n* = 27 randomised, 20 analysed)	Multicomponent conservative tx** (*n* = 33 randomised, 28 analysed)	3 months tx	Leakage episodes/week (mean change)	–73% vs –73%, *P* = NS	Funding: none declared. [EL = 1–] No baseline characteristics presented, analysis on completers only, with no explanation for withdrawals. *bladder training for DO or hypersensitive bladder (aiming for 5 h voiding interval); PFMT for SUI (tailored to individual, 3–10 repetitions 3×/day); CISC for voiding difficulty. **bladder training (as inpatients), PFMT, dietary and fluid intake advice.
							Frequency/day (mean change)	–34% vs –40%, *P* = NS	
							Nocturia/night (mean change)	–59% vs –60%, *P* = NS	
							Short pad test (mean change, g)	–72% vs –72%, *P* = NS	
							Subjective assessment (VAS, mean change)	–3.5 vs –3.6 (units not stated), *P* = NS	
							Self-reported cure or improvement (no further tx required)	60% vs 71%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Thompson 2000[124]	Cohort* EL = 2–	131 (109 followed up)	F ≤ 50 years who underwent retropubic surgery for stress UI; surgery performed by a urogynaecologist** Exclusions: prior retropubic urethropexy, low MUCP and/or low cough leak-point pressure	Full pre-op UD (*n* = 95; 77 followed up) 10 had surgery (Burch), tx others had not stated (UD diagnosis SUI 45%, 27% MUI, 27% UUI)	Minimal pre-op assessment[#] (*n* = 36; 32 followed up) 3 had surgery (Burch), tx others had not stated	Mean ~25 months follow-up	Subjective outcome for stress UI (*n* = 109)	Cure 70% vs 72% Improved 18% vs 19% Failed 12% vs 9% *P* = NS for all comparisons	Funding: Woman's Hospital of Texas Research and Education Foundation. *retrospective chart review. **Thomson also compared these findings with results for women operated on by urologists who do not use any formal urodynamic studies; data not reproduced here as not directly relevant to guideline question. [#]uroflowmetry, subtracted CMG, MUCP, CLPP, cystourethroscopy.
							Subjective outcome with 'true' success (no urge UI or other voiding problems) (*n* = 109)	True success 69% vs 78% Partial success 19% vs 13% Failed 12% vs 9% *P* = NS for all comparisons	
Black 1997[125] Associated reference Hutchings 1998[126] (competence section) Impact of other symptoms and comorbidity also described in the report – data not reproduced here.	Cohort* EL = 2+	442 (68% of 650 treated who wished to participate and returned Q on time) 359 (81%) responded to 1 year follow-up Q**, surgeons completed data on 63% Urodynamic data available for 267	F mean age 52 years who had surgery for stress UI between Jan 93 and June 94 Exclusions: unable to read or understand English Procedure: 3.8% missing info, 50% colposuspension, 12% needle suspension, 29% anterior colporrhaphy, 4.5% other	Pre-op urodynamic pressure studies (*n* = 164)	No pre-op urodynamics (*n* = 103)	1 year	Mean symptom severity score at 1 year	5.7 vs 6.0 (difference 0.3, [95% CI –1.2 to 1.8]) (baseline 12.2 vs 14.6, *P* = NS)	Funding: MRC Health Services Research and Public Health Board. *137 gynaecologists/urologists from North Thames region invited to participate in the study; 47% agreed, 9% declined and 44% did not respond. 49 of the 64 who agreed to participate were selected (38 gynae, 11 urologists), as it was deemed a representative sample in terms of case load, specialty, setting (DGH or teaching; rural, suburban, or urban population). Surgeons provided pre-op data. Pts completed pre-op questionnaire re sociodemographic factors, symptoms, history, mental health, expectations from surgery. **more non-respondents had severe symptoms (33% vs 23%). Respondents more likely to have colpo (57% vs 46%) and less likely to have a needle suspension (7% vs 26%), *P* < 0.01.
							Cure	24% vs 26%, *P* = NS	

Do preoperative urodynamic findings predict post-surgical outcomes?

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Francis 1987[127]	Case series EL = 3	Identify UD changes in a grp undergoing modified Burch colposuspension	50	F mean age 50 years (32–71) with genuine stress UI 56% had prior continence surgery, (MMK in 12, anterior colporrhaphy in 20, Burch in 5, Stamey in 1) 74% had prior hysterectomy	Objective failure rate	26% (*n* = 13)	Funding: none declared. UD method: MC pre-op and at 3 months post-op. Static and stress UCPP studied in supine empty and sitting empty positions with bladder filled with 150 ml saline Studies also conducted in sitting full position at max. cystometric capacity. Not stated whether UD performed to ICS standards.
					Urethral closure pressure in objectively failed vs successful surgery	Mean pre-op 18 vs 33 cmH_2O, *P* < 0.005 (10 of 13 with failed surgery had pre-op closure pressure < 20 cmH_2O)	
Kujansuu 1983[128]	Case series EL = 3	Investigate UD before and after continence surgery, and correlate findings with operative success	79	F with previous failed continence surgery, investigated clinically and by simultaneous urethrocystometry before and 15 months (SD 4) after continence surgery (11 vaginal Kelly, 7 Lyodura sling, 18 MMK, 43 Burch) 97% had stress UI, 3% mixed UI	Objective failure rate	41% (*n* = 32)	Funding: none declared. UD method: MC, with UPP measurement in the standing position. Not stated whether ICS standards for UD followed. *ratio of highest intraurethral pressure between coughs in the stress UPP to the maximal UCP in the UPP at rest. No other UD measurements found to 'correlate' with surgical success (MUCP, location of max. closure pressure, urethral length).
					Urethral relaxation at stress* (mean pre-op values in failed vs successful grp)	0.584 (SD 0.197) vs 0.710 (SD 0.216), *P* < 0.01	
Digesu 2004[129]	Case series EL = 3	Determine whether acceleration of flow rate (AFR), pressure flow variables, and UPP measurements have a role in evaluating women with urodynamic stress UI, to predict surgical outcomes and *de novo* DO	209	F mean age 60 years (34–90) with UD stress UI, seen at a tertiary UD clinic, owing to undergo modified Burch colposuspension. 17% had prior continence surgery Exclusions: DO and/or POP beyond vaginal introitus; irritative urinary symptoms	Objective cure	82% at 1 year post-op	Funding: none declared. UD method: VCU, pressure flow studies. Acceleration of flow rate (AFR = max. flow rate ÷ time to reach max. flow), opening detrusor pressure (ODP), and urethral pressure at closure (CDP), UPP calculated pre-op. Terms and definitions for UD conform to ICS standards. Complete pressure flow studies obtained from 96% F before surgery VCU repeated 1 year after surgery
					Pre-op MUCP, ODP, CDP, AFR in failed vsvs Successful grps (mean, SD)*	MUCP: 37.5 (15) vs 40.5 (18), *P* = NS ODP: 12.1 (8.8) vs 21.3 (12), *P* = 0.02 CDP: 21.2 (10) vs 25.2 (16), *P* = 0.04 AFR: 4.0 (2.5) vs 4.2 (3.2), *P* = NS	
					De novo DO	18% at 1 year post-op	

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
					Pre-op MUCP, ODP, CDP, AFR in *de novo* DO vs 'normal' bladder function grps (mean, SD)	MUCP: 45.6 (19) vs 39 (17.2), *P* = NS ODP: 27.5 (16) vs 22.4 (12), *P* = 0.04 CDP: 36.8 (17) vs 26.5 (16), *P* = 0.03 AFR: 5.6 (4.6) vs 3.9 (2.7), *P* = 0.009	*MUCP, ODP, CDP in cmH_2O; AFR units ml/s^2.
Rodriguez 2004[130]	Case series EL = 3	Examine role of VLPP in predicting risk of failure, success rates and surgical outcomes in pts who underwent the distal urethral polypropylene sling procedure	174	F mean age 62 years (32–88) with stress UI Mean no. of previous surgeries 0.6–0.7 across VLPP grps 33% had concomitant prolapse repair	Objective* cure rates according to VLPP (cmH_2O)	95% (no leak on UD) 92% VLPP > 80 93% VLPP 30–80 92% VLPP < 30	Funding: none declared. UD method: videoUD, according to ICS recommendations. VLPP determined at bladder volume of 200 ml. Mean follow-up 14.7 months (12–30). *self-reported, where failure defined as < 50% improvement.
McLennan 1988[140]	Case series EL = 3	Determine time to resumption of normal voiding after a fascia lata suburethral sling, and whether clinical, operative, or UD variables predict this time	61 (UD studies in 49)	F mean age 60 years (40–84) with UD stress UI, who had fascia lata suburethral sling for ISD or recurrent UI. 77% had sling alone, 23% had additional procedures 67% had prior continence surgery, mean 1.7 (range 1–7); 21% had failed prior continence surgery 46% had low VLPP (≤ 65 cm), 3% had MUCP < 20 cm, 23% urethral hypomobility	Time to normal voiding as a function of UD voiding indices (results for early vs late voiders*)	Max. flow (≥ 20 ml/s) 79% vs 43%, *P* = 0.03 [Logistic regression analysis: max. flow rate < 20 ml/s associated with delayed voiding (OR 4.6, 95% CI 1.06 to 20.01), *P* = 0.04. Mean max. urethral closure pressure (cm) 26 vs 34, *P* = NS Valsalva void 37% vs 30%, *P* = NS Detrusor void 79% vs 80%, *P* = NS	Funding: none declared. Retrospective review. UD method: MC UD, and Cystourethroscopy. Cough and static UCPP measured at max. capacity, and MUCP calculated electronically. Not stated whether ICS criteria followed. Voiding trial began day 2 post-op; suprapubic catheter removed when PVR < 100 ml with voided vol. 3× residual, or at 3–4 weeks if pt in retention. Pts then taught self-catheterisation. Time to resumption of normal voiding defined as both suprapubic catheter days and self-catheter days. *early voiding = by day 7, and late voiding thereafter. 19/49 were early voiders, 30/49 took > 7 days. Mean time to normal voiding 10 (SD 9) days, median 9 (3–49).
Bergman 1985[141]	Case series	Test the validity of uroflowmetry as a	45	F mean age 58 years (27–74), UD stress UI; undergoing Tanagho's	Days of post-op drainage	Mean 6.7 (3–28) 9 (20%) ≥ 7 days*	Funding: none declared. Uroflowmetry (with ≥ 200 ml urine in bladder)

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
	EL = 3	predictor of postoperative voiding problems		modification of Burch, 21 (47%) had total abdominal hysterectomy simultaneously 10 (22%) had prior continence surgery	Pre-op uroflow findings in early vs late voiders (*n*)	Peak flow rate (ml/s): < 20 ml/s: 5 vs 4 ≥ 20 ml/s: 31 vs 5, *P* = NS Residual volume (mean, ml): 19.8 (SD 12) vs 21.6 (12.4), *P* = NS	followed by catheterisation to determine residual volume, terminology conformed to ICS. 'Normal' peak flow defined as ≥ 20 ml/s. Prolonged catheterisation = inability to resume spontaneous voiding or voiding with a PVR vol. > 50 ml on postop day ≥ 7. *1 had pre-op history of voiding difficulty.
Kilicarslan 2003[131]	Case series EL = 3	Evaluate whether pre-op VLPP and UCP could be used as predictors of surgery	58	F mean age 52 (41–71) years, stress UI undergoing vaginal wall sling procedure (Raz) Exclusions: DO, MUI, underactive detrusor, outlet obstruction, POP, neurogenic bladder	Objective cure in 2 grps (VLPP < 50 cmH_2O and MUCP < 30 vs VLPP ≥ 50 cm and MUCP ≥ 30)	65.4% vs 90.6%, *P* < 0.05	Funding: none declared. Fluorourodynamics performed. Objective cure: dry on 1 h extended pad test and UD studies in normal limits. Mean follow-up 26 months (16–34).
					VLPP in successful (*n* = 46) vs failed cases	92.7 ± 6.3 (median 83) vs 43.6 ± 3.4 (median 46), *P* = NS	
					MUCP in successful vs failed cases	72.2 ± 12.3 vs 42.1 ± 3.8 (median 46), *P* < 0.05	
Hong 2003[142]	Case series EL = 3	To determine factors predictive of urinary retention in women undergoing TVT, where retention was defined as the need for ISC for at least 3 days	375	F mean age 52 (33–74), with stress or mixed UI (mixed in 38%) 17% had prior hysterectomy, 4% prior continence surgery. 7% had cystocele Concomitant surgery; 3% hysterectomy, 3% cystocele repair, 8% vaginal repair	Retention	8.5% (*n* = 32)*	Funding: none declared. *88% of whom required ISC for less than 1 month. Time to normal voiding was mean 12 days (3–31, median 9), and 12% needed sling release for retention. Only data relevant to urodynamics extracted. TVT done between March 1999 and May 2002.
					Urodynamic (multichannel cystometry) pre-op results in grp with retention vs those without	Univariate analysis: peak flow rate (ml/s): 22.3 vs 29.7, *P* = 0.001 VLPP 74 vs 65, *P* = NS MUCP 44 vs 45, *P* = NS Max. detrusor pressure 28 vs 30, *P* = NS Multivariate analysis: Peak flow rate: SE 0.0012 (95% CI 0.897 to 0.981), *P* = 0.007	

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Sand 1987[132]	Case series EL = 3	To evaluate low urethral closure pressure as a risk factor for failed surgery in women undergoing colposuspension (Tanagho modification of Burch)	86	F mean age 50 years (30–72), with urodynamic stress UI. 58% had prior continence surgery (balanced in low/normal UCP groups) Based on multichannel urodynamics with UCPP determined in resting position, pts divided into low UCP group (≤ 20 cmH_2O [*n* = 41]), or normal (> 20 [*n* = 45]). Mean values of UCP were 12.5 vs 37.2	Surgical failure at 3 months	35% overall 54% vs 18% in low vs normal UCP groups, *P* < 0.0005	Funding: none declared. Surgical failure = leakage on urodynamics or on stress test. Low/normal UCP groups also differed in age (53 vs 47 mean, *P* < 0.01). [linear regression analysis undertaken to investigate effect of difference in age; no numerical data given but reported that for women aged < 50 years, low UCP is an independent risk factor for failure.]
Meschia 1993[133]	Case series EL = 3	To compare outcomes in menopausal and pre-menopausal women. Also, MUCP as a predictor of failure in total group considered Procedure undertaken was Burch colposuspension	98	F mean age 50 years (33–73), with urodynamic stress UI and no signs of bladder instability 28% had MUCP ≤ 20 cmH_2O, and 72% with > 20 cmH_2O	Objective failure 1–3 years after surgery*	Overall failure 17% 33% vs 11% in MUCP ≤ 20 vs > 20 cmH_2O groups, *P* < 0.05	Funding: none declared. Failure = urinary leakage or pressure equalization or both during the cough profile or urinary leakage in the standing positions with a very strong desire to void during coughing. *overall duration of followup unknown; was mean 21 months in 39% menopausal pts, and 18 in 61% pre-menopausal grp. No attempt to explore effects of potential confounding factors on results.
Weil 1984[134]	Case series EL = 3	To assess the effects of surgery on pressure profiles, and also whether pre-op urethral pressures	86*	F with stress UI. None had prior surgery. All had stable bladders on cystometry Pre-op MUCP (mean, SD): 47 (15) Burch, 45 (14) Pereyra, 43 (18)	Continence (subjective and 'no urine loss' objectively) at 6 months	91% of Burch grp 50% Pereyra 57% anterior colporrhaphy	Funding: none declared. Multi-channel cystometry undertaken with urethral profile measured at rest and under stress. Transmission ratio = quotient between the

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		predict outcom		anterior colporrhaphy; transmission ratio: 75 (13), 79 (10), and 86 (13)	Differences in pre-op variables for continent vs incontinent	No data given for Burch – reported that no difference stat sig. For Pereyra: MUCP 46 (18) vs 43 (14), *P* = NS Tratio 83 (9) vs 75 (10) *P* < 0.05 For colporrhaphy: MUCP 51 (16) vs 32 (15), *P* < 0.05 Tratio 88 (11) vs 84 (15) *P* = NS	increases in urethral and bladder pressures at coughing; an average of 2 values measured on the middle third of the urethra was used for calculations. *women underwent colporrhaphy (30), Pereyra (22) or Burch procedures (34).
Minassian 2004[143]	Case series EL = 3	Compare incidence and predictors of early post-operative voiding dysfunction after continence surgery	138	F mean age ~60 years, who had continence surgery for stress UI (63 TVT, 42 Burch, 33 polypropylene sling)	Incidence of post-op voiding dysfunction	Overall 33% (50% TVT, 5% Burch, 24% sling)	Funding: none declared. Retrospective review. Voiding dysfunction = inability to void or PVR > 200 ml.
					MUCP in pts with and without voiding dysfunction	32 vs 39 cmH_2O (mean), *P* = NS	Only pre-op investigations' data reproduced in this table; the effects of several other demographic factors also considered in the report.
Bombieri 2002[144]	Case series EL = 3	Investigate the causes of voiding difficulty and DO after colposuspension	77	F mean age 54 years (SD 12), with UD stress UI. 22% prior continence surgery. 49% prior hysterectomy 69% had some urge UI (though quoted that 23% had MUI)	Urodynamic variables associated with 'voiding performance' (day of catheter removal, multivariate analysis	Regression coefficient – 0.0166 (SE 0.00551), *P* = 0.004	Funding: none declared. UD performed = peak flow rate, detrusor pressure at maximum flow, max. detrusor pressure, urethral resistance. Qmax = peak flow rate.
					UD factors associated with *de novo* DO	None of those studied: Qmax; Pdet, Qmax; Pdet, max; urethral resistance	Pdet, Qmax = detrusor pressure at maximum flow. Pdet, max = max. detrusor pressure.

Different methods of urodynamic investigation (1 of 2 tables)

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Outcome measures	Effect size	Additional comments
Fonda 1993[146]	DS EL = II	70 (61% F)	M/F mean age 74 years (60–93), UI ≥ 1/week. 40% had neurologic diagnosis Exclusions: nursing home residents, UTI, acute illness	Single-channel UD	Multi-channel UD	Diagnostic accuracy for DO (found in 60% on MC UD)	Sensitivity 88% (81% in F only) Specificity 75% (68% F) PPV 84% (71% F) NPV 81% (79% F)	Funding: Veteran's Aged Care Committee. Tracings interpreted by person blind to clinical and lab findings. UD methods conformed to ICS standards. Cystometric capacity stated to not be sig. different with the 2 methods – no data given.
Ouslander 1988[145]	DS EL = III	171 (81% F)	M/F mean age 80 years (65–100), referred to outpatient clinic for evaluation of persistent UI (≥ 2×/week)	Simple cystometry (incremental filling by gravity)	Continuous water filling multi-channel UD	Cystometric capacity (*n* = 164; 82% F)	Mean (SD) in F: 275 (183) vs 282 (178), *P* = NS	Funding: National Institute on Aging; and Robert Wood Johnson Foundation. MC done 1–4 weeks after simple cystometry. DO diagnosed at increase in detrusor pressure of ≥ 15 cmH_2O. *found in 64% on MC UD.
						Diagnostic accuracy of simple vs MC in F	DO/detrusor hyperreflexia*: Sens 72%, Spec 80%, PPV 84%, NPV 63%	
Sutherst 1984[147]	DS EL = II	100	F mean age 47 years (22–78) attending incontinence clinic for evaluation of symptoms	Single-channel UD* (Cystomat)	Multi-channel UD* with UPP	Diagnostic accuracy of simple vs MC for DO (with or without mixed)	Sensitivity 100% Specificity 89% PPV 17% NPV 100%	Funding: none declared. *in random order, on the same day. Medium-fill cystometry used (50 ml/min). UD conformed to ICS standards. Each method done blind to findings of other. Provocative tests used with both methods.
Scotti 1993[149]	DS EL = III	145	F mean age 58 years (32–91) with UI	Single-channel UD + cough stress test	MC urethrocystometry with UPP	Diagnostic accuracy of simple vs MC UD for stress UI	Sensitivity 84% Specificity 84% PPV 87% NPV 81%	Funding: none declared. UD conformed to ICS standards. Not stated whether investigations were done blind to each other. Stress UI (with or without mixed) diagnosed if positive cough stress test at full bladder capacity without vesical contraction (single-channel cystometry), or if cough UPP positive in the absence of vesical contraction.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Outcome measures	Effect size	Additional comments
Hsu 1999[150]	DS EL = II	41	F mean age 64 (29–82), with stress UI symptoms	Supine stress test using cough and Valsalva maneouvre*	MC video UD with abdominal LPP	Diagnostic accuracy of stress test vs abdominal LPP for ISD (< 100 cmH_2O being positive for ISD)	Sensitivity 94% Specificity 90% PPV 97% NPV 82%	Funding: none declared. VideoUD done by person blind to stress test. UD conformed to ICS. *after bladder filling to 200 ml positive stress test if efflux of urine from the urethral meatus coincided with cough or Valsalva maneouvre.
Lobel 1996[151]	DS EL = III	304	F mean age 59 (26–92), 26% had prior continence surgery Exclusions: POP beyond introitus, UTI	'empty' supine stress test using cough and Valsalva maneouvre*	MC cystometry with resting and dynamic UPP	Diagnostic accuracy of empty stress test vs MC UD for stress UI (regardless of MUCP)	Sensitivity 49% Specificity 95% PPV 98% NPV 29%	Funding: none declared. *within 20 min of catheterisation. UD conformed to ICS. Interval between stress test and MC UD not stated. Positive stress test if efflux of urine from the urethral meatus coincided with cough or Valsalva maneouvre. SUI diagnosed on MC UD if leakage on cough/Valsalva; ISD diagnosed if stress UI and MUCP ≤ 20 cmH_2O.
						Diagnostic accuracy of empty stress test vs ISD diagnosis	Sensitivity 65% Specificity 76% PPV 66% NPV 76%	
Hanzal 1991[152]	DS EL = III	981	F with lower urinary tract symptoms. 67% had stress UI on clinical stress test Exclusions: residual urine, isolated detrusor contractions during filling cystometry	MC cystometry with UCPP	Clinical stress test in supine and standing position	Diagnostic accuracy of UPP vs clinical stress test for stress UI	Sensitivity 93% Specificity 83% PPV 92% NPV 86%	Funding: none declared. UD methods conform to ICS. UCPP measured in sitting position with bladder vol. of 300 ml and infusion rate 5 ml/min.
Swithinbank 1999[153]	Case series (retrospective review) EL = 3	122 (91% F)	M/F mean age 45 years (14–79), referred for ambulatory studies when diagnosis from routine cystometry were normal but pts still had symptoms of stress, OAB or both 19% had > 1 cystometogram prior to AM	Ambulatory UD (AM)	Conventional MC cystometry	Findings on AM	53/94 with OAB symptoms had DO on AM Of 17 with stress UI symptom, 5 had SUI on AM Overall 79/125 had additional findings on AM	Funding: none declared. AM using MMS 2020 recording device; pts monitored for 2 fills of ~3 h. Time between AM and MC UD – mean 37 weeks (range 1–380).

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Outcome measures	Effect size	Additional comments
Radley 2001[154]	Case series EL = 3	106 (both tests done in 97)	F mean age 53 years (26–81), referred for UD assessment of symptoms incl. urinary urgency with/without incontinence Exclusions: heart valve disease, UTI, neuropathic UI	Ambulatory UD* (AM)	Video cystometry*	% diagnosed with each method, and % agreement between AM and VC	DO (± stress UI): 66% vs 30% (50% agreement, $P < 0.001$) Stress UI: 32% vs 40% (83% agreement, P = NS) Normal UD: 14% vs 39% (66% agreement, $P < 0.001$)	Funding: none declared. *in random order ~1 month apart. Not stated whether each test done blind to findings of other. Video cystometry according to ICS guidelines, and all definitions. AM took 3 h- 1 h sitting, 1 h of normal activity, 1 h of provocative tests. Each test said to show positive correlation with symptoms.
						Correlation between symptoms (on BFLUTS) and UD findings	Urgency: $r = 0.369$, $P < 0.0001$ (AM); $r = 0.327$, $P = 0.001$ (VC) Stress UI: $r = 0.340$, $P = 0.001$ (AM); $r = 0.434$, $P < 0.0001$ (VC) Urge UI: $r = 0.470$, $P < 0.0001$ (AM); $r = 0.2$, $P = 0.043$ (VC)	
Davis 1998[155]	Case series EL = 3	50 (also 10 controls, no UI)	F soldiers with exercise-induced UI, mean age 32 years	Ambulatory UD	Conventional MC cystometry, with UPP	% with unstable detrusor contractions	96% vs 18% (20% vs 0% in control grp)	Funding: none declared. AM conducted 1 week after MC cystometry, using UPS 2020 device.
Webb 1991[156]	Case series EL = 3	52 (69% F)	M/F aged 22–74 years, investigated on AM owing to unexplained findings on conventional cystometry	Ambulatory UD	Conventional MC cystometry	% diagnosis on AM vs conventional UD	DO: 60% vs 0 Stress UI: 13% vs 2%	Funding: none declared. AM took 3 h: 1 h sitting, 1 h of normal activity, 1 h of provocative tests. ICS standard criteria for diagnosis used.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Outcome measures	Effect size	Additional comments
McInerney 1991[157]	Case series EL = 3	20 (17 F)	M/F aged 10–60 years, presenting symptoms 'urge syndrome' (9), primary nocturnal and diurnal enuresis (4), leakage or urgency symptoms following reconstructive bladder surgery	Ambulatory UD	Conventional video cystometry	Proportion with DO diagnosis	Of 9 with 'urge syndrome: 2/9 vs 0.9 Of 4 with enuresis: 4/4 vs 1/4	Funding: none declared. AM over 24 h. Not stated whether ICS recommendations for UD followed.
Davila 1994[158]	Case series EL = 3	27	F aged 25–79 with urge UI previously undergone MC UD findings normal (*n* = 18) or did not reproduce the symptoms presented with (*n* = 9)	Ambulatory UD	Conventional MC cystometry	Diagnosis identified on AM vs MC cystometry (*n*)	Normal: 10 vs 18 DO: 15 vs 3	Funding: none declared. 2 AM systems used – Urodec 500 (17 pts) and the Wiest Camsys (10 pts). 'most people monitored for at least 4 h'. Conventional UD performed using Surgitek UDS 1000. ICS terminology and diagnostic criteria used.
Pelsang 1996[159]	DS EL = III	159	F mean age 52 years (17–90) with leakage or voiding dysfunction	VCU	MC cystometry	Accuracy of VCU vs MC UD for stress UI	Sensitivity 61% Specificity 70% PPV 56% NPV 74%	Funding: none declared Not stated whether ICS standards for cystometry followed.
						Accuracy of VCU vs MC UD for urge UI	Sensitivity 14% Specificity 97% PPV 87% NPV 45%	
Kadar 1988[160]	DS EL = III	37	F median age 49 years (23–84) with LUTS and UI	VCU	Clinical assessment (with bladder filling if necessary)	Diagnostic accuracy for each type of UI	Stress UI: Sens 74% Spec 78% PPV 78% NPV 74% Mixed UI: Sens 0* Spec 91% PPV 0 NPV 91% Urge UI: Sens 50% Spec 89% PPV 20% NPV 97%	Funding: none declared. Terms and diagnosis conformed to ICS. Clinical stress UI defined as water lost coincidentally with coughing/straining; DO if pt voided uncontrollably during the exam. *zero because no patients had both a clinical and urodynamic diagnosis of mixed UI.

Different methods of urodynamic investigation(2 of 2 tables)

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity*	Positive and negative predictive value*	Additional comments
Sand 1987[148]	DS EL = III	218	–	F mean age 52 years (18–80) who had undergone multichannel UD evaluation owing to UI (83%) or urethral syndrome (17%) UD diagnosis 70% SUI, 17% MUI, 14% DO	Supine urethroscopic cystometry (*n* = 203)	Multichannel urethrocystometry	Sens: 25% Spec: 94% (for DO)	PPV: 65% NPV: 74% (for DO)	Funding: none declared. 203 underwent dynamic urethroscopy and simultaneous supine cystometry (in which a detrusor contraction = sustained opening of the urethrovesical junction and proximal urethra during cystometry). 179 tested with standing, medium-fill, single-channel electronic cystometry. Detrusor contraction during cystometry was determined by a sustained pressure increase of > 15 cmH_2O in the absence of 39rethra39 ICS terminology used in the study.
					Standing single-channel cystometry (*n* = 179)	Multichannel urethrocystometry	Sens: 59% Spec: 82% (for DO)	PPV: 59% NPV: 82% (for DO)	

Test-retest reliability of urodynamic testing

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Homma 2000[162]	Case series EL = 3	Examine reproducibility of cystometry in DO	30 (12 F)	M/F mean age 62 years, symptoms of frequency, urgency with/without UI, and receiving placebo in a RCT of drug treatment Pretreatment UD showed DO	vol. at 1st desire to void; vol. at 1st involuntary contraction, cystometric capacity; max. pressure of involuntary contraction	All values sig. improved at 2nd measurement	Funding: none declared. 2nd cystometry performed after 2–4 weeks tx with placebo.
Digesu 2003[161]	Case series EL = 3	Evaluate intra- and inter-observer reliability of pressure flow parameters in women Women underwent VCU (83%) or saline cystometry (17%). Those with inconclusive laboratory UD studies were further investigated with ambulatory UD	554	F mean age 51 (22–89) with LUTS referred to a tertiary UD clinic Exclusions: poor quality UD traces owing to artefacts, one or both pressure lines not recording, uninterpretable results, F unable to void	Detrusor pressure at max. flow rate; mean (SD); mean difference (SD)	Intra-observer reliability 31 (17); 0.13 (1.4) Inter-observer 31 (17); 0.27 (2.3)	Funding: none declared ICS terms and definitions used. Pressures repeated after 1-week. All measurements in cmH_2O. Within-patient reproducibility of measures during multiple voids on ambulatory UD also reported for 9 women (data not reproduced here). Inter-observer agreement reported to be significant for all parameters except max. flow
					Max. flow rate mean (SD), mean difference (SD)	Intra-observer reliability 29 (15); 0.07 (0.5) Inter-observer 29 (15); 0.003 (0.6)	

Study	Study type and EL	Aim	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
					Opening detrusor pressure mean (SD), mean difference (SD)	Intra-observer reliability 27 (16); 0.06 (1.5) Inter-observer 27 (15); 0.04 (1.8)	rate (no results of analysis given). No statistical analysis for intra-observer reported (though said to be 'good').
					Closure detrusor pressure mean (SD), mean difference (SD)	Intra-observer reliability 28 (18); 0.08 (0.8) Inter-observer 27 (18); 0.09 (2.3)	

Health economics of urodynamic testing

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Weber 2000[938] US	A hypothetical patient population of otherwise healthy women, aged < 65 years, with predominantly stress incontinence symptoms and were candidates for primary surgical treatment. Decision analytic model to estimate the cost and outcomes (cure, retention and incontinence)	2 pre-operative testing strategies: Basic office assessment followed by; No further testing vs Urodynamic testing to confirm diagnosis	Cost per patient: No further testing USD5,042; Urodynamics USD5,046 Cure rate: No further testing 96.4%; Urodynamics 96.5%	Incremental cost effectiveness of Urodynamics USD3,847 per cure	Funding: none declared. Model US context. Authors state societal perspective but costs seem to relate to health care payer only. Costs for tests and procedures are based on 1998 values. Sensitivity analysis suggested that the results were very sensitive to the prevalence of pure stress incontinence in the patient population.	Cost effectiveness analysis

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Holley 1999[928] US	Hypothetical patients A model was used to estimate the cost and correct diagnoses	2 diagnostic tests for stress incontinence: cough stress test with simple cystometrogram (CST/CMG) vs multi-channel urodynamics (MCU)	Costs: CST/CMG USD217, MCU USD548 Sensitivity: CST/CMG 87%, MCU 89%	Incremental cost per correct diagnosis; CST/MCG vs no testing USD249; MCU vs CST/MCG USD 16550	Funding: none declared. Model US context. 1998 costs. Test specificity ignored in model (justified on the basis that both methods have low false-positive rates). Charges were used as an index of costs. Equipment costs were not considered. Sensitivity analysis undertaken. It is not possible to draw conclusions on the relative cost effectiveness of the 2 testing strategies from the analysis presented.	Cost effectiveness analysis

Other tests of urethral competence (1 of 2 tables)

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity	PPV and NPV	Additional comments
Montella 1997[164]	DS EL = III	111	75% had positive Q-tip test	F mean age 64 years (33–89) with symptoms of prolapse (70%) and/or UI (30%). 36% had prior anterior vaginal wall surgery (3 pts > 1 procedure): 23% anterior colporrhaphy, 10% retropubic suspension, 6% a vaginal needle procedure	Visual assessment and measurement of descent of point Aa*(POP-Q)	Q-tip test	At different Aa descent cut-off points: –2: sens 94%, spec 36% –1: 67%, 61% 0: 39%, 93% 1: 24%, 96% 2: 7%, 100% 3: 2%, 100%	At different Aa descent cut-off points: –2: PPV 80%, NPV 67% –1: 84%, 41% 0: 94%, 34% 1: 95%, 30% 2: 100%, 27% 3: 100%, 26%	Funding: none declared. *pts coughed 3×, and performed the Valsalva manoeuvre 3× for each test; max. value taken. Max. descent of point Aa measured using a ruler. Descent of Aa to hymen = 0; –3 = no descent. Q-tip test done blinded to Aa measurement, preceded by speculum and bimanual exam. Q-tip movement measured using orthopaedic goniometer. Positive Q-tip test = max. straining angle of ≥ 30° relative to the horizontal plane. No change in pattern of results found for women who had or did not have prior surgery. Retest done in 10 pts.

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity	PPV and NPV	Additional comments
Caputo 1993[163]	DS EL = III	114	64% had positive US test	F presenting with UI or prolapse. Urodynamic diagnosis: 34% stress UI, 38% mixed UI, 21% DO, 7% no UI. 32% had prior anterior vaginal wall surgery/ 'anti-incontinence' procedures Exclusions: prolapse beyond introitus while straining in the upright position	Q-tip test	Perineal ultrasound	Sens 25% Spec 78%	PPV 67% NPV 37%	Funding: none declared. Same examiner performed both tests. Q-tip angle from the horizontal measured using an orthopaedic goniometer; positive test ≥ 30° change between rest and straining angles. A curved linear-array 3.5 MHz US transducer used; Millar microtransducer urethral catheter used to visualise the urethrovesical junction hypermobility. Distance in millimetres between the urethrovesical junction positions at rest and after max. strain; positive test > 10 mm movement. Retest done in 10 pts.
Sutherst 1980[171]	DS EL = III	67 (with SUI) 23 controls (no UI)	Positive Fluid-Bridge (FB) test 58% 36% clinical diagnosis stress UI 57% UD diagnosis stress UI	F mean age 52 years with symptoms of stress UI Controls mean age 33 years	Fluid-Bridge test in supine position	Clinical evidence of UI	Sens 74% Spec 62%	PPV 72% NPV 64%	Funding: none declared. Test point selected = 0.5 cm from urethrovesical junction. If the test point remains closed, the test is negative; if it opens, the test is positive. UD: SUI diagnosed if evidence of stress leakage in the absence of detrusor contractions, or if UCPP measurements 'small'. UD methods, definitions and units conform to ICS. Positive FB test in 39 (58%) test grp, 1 (4%) control grp, $P < 0.001$.
						UD diagnosis of stress UI	Sens 72% Spec 53%	PPV 54% NPV 71%	
Sutherst 1981[172]	DS EL = III	100 (only 76 analysed*)	Positive FB test in 74% test grp when supine 89% erect 43% clinical diagnosis SUI 57% UD diagnosis	F mean age 52 years, attending a stress UI clinic for UD assessment 27 women mean age 41 years with no UI were also tested (were attending hospital for abnormal uterine bleeding or infertility).	Fluid-Bridge test in supine position Fluid-Bridge test in erect position	Clinical evidence of UI	Supine: Sens 89% Spec 35% Erect: Sens 100% Spec 16%	Supine: PPV 43% NPV 85% Erect: PPV 40% NPV 100%	Funding: none declared. UD methods, definitions and units conform to ICS. Test point selected = 0.5 cm from urethrovesical junction. If the test point remains closed, the test is negative. *reasons for exclusion: 7 continent after surgery but UD abnormal; 7 owing to technical difficulties, 10 because change from supine to standing initiated detrusor contractions. Positive FB test in 56 (74%) test grp when supine, 68 (89%) when erect. 4 (15%) control grp (supine and erect), $P < 0.001$ vs SUI grp.
					Fluid-Bridge test in supine position Fluid-Bridge test in erect position	UD diagnosis of stress UI	Supine: Sens 86% Spec 42% Erect: Sens 100% Spec 24%	Supine: PPV 66% NPV 70% Erect: PPV 37% NPV 100%	

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity	PPV and NPV	Additional comments
Niecestro 1992[173]	DS EL = III	66	53% history of SUI 74% positive UPP test 61% positive FB test 66% positive Marshall test	F > 18 years referred for UD investigation owing to voiding symptoms Exclusions: UTI, STI	Stresscath (modified Fluid-Bridge)	Marshall test	Sens 86% Spec 87%	PPV 77% NPV 93%	Funding: none declared. History followed by supine and sitting Marshall test, then by the 'Stresscath' procedure, a modified version of the Fluid-Bridge test (10F catheter passed into the bladder; with catheter eye in the bladder, urine flows out of the distal end; catheter slowly withdrawn until flow of urine stops, then pulled back 0.5 cm and the pt asked to cough. Diagnosis of bladder neck incompetence made if urine flows through catheter. Catheter pulled back 0.5 cm and test repeated until a negative result is achieved). UPP diagnosis: if max. urethral pressure < 30.5 cmH_2O, bladder neck incompetent; if > 30.5, considered not to have stress UI, and possibly no bladder neck incompetence. *for a diagnosis of SUI owing to bladder neck incompetence.
					Stresscath	History	Sens 73% Spec 88%	PPV 85% NPV 80%	
					UPP	Marshall	Sens 50% Spec 88%	PPV 69% NPV 78%	
					UPP	History	Sens 43% Spec 91%	PPV 81% NPV 65%	

Other tests of urethral competence (2 of 2 tables)

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Cogan 2002[165]	Case series EL = 3	To assess correlation between the Q-tip and Aa point of the POP-Q system	274	F enrolled in 2 studies: Study 1; a RCT of anterior colporrhaphy; mean age 64 years (35–90), 93% had prior surgery for prolapse/UI, 92% prior anterior colporrhaphy, 14% prior retropubic urtheropexy (*n* = 71) Study 2; a cohort study evaluating outcomes of continence/prolapse operations, mean age 57 years (27–85), 19% had prior surgery for	% with urethral hypermobility (Q-tip angle ≥ 30°) for each stage of prolapse at point Aa (results for all pts)	Stage 0 (–3 cm): 62% (*n* = 5/8), 95% CI 24% to 91% Stage I (–2 cm): 83% (*n* = 19/23) to 95% CI 61% to 95% Stage II (–1, 0, or +1 cm): 95% (*n* = 161/170), 95% CI 90% to 98% Stage III (+2 cm): 100% (*n* = 24/24) to 95% CI 86% to 100% Stage IV (+3 cm): 100% (*n* = 49/49), 95% CI 93% to 100%	Funding: none declared. Initial POP-Q and Q-tip tests done the day before the surgery. Positive Q-tip test = max. straining angle of ≥ 30° relative to the horizontal plane (94% had urethral hypermobility based on this threshold). ICS methods and definitions used for POP-Q. *r* = Spearman's correlation coefficient.

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
				prolapse/UI, 4% prior anterior colporrhaphy, 17% prior retropubic urethropexy (*n* = 203) Exclusions: F needing a retropubic urethropexy	Correlation vs between Q-tip straining angle (degrees) and point Aa (cm) results	*r* = 0.47, *P* < 0.001	
					Sensitivity and specificity of Aa measurement	At 3 cm cut-off: sens 28%, spec 100% At 2 cm cut-off: sens 91%, spec 44%	
Noblett 2005[166]	DS EL = III	To evaluate the relationship between urethral mobility and stages 0 or 1 anterior wall prolapse and to determine whether a Q-tip test is necessary in this subgroup of patients	134	Consecutive F pts referred to urogynae unit for evaluation. 15% had prior surgery for UI and/or pelvic organ prolapse 24% stage 0 prolapse, 25% stage I, 39% stage II, 6% stage III, 6% stage IV	Correlation between POP-Q point Aa and Q-tip test	Spearman's correlation coefficient for POP-Q and Q-tip was 0.787, *P* < 0.001	Funding: none declared. POP-Q undertaken prior to Q-tip, but no assessor blinded to results of other test. Hypermobility defined as a straining angle of ≥ 30° on Q-tip. Sensitivity, specificity, PPV and NPV of point Aa also quoted relative to Q-tip angle for stages 0 vs I-IV, and for stage 0 vs I. Data not reproduced here.
					% hypermobile for each stage of the POP-Q test	stage 0: 6% hypermobile stage I: 91% hypermobile stages II to IV: 100% hypermobile	
Migliorini 1987[167]	Case series EL = 3	Assess the validity of the Bonney test	61	F presenting at UI hospital clinic for assessment (history, examination, UD [as per ICS criteria]). Static and cough profile urethral pressure profiles repeated with bladder neck elevation (Bonney test)	Diagnosis (based on cystometry)	74% SUI (31 of the 45 had urine loss at the time of the investigation*) 16% MUI (6/10 had urine loss) 10% DO (none had urine loss)	Funding: none declared. *without bladder neck elevation.
					Bonney test (% with urine loss on bladder neck elevation)	None (100% positive Bonney test)	
					Urethral closure pressure (cmH_2O) without or with bladder neck elevation (Bonney test); median (range)	In pts with SUI diagnosis: without 38 (8–78); with 117 (49–232) In pts with MUI: without 38 (16–70); with 111 (59–148) In pts with DO: without 45 (11–75); with 116 (86–124)	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Bhatia 1983[168]	Case series EL = 3	Describe the changes in urethral and urethrovesical function under resting and stressful conditions when the Bonney test was used in F with stress UI	12	F history and UD diagnosis of stress UI	Urethral closure pressure (cmH_2O), mean (SD)	Resting: 40.6 (14.4) Bonney test: 210 (13.6), $P < 0.0005$ vs resting profile Urethral occlusion*: 212 (13.5), $P < 0.0005$ vs resting profile	Funding: none declared. Intravesical, intraurethral, and intra-abdominal pressures measured directly by 2 microtip pressure transducer catheters. Urethral and cough pressure profiles repeated during Bonney test (middle and index finger placed 1 cm lateral to each side of urethra; and repeated again with *middle and index fingers placed directly over the bladder neck with the intention of compressing the urethra and bladder neck). All pts demonstrated urine loss during the recording of the cough urethral pressure profile (in the supine position with a full bladder), and none during Bonney test, nor with compression of the urethra or bladder neck. *measured using a planimeter. ICS terminology used. No significant differences seen between Bonney test and Urethral occlusion in any outcome.
					Urethral Closure Pressure Profile area (cm^2)*, mean (SD)	Resting: 2.11 (1.6) Bonney test: 10.5 (1.7), $P < 0.0005$ vs resting profile Urethral occlusion*: 11.1 (1.7), $P < 0.0005$ vs resting profile	
					Urethral cough pressure profile area* (cm^2)	Resting: 0.8 (0.95) Bonney test: 9.0 (3.9), $P < 0.0005$ vs resting profile Urethral occlusion*: 9.7 (3.98), $P < 0.0005$ vs resting profile	
Miyazaki 1997[169]	Case series EL = 3	Re-evaluate the Bonney test and direct urethral compression, and to present a modification of the Bonney test (the Miyazaki–Bonney test)	37	F, genuine stress UI Each pt underwent the Bonney test, direct urethral compression, and a Miyazaki–Bonney test* while the following observations made: urethroscopy of bladder neck and proximal urethra; resistance of cotton swab to withdrawal; proximal urethral pressures changes	Urethroscopic observations	Bonney and Miyazaki–Bonney tests 'produced concentric closure of the bladder neck and elongation and closure of the proximal urethra'	Funding: none declared. ICS methods, definitions and units used for UD studies. *Miyazaki–Bonney test was performed in 2 ways: (1) cotton swabs directed laterally to reapproximate anterolateral vaginal wall to pelvic sidewall; (2) cotton swab handles depressed to –30° and pushed anteriosuperiorly and laterally to bring cotton swab down to 0°. Bonney test used as 'originally described'. Two methods were used to measure proximal urethral pressure changes: 12 studied using a microtip catheter; 13 using both a microtip and Foley bulb; 12 using a Foley bulb set up only.
					Proximal urethral pressure changes	Bonney: mean increase 52 cmH_2O (25–100) M-Bonney: 'little or no increase', mean 30 (20–40) Direct urethral compression: no mean reported but 'easily produced pressures > 250 cmH_2O' No overlap of values between Bonney and direct urethral compression	
					Pressure transmission ratio	Incomplete numerical results reported	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Bergman 1987[170]	Case series EL = 3	Record and compare the changes in urethral and urethrovesical function under resting and stressful conditions when the Marshall-Marchetti test and intentional occlusion of the urethra were used in women with UI	16	F mean age 53 years (36–64), genuine stress UI	UCPP (AUC, cm^2)	Marshall test 8.7 ± 1.1 Urethral occlusion 9.1 ± 1.2 *P* = NS between tests	Funding: none declared. Multi-channel UD done according to ICS standards. Marshall test – moderate elevation of the urethrovesical junction using clamps on the anterior vaginal wall, one on each side and lateral to the urethrovesical junction. AUC = area under the curve.
					Cough PP (AUC, cm^2)	Marshall test 8.8 ± 2.8 Urethral occlusion 9.1 ± 2.4 *P* = NS between tests	

Cystoscopy (1 of 2 tables)

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Cundiff 1996[175]	Case series EL = 3	Determine whether multichannel urodynamics in combination with urethrocystoscopy improves diagnostic accuracy of UD alone	84	F mean age 56 years (23–79) from a 'referral urogynaecologic practice'. 93% presented with UI, 6% prolapse, 1% retention 'Final' diagnoses (17% had 2): 26% genuine SUI; 25% DO, 18% MUI, 11% intrinsic sphincter deficiency, 6% prolapse; 4% sensory urgency, 3% cystitis, 2% bladder cancer, 2% bladder lesion, 1% diverticulum, 1% intravesical suture (and 3% no abnormalities)	Findings on urethrocystoscopy	65 (77%) had same diagnosis as on UD: 34 confirmed UD diagnoses 24 normal 10 incidental findings Urethrocystoscopy 'contributed to the final diagnosis' in 16: 10 ISD 6 'critical new' diagnoses; 1 intravesical suture, 1 urethral diverticulum, 2 papillary transitional-cell carcinoma, 2 cystitis glandularis	Funding: none declared. Full UD evaluation included uroflowmetry, complex cystometry, passive and dynamic UPP, pressure voiding study. Terms, methods and criteria conform to ICS. Intrinsic sphincter deficiency diagnosed if MUCP ≤ 30 cmH_2O. Urethrocystoscopy followed urodynamics. Not stated what the indications for urethrocystoscopy were.

Cystoscopy (2 of 2 tables)

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity*	Positive and negative predictive value*	Additional comments
Scotti 1990[176]	DS EL = III	99	94% UD SUI	F mean age 51 years (23–86) who had undergone dynamic urethroscopy*	Urethroscopy (in supine position, with simultaneous supine cystometry)	Multichannel cough UPP (resting and stress UCPP supine with empty bladder, and sitting with empty and with full bladder)	Sens: 60% Spec: 79%	PPV: 75% NPV: 66%	Funding: none declared. *retrospective chart review. F also underwent urinalysis, urine culture, history and physical exam; 96% had Q-tip test, 76% completed a voiding diary. ICS terminology used. If urethrovesical junction opened, urethroscopy considered positive for stress UI. Diagnosis of genuine stress UI if pt lost urine in 1 of 2 ways: during cough strain or increase in intraabdominal pressure; or on cough stress test. *values quoted in paper; equivocal diagnoses were excluded from the calculations (*n* = 11).
Sand 1987[148]	DS EL = III	218		F mean age 52 years (18–80) who had undergone multichannel UD evaluation owing to UI (83%) or urethral syndrome (17%) UD diagnosis 70% SUI, 17% MUI, 14% DO	Supine urethroscopic cystometry (*n* = 203)	Multichannel urethrocystometry	Sens: 25% pec: 94% (for DO)	PPV: 65% NPV: 74% (for DO)	Funding: none declared. 203 underwent dynamic urethroscopy and simultaneous supine cystometry (in which a detrusor contraction = sustained opening of the urethrovesical junction and proximal urethra during cystometry. 179 tested with standing, medium-fill, single-channel electronic cystometry. Detrusor contraction during cystometry was determined by a sustained pressure increase of > 15 cmH_2O in the absence of valsalva. ICS terminology used in the study.
					Standing single-channel cystometry (*n* = 179)	Multichannel urethrocystometry	Sens: 59% Spec: 82% (for DO)	PPV: 59% NPV: 82% (for DO)	

Imaging (1 of 2 tables)

Study	Study type and EL	No. of patients	Prevalence	Patient characteristics	Type of test	Reference standard	Sensitivity and specificity*	Positive and negative predictive value	Additional comments
Bergman 1988[177]	DS EL = II	67	UD diagnosis: 66% SUI, 34% DO	F mean age 39 years (21–78)	US (drop in urethrovesical junction of ≥ 1 cm positive for stress UI diagnosis)	UD diagnosis (water urethrocystometry at filling rate 60 ml/min resting; and stress UPP)	For SUI Sens 86% Spec 91% (no pts with DO or normal diagnosis had positive US result)	Unable to calculate from data given	Funding: none declared. US of bladder base and urethrovesical junction at rest and on maximal straining in the supine position. Drop in urethrovesical junction on straining measured in cm on US. Investigator blind to clinical and UD diagnosis. Q-tip angle also measured; the distance between the edge of the Q-tip and the examination table measured at rest and straining. ICS terminology used. *values quoted in paper.
					Q-tip (change in angle of ≥ 35° indicative of positive test)	UD diagnosis (water urethrocystometry at filling rate 60 ml/min resting; and stress UPP)	For SUI: Sens 90% Spec 55%	Unable to calculate from data given	

Imaging (2 of 2 tables)

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Khullar 1996[178]	Case series EL = 3	To compare bladder wall thickness measured by transvaginal US scan with UD diagnosis of DO by VCU ± ambulatory UD	180	F mean age 54 years (20–85) with urinary symptoms attending UD clinic for investigation	UD diagnosis	29% SUI, 24% DO, 24% MUI, 19% normal UD, 3% sensory urgency, 2% voiding difficulty	Funding: none declared ICS terminology used. Bladder wall thickness taken as mean of 3 measurements (perpendicular to the luminal surface of the bladder at the thickest part of the trigone; at the dome of the bladder; at the anterior wall of the bladder. Provocative cystometry conducted. Those with bladder thickness > 5 mm on US but not found to have DO also had ambulatory UD (*n* = 42, of whom 36 showed DO on ambulatory UD). *calculated by authors.
					Bladder wall thickness (median, IQR)	In DO grp: 6.3 (5.3, 7.7) Other grps 3.9 (3.4, 4.5) *P* < 0.0001	
					Accuracy of bladder thickness > 5 mm for diagnosing DO*	Sens 84% Spec 89% PPV 94%	
Robinson 2002[179]	Case series EL = 3	Investigate whether transvaginal US assessment of	128	F mean age 54 years (20–85) with irritative lower	Ambulatory UD diagnosis	SUI 34%, normal 29%, MUI 20%, DO 16%, voiding difficulties 1%	Funding: none declared. Bladder wall thickness taken as mean of 3 measurements (perpendicular to the luminal surface of

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		bladder wall thickness could replace ambulatory UD when investigating women with equivocal lab UD		urinary tract symptoms (frequency and urgency with or without urge UI) with normal lab UD; and F with equivocal UD lab UD (where UD do not correlate with clinical symptoms); attending tertiary referral ambulatory UD clinic	Bladder wall thickness (mean)	SUI 4.8 mm (95% CI 4.4 to 5.3) normal (no UI) 5.1 mm (95% CI 4.6 to 5.6) MUI 5.8 mm (95% CI 5.1 to 6.5) DO 6.7 mm (95% CI 6.0 to 7.4) *P* = 0.0001 between all diagnostic groups	the bladder at the thickest part of the trigone; at the dome of the bladder; at the anterior wall of the bladder. No overlap between 95% CI for either the 'normal' or stress UI groups compared with the DO group.
Heit 2000[180]	Case series EL = 3	To use intraurethral ultrasonography o correlate urethral anatomy with functional UD parameters for the purpose of distinguishing patients with intrinsic urethral sphincter deficiency from those with genuine SUI	39	F mean age 51 years (27–74) undergoing UD evaluation for symptoms of UI. 14 (36%) had prior continence surgery (6 retropubic urethropexies, 6 anterior colporrhaphies, 2 needle suspensions Exclusions: prolapse of the anterior vaginal wall beyond the hymenal ring in the standing position with straining; UD diagnosis of DO (= 18 of 57 originally investigated)	UD diagnosis	24 SUI; 5 (17%) Intrinsic urethral sphincter deficiency (ISD); 10 normal	Funding: none declared. UD done blind to results of US. UD: including digitally subtracted retrograde filling urethrocystometry, static and dynamic cough UPP at max. cystometric capacity, pressure-flow and Valsalva leak-point pressure studies. UD stress UI diagnosed if urine leakage demonstrated during dynamic cough UPP, Valsalva LPP determinations at 150 ml bladder vol., or max. cystometric capacity and continuous cough at max. cyst capacity in the standing position with and without the transurethral catheter in place. Intrinsic urethral deficiency diagnosed if LPP < 60 cmH_2O and a MUCP < 20 cmH_2O. ICS terminology used.
					Spec, PPV, and NPV of urethral measurements (longitudinal smooth muscle thickness and outer circumference, rhabdosphincter thickness) for distinguishing ISD from SUI, having assumed sensitivity of 80%	Specificities 58–75% PPV 30–40% NPV 93–95%	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Grischke 1991[181]	Case series (retrospective review of 4 years data) EL = 3	Determine how bladder neck descent and posterior urethrovesical angle correlated with UD diagnosis	84	F mean age 51 years (24–70), who had both UD and radiological data UD diagnosis: 40% SUI, 25% mixed UI, 20% urge UI, 15% normal	Correlation between UD and radiological diagnosis	Bladder neck descent (radiological diagnosis) found in 91% of women with stress UI, 90% with mixed UI, 75% with urge UI, and 53% with normal UD	Funding: none declared. MC UD performed.
					Posterior urethrovesical angle during straining	152 ± 33 in SUI 142 ± 23 in MUI 138 ± 40 in MUI 126 ± 30 in normal UD	
Bergman 1988[182]	Case series EL = 3	To prospectively assess the role of cystourethrography in the diagnosis of stress UI and to determine whether a surgical plan can be based on cystographic results	59	F mean age 57 (41–70) with 'pelvic floor relaxation; with (54%) or without (46%) stress UI	Prevalence of posterior urethrovesical angle ≥ 115°, angle of urethral inclination ≥ 45°, urethra at most dependent point in bladder funneling of proximal urethra, flatness of bladder base in continent vs incontinent grps	No significant differences between incontinent and continent groups in the prevalence of the parameters measured	Funding: none declared. MC UD performed; ICS terminology followed. Bead chain cystourethrography – bead chain inserted into bladder, which was filled to capacity with iodine-containing liquid. 5 radiographic landmarks measured: posterior urethrovesical angle, angle of urethral inclination (change ≥ 45° in erect position considered loss of anterior angle), most dependable portion of the bladder base, 50rethra50*n*50 of the proximal urethra, flatness of the bladder base.
Bergman 1988[183]	Case series EL = 3	Evaluate and compare information obtained by a small transrectal ultrasonic	85	F mean age 56 years (36–72), stress UI (*n* = 32) Control groups: (1)	Prevalence of urethra at the most dependable position in the bladder by cystography and US	SUI: 94%, 88% Control grp 1: 55%, 52% Control grp 2: 42%, 42%	Funding: none declared. MC UD performed; ICS terminology followed. A ≥ 1 cm drop in urethrovesical junction measured on

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		transducer and by X-ray cystography before and after surgery		symptomatic pelvic relaxation, no urinary complaints (*n* = 29) (2) Symptoms and UD diagnosis of bladder instability (*n* = 24); mean age 39 (21–57)			US was considered poor anatomical support to the urethrovesical junction. X-ray landmarks viewed were (1) most dependent position of the bladder base = at or posterior to the urethrovesical junction; (2) relationship between bladder base and inferior ramus of symphysis pubis; both evaluated in erect position on a lateral straining film. Pts with urethrovesical jct descended below posterior lower edge of the symphysis pubis on straining considered to have poorly supported urethrovesical jct on cystography. Sensitivity and specificity of 2 parameters (urethra at most dependent point in bladder; urethral descent on straining) reported with reference to two control groups (continent women with POP, and women with DO), though these were not sensitivities and specificities in the diagnostic accuracy sense; not possible to follow the calculations made in the published report.

Conservative management

Lifestyle interventions

Cohort and cross-sectional studies evaluating association of lifestyle factors and UI or OAB

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Dallosso 2003[190]	Cohort study EL = 2+	Investigate the association of lifestyle factors with the incidence of OAB (1 or both of urge UI several times a month, or urgency), and stress UI. [Further analysis of energy and nutrient intake published in Dallosso 2004.[191,192]]	6424	F ≥ 40 years in Leicestershire (not women of South Asian origin) completed a repeat food-frequency questionnaire at 1 year Part of Leicestershire MRC Incontinence Study	Incidence of UI/OAB at 1 year	At 1 year follow-up, 492 new cases of OAB, 421 of stress UI (incidence rates 9.2% and 8.3%)	Funding: Medical Research Council. All results from multivariate analysis (risk of onset between baseline and 1 year follow-up), OR (95% CI). No OR for smoking, veg, or chicken presented in paper in relation to stress UI. Tea and caffeine intaken also considered but only univariate analysis reported in paper.
					Bread consumption	Risk of OAB onset: bread > daily vs daily or less; 0.68 (0.55, 0.86) Risk of stress UI onset: bread > daily vs daily or less; 0.76 (0.61, 0.96)	
					Chicken consumption	Risk of OAB onset: chicken consumption (1/week vs < 1/week); 0.92 (0.70, 1.21) ≥ 2/week vs < 1/week; 0.64 (0.48, 0.87)	
					Vegetable consumption	Risk of OAB onset: consumption of vegetables (4/day vs 0–3/day); 0.69 (0.48, 0.98) 5/day vs 0–3/day; 0.83 (0.58, 1.18) 6/day vs 0–3/day; 0.74 (0.50, 1.09) ≥ 7/day vs 0–3/day; 1.12 (0.80, 1.58)	
					Carbonated drinks	Risk of OAB onset: Carbonated drinks (1/week vs < weekly); 0.90 (0.65, 1.24) 2–6/week vs < weekly; 1.32 (0.99, 1.76) daily or more vs < weekly; 1.41 (1.02, 1.95) Risk of stress UI onset: Carbonated drinks (1/week vs < weekly); 1.10 (0.80, 1.50) 2–6/week vs < weekly; 1.10 (0.81, 1.50) daily or more vs < weekly; 1.62 (1.18, 2.22)	
					Smoking	Risk of OAB onset: Current smoking vs never smoked; 1.44 (1.05, 1.98) Ex smoker vs never smoked; 1.24 (0.97, 1.58)	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
					BMI	Risk of OAB onset: BMI < 20 kg/m^2 (vs BMI 20–25); 0.82 (0.46, 1.44) BMI > 25–30 kg/m^2 (vs BMI 20–25); 1.24 (0.93, 1.63) BMI > 30 kg/m^2 (vs BMI 20–25); 1.46 (1.02, 2.09) Risk of stress UI onset: BMI < 20 kg/m^2 (vs BMI 20–25); 0.69 (0.38, 1.26) BMI > 25–30 kg/m^2 (vs BMI 20–25); 1.25 (0.94, 1.67) BMI > 30 kg/m^2 (vs BMI 20–25): 1.74 (1.22, 2.48).	
Dallosso 2004[191,192]	Cohort EL = 2+	Investigate the association between diet and the development of OAB[191] and stress UI[192] in women aged > 40 years	5816	Population as Dallosso 2003. Useable nutrient data from 5816 women	Energy (protein, fat, carbohydrates, cholesterol, fibre) Vitamins and minerals (retinol, vitamins B, C, D E; folate, calcium, iron, potassium, zinc, sodium, selenium, iodine, magnesium, copper)	Factors associated with reduced risk of OAB[191] (OR, 95% CI): Protein intake when adjusted for BMI (no numerical data) Vitamin D (4th quintile vs lowest quintile): 0.51 (0.34, 0.78) Potassium intake (3rd vs lowest quintile: 0.60 (0.40, 0.90) Factors associated with increased risk of stress UI[192] (OR, 95% CI): Total fat intake (highest vs lowest quintile): 2.02 (1.33, 3.05) Cholesterol intake (highest vs lowest quintile): 2.09 (1.40, 3.14) Vitamin B12 (4th and 5th quintile vs lowest): 1.84 (1.21, 2.79) and 1.66 (1.10, 2.52) Zinc (3rd and 4th quintile vs lowest): 1.57 (1.02, 2.40) and 1.89 (1.25, 2.85)	Funding: Medical Research Council. Only factors with OR and CI indicative of an association with OAB or stress UI reproduced here. No significant risk found for other factors. Logistic regression analysis performed.
Hannestad 2003[200]	Cross-sectional EL = 3	Investigate an association between lifestyle factors and UI in women.	6876	F ≥ 20 years, any UI; slight (few drops/month, 43%), moderate (few drops daily, 31%), severe (larger amounts at least once/week, 26%). Classification based on symptom description: 50%	Smoking (OR for UI)	Former smoking and current smoking (if > 20 cigarettes a day); OR 1.7 (1.4, 2.0), and 1.3 (1.1, 1.6) Former smoking if 15+ pack years history, OR 1.5 (1.3, 1.7)	Funding: Research Council of Norway; Norwegian University of Science and Technology; Norwegian Institute of Public Health, Nord-Tondelag County Council. All results OR (95% CI),
					Weight (OR for UI)	BMI 25–29 kg/m^2 (vs BMI < 25); 1.4 (1.3, 1.5) BMI 30–34; 1.9 (1.7, 2.1) BMI 35–39; 2.4 (2.1, 2.8) BMI ≥ 40; 2.7 (2.1, 3.5)	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
				stress UI, 11% urge, 36% mixed, 3% unclassified Continent women served as reference group for logistic regression analyses Substudy of a population-based survey (EPINCONT) performed in one county in Norway (1995–97)	Physical activity (low impact [not sweating/out of breath] or high impact [sweating/ out of breath]) (OR for UI)	High impact physical activity (vs < 1 h per week): 1–2 h per week; 1.1 (1.0, 1.2) ≥ 3 h per week; 1.0 (0.9, 1.2) Low impact physical activity (vs < 1 h per week): 1–2 h per week; 0.9 (0.8, 1.0) ≥ 3 h per week; 0.9 (0.7, 0.9)	logistic regression analysis used. No other factors investigated (alcohol, coffee) found to be associated with reduced UI risk.
					Caffeinated drinks (tea, coffee) (OR for UI)	Tea: 1–2 cups/day (vs 0 cups/day); 1.2 (1.1, 1.2) 3+ cups/day (vs 0 cups/day); 1.3 (1.2, 1.5)	
Moller 2000[188]	Cross-sectional EL = 3	Determine relationship between lower urinary tract symptoms* and possible associated risk factors (BMI, constipation [frequency of stool < daily], straining at stool)	487	F with symptoms > weekly and 564 with no symptoms. Age range 40–60 years Conducted in Denmark	BMI (OR, 95% CI)	BMI increased risk of stress UI, urge UI, urgency, 'continuous incontinence', night-time incontinence (quartiles 2,3,4, vs quartile 1) (Risk of incontinence or urgency quoted according to quartiles, but these not defined in the report)	Funding: Coloplast A/S, Pharmacia and Upjohn, and other sources. *lower urinary tract symptoms: UI, day or night-time frequency, postmicturition dribble, straining, urgency, incomplete bladder emptying, hesitancy. Only statistically significant findings reproduced here.
					Constipation (stool frequency < daily), (OR, 95% CI)	Stress UI 1.4 (1.0, 2.1) urgency 1.5 (1.0, 2.2) hesitancy 2.6 (1.2, 5.6)	
					Straining at stool (OR, 95% CI)	Stress UI 1.9 (1.3, 2.6) urgency 1.7 (1.2, 2.4) hesitancy 4.3 (1.8, 10.3) sensation of incomplete emptying 2.8 (1.7, 4.6) postmicturition dribble 1.9 (1.0, 3.5) straining 6.4 (2.0, 20.1)	
Asplund 2004[201]	Cross-sectional EL = 3	Assess relationship between nocturia and lifestyle factors (BMI, smoking, regular exercise, coffee and tea intake)	3669	F aged 40–64 years. Conducted in Sweden	Factors associated with reduced risk of ≥ 2 nocturia episodes/night	Nocturia 'less common' in 'regular' exercisers (no numerical data) 2 nocturia episodes 'twice as common' in women who did not vs those who did drink tea or coffee in the evening (no numerical data)	Funding: The Jamtland County Council, Ostersund Sweden. OR calculated by logistic regression analysis.
					Factors associated with increased risk of ≥ 2 nocturia episodes/night vs no more than 1 episode (OR, CI [not stated whether 95% CI used])	Smoking: 1–15 cigarettes vs no smoking: 1.4 (1.1, 1.8) > 16 cigarettes vs no smoking: 1.8 (1.1, 2.8) BMI ≥ 30 vs < 20 kg/m^2; 3.5 (2.6, 4.7)	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Burgio 1991[208]	Cross-sectional EL = 3	Determine prevalence, incidence and correlates of UI (smoking, caffeine, alcohol, BMI)	486	Healthy women, subsample of USA Healthy Women Study (investigation of cardiovascular risk factor changes in premenopausal women) aged 42–50 years. 58% had UI	BMI*	Women with regular UI (≥ 1 episode per month) had highest mean BMI; those who had never had UI had the lowest mean BMI (results shown in graph; BMI ranged from 25 to 29)	Funding: National Institutes of Health; National Institute on Aging. *reported to be the only significant result when risk factors analysed.
Nuotio 2001[193]	Cross-sectional EL = 3	Evaluate association of former and current smoking with urgency in older people	1059 (50% women)	M/F age 60–89 years Conducted in Finland	Smoking*	Former smoking vs Never: 2.62 (1.14, 6.0) Current smoking vs never: 2.54 (0.79, 8.22)	Funding: Medical Research Fund Tampere Uni Hosp; Uulo Arhio Foundation. All results for only women: (OR, 95% CI, by logistic regression). *current smoking = regularly now; former history of smoking = regularly almost every day for at least a year but not currently smoking.
					Alcohol (any use)	Alcohol vs no alcohol: 1.71 (0.99, 2.92)	
					Coffee	2–4 coffee cups/day vs 0–1: 1.81 (0.61, 5.41) > 5 coffee cups/day vs 0–1: 1.34 (0.42, 4.29)	
Roe 1999[209]	Cross-sectional EL = 3	Compare health and lifestyle factors (diet, smoking, BMI) of people with or without incontinence	6037 (56% women)	M/F in England; women (mean age 54 years (37–71), 11% of whom incontinent	Diet, smoking, BMI	No significant association between diet or smoking and UI (23% of total sample were smokers) More women who were obese (BMI > 29 kg/m^2) were incontinent than continent (27% vs 13%, $P < 0.0001$)	Funding: study done as part of Dept Health Postdoctoral Fellowship.
Bradley 2005[202]	Cross-sectional survey	To measure prevalence of pelvic floor symptoms in	297	F who had been enrolled at 1 site of the Women's Health Initiative study 4–	Prevalence of urinary symptoms	51% stress UI 49% urge UI 29% frequency	Funding: National center for research resources, and National institutes of

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
	EL = 3	noncare-seeking older women and the association between symptoms and lifestyle factors		6 years previously were invited to take part Mean age 68 years (57–84), mean BMI 30 (16–56) 3% prior continence or POP surgery; 11% treated for UI or OAB 8% current smokers, 42% past or current. 18% ≥ 1 alcoholic drink per week (6% per day). 68% drank ≥ 1 cup of coffee daily (of whom 69% drank ≥ 3 per day)	Univariate analysis of association between risk factor and pelvic floor symptoms* (OR, 95% CI)	BMI as risk factor for urinary symptoms (highest vs lowest quartile): Urgency 1.8 (0.8–4.0) urge UI 2.2 (1.0–4.8) Exercise (≥ weekly): Urgency 24% vs 35%, *P* = 0.03, OR 0.6 (0.4–1.0) Coffee drinking (yes vs no): difficulty emptying bladder 15% vs 3% *P* = 0.01 OR 8.6 (1.4–55.0) weak urinary stream 23% vs 5% *P* ≤ 0.01 OR 5.3 (1.5–19.0) Smoking: no factor associated with risk of UI or OAB	child health and human development. *adjusted Mantel–Haenszel odds ratio.
Song 2005[189]	Cross-sectional survey	To evaluate prevalence of UI in Fuzhou, a city in China; to clarify which risk factors predispose to UI, and compare risk factors for urge and stress UI	6006	F aged ≥ 20 years (mean 40, SD 11), mean BMI 22 (SD 3) 3% of total population selected randomly	Prevalence of UI	16.6% stress UI 10% mixed UI 7.7% urge UI	Funding: none declared. *multivariate logistic regression analysis undertaken for variables found to be associated with UI risk on univariate analysis. Smoking status also evaluated but not found to be associated with UI risk on univariate analysis.
					Lifestyle variables and association with UI*	Constipation (not defined): OR for stress UI 2.6 (95% CI 1.8 to 3.8) OR for urge UI 2.3 (1.4 to 3.7) Alcohol consumption (12 pts; drinks per week): OR for stress UI 4.7 (1.1 to 20.2) OR for urge UI 4.0 (0.9 to 17.3) Higher BMI (≥ 75th percentile) OR for stress UI 1.8 (1.5 to 2.2) OR for urge UI 1.5 (1.2 to 2.0)	
Nygaard 1990[217]	Cross-sectional EL = 3	Investigate prevalence of exercise and UI in women (where exercise = running, aerobics, tennis, walking, golf, cycling, racquetball, swimming, weight lifting)	326	F mean age 39 years (17–68). 47% some UI. 89% exercised at least once a week (current or past) Conducted in USA	Exercise habit	No relationship found between UI and presence or absence of exercise habit, though only 11% were non-exercisers (the reference group)	Funding: none declared.

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Bo 2001[218]	Cross-sectional EL = 3	Determine prevalence of stress and urge UI in female elite athletes and age-matched controls; and assess possible association between UI and eating disorders	1146	female elite athletes, who trained ≥ 8 h/day, and age-matched controls aged 15–39 years Conducted in Norway	Exercise habit	Prevalence of stress UI (41% elite athletes, 39% controls), and urge UI (16% vs 19%) was not significantly different Difference in prevalence according to type of sport not significant for stress UI. Prevalence of urge UI higher in endurance sports (27.5%) vs technical (15.3%), weight class (16.1%), ball games (11.8%), or gravity sports (10%) $P < 0.05$ Prevalence of eating disorders (DSM-IV) 20% in athletes vs 9% controls. Urge UI prevalence higher in athletes with eating disorders vs athletes without (20% vs 16%, $P < 0.05$)	Funding: none declared.
Bo 1989[219]	Cross-sectional EL = 3	Compare prevalence of stress UI in regular exercises vs sedentary women (regular exercise = organised physical activity once/week; sedentary = not participating in organised physical activity once/week)	205	F mean age 23–26 years Conducted in Norway	Exercise	Overall no significant difference in prevalence between regular exercisers vs sedentary women (26% vs 19%) Higher prevalence of stress UI in regular exercisers group who exercised > 3×/week vs sedentary (31% vs 10%, $P = 0.02$)	Funding: none declared.

Bowel

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Spence-Jones 1994[187]	Cohort EL = 2+	To investigate impact of straining at stool on urogynaecological function in later life	73	F mean aged 52–57 years with uterovaginal prolapse ($n = 23$, 10 of whom had 'minor' stress UI symptoms), and women with stress UI ($n = 23$) with a control group (27 women being investigated for abnormal vaginal bleeding)	Straining at stool as a young adult (16–35 years)	reported by significantly more women with prolapse or stress UI than the control group (61% and 30% vs 4%, $P < 0.001$)	Funding: Warburg Trust, and St Marks' Research Foundation.
					Bowel frequency of less than twice a week as young adults	reported by significantly more women with prolapse vs control (48% vs 8%, $P < 0.001$	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
McGrother 2006[14]	Cohort EL = 2+	To identify consistent and coherent general health and specific comorbidities leading to the onset of OAB and SUI in women in the general population	12,570	F aged 40 years or over drawn from list of 108 general practices in Leicestershire Prevalence at baseline: 7.7% pure stress UI, 7.7% OAB, 12.7% mixed UI Incidence at 1 year: 3.6% pure stress UI, 5.4% OAB, 4.5% mixed UI (Leicestershire MRC study)	Risk of OAB at 1 year (multivariate analysis)*	Bowel urgency OR 2.2 (95% CI 1.5 to 3.4), $P < 0.01$	Funding: Medical Research Council. Information gained from postal questionnaires at baseline and after 1 year. Response rates 65% and 80%. *only data relevant to lifestyle factors extracted (bowel).

Dietary factors (caffeine and fluid intake) (1 of 2 tables)

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Bryant 2002[194]	RCT EL = 1+	95 (91% women), 74 completed and analysed*	M/F mean age 57 years, symptoms of urgency, frequency and/or urge UI, routinely ingested > 100 mg caffeine/day Exclusions: significant cognitive impairment, pregnancy, UTI	Caffeine-fading + bladder training (36)	Bladder training with no caffeine restriction (n = 38)	1 month	Leakage episodes/24 h (mean change)	–55 vs –26%, P = NS	Funding: none declared. Caffeine-fading: reduce caffeine intake by 1 drink/day, until max. 100 mg/day reached; also review of caffeine history, urinary symptoms, time/vol./caffeine charts. Bladder training: increasing voiding interval (no target stated); do not exceed 2 litre intake per 24 h; teaching urinary deferment techniques, ceasing 'just-in-time' voiding. Caffeine intake fell by –58 vs –11%, $P < 0.0001$. *caffeine levels in those analysed vs withdrew checked – difference NS (P = 0.99).
							Urgency episodes/24 h (mean change)	–61 vs –12%, P = 0.002	
							Frequency/24 h (mean change)	–35 vs –23%, P = 0.037	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Arya 2000[195]	Case–control EL = 2+	259	Women, mean age, symptoms of UI presenting at tertiary centre for urodynamics Cases: DO on provocative cystometry with MUCP > 20 cmH_2O (*n* = 131) Control: genuine stress UI (no unstable bladder contractions on cystometry) (*n* = 128)	Exposure: Caffeine intake; minimal (< 100 mg /day), moderate (100–400 mg /day), high (> 400 mg /day)	–	–	Risk factors for detrusor overactivity	Age > 55 years: OR 1.7 (95% CI 1.03 to 2.9), *P* = 0.028 High vs minimal caffeine intake:* OR 2.4 (95% CI 1.1 to 6.5), *P* = 0.018 High vs moderate:** OR 1.3 (95% CI 0.8 to 2.4), *P* = NS Moderate vs minimal caffeine intake * OR 1.5 (95% CI 0.1 to 7.2), *P* = NS Current vs never smokers:** OR 1.9 (95% CI 1.0 to 3.8), *P* = 0.027	Funding: none declared. Women with detrusor overactivity had significantly higher mean age (56 vs 45 years), and more were current smokers (43% vs 23%), *P* = 0.04. Mean caffeine intake 484 ± 123 mg/day vs 194 ± 84 mg/day, *P* = 0.02. *multivariate analysis, adjusting for differences in age and weight. **only univariate analysis reported.
							Risk factors for detrusor overactivity (multivariate analysis; controlling for age and smoking status)	High vs minimal caffeine intake: OR 2.4 (95% CI 1.1 to 6.5), *P* = 0.018 Moderate vs minimal caffeine intake: OR 1.5 (95% CI 0.1 to 7.2), *P* = NS	
Dowd 1996[203]	RCT EL = 1–	58 eligible, (32 analysed as had complete diary sets)	Women, mean age 70 years (52–89), UI for 6 months or more, independent in self-care	Increased fluid intake of ≥ 500 ml but total intake not > 2400 ml/day	Maintained fluid intake (*n* = 8) Reduced fluid intake by 300 ml,	5 weeks tx	Leakage episodes (mean change)	–0.1 vs +0.09 vs –0.4, *P* = NS from baseline in all grps	Funding: none declared. Adherence to fluid intake protocols was 'poor'.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
				(*n* = 14)	but total intake not < 1000 ml/day(*n* = 10)	Follow-up at 3 months (*n* = 29)	Leakage episodes	22 reported overall decrease in episodes since participation in the study, 6 no change, 1 increase	
							Frequency	11 reported decreased frequency 15 noted no change in voiding patterns	
Swithinbank 2005[204]	Cross-over RCT EL = 1–	84 randomised, 69 (82%) completed and analysed	F mean age 55 years UD stress UI or idiopathic DO. No pts with stress UI had prior surgery 69 women, mean age 55 years completed the study, including 39 with USI and 30 with IDO Exclusions: UTI, liver, cardiac, renal disease, and diabetes mellitus; treatment with antidepressants, anticholinergics, diuretics	Fluid manipulation for 3 weeks* (order of increasing or decreasing fluid intake randomised)	Fluid manipulation for 3 weeks* (order of increasing or decreasing fluid intake randomised)	4 weeks	Leakage episodes /day (change in median from baseline)	After 1 week caffeine restriction: SUI –0.8 (50%) DO –0.3 (33%), *P* = NS After increasing fluid intake: SUI –0.9 (56%) DO +0.2 (22%) After decreasing fluid intake: SUI –1.1 (69%), *P* = 0.006 DO –0.4 (44%), *P* = 0.006	Funding: none declared. *1 week baseline, then caffeine restriction with normal fluid intake for 1 week; next 2 weeks, increased decaffeinated fluids to 3 litre daily or decreased decaffeinated fluids to 750 ml (order randomised). [EL = 1–] Only completers analysed, results presented for total group not between groups based on order of randomisation. QOL also assessed using shortened version of

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Frequency/day (change in median from baseline)	After 1 week caffeine restriction: SUI –0.2 (3%) DO –0.1 (1%) After increasing fluid intake: SUI +1.1 (15%), *P* < 0.003 DO +1.8 (20%), *P* < 0.003 After decreasing fluid intake: SUI –0.9 (13%), *P* < 0.003 DO –1.3 (14%), *P* < 0.003	BFLUTS; no numerical data.reported. It was reported that decreasing fluid intake showed sig. improvement in QOL in women with SUI and in those with DO.
							24 h pad test (change in median weight from baseline)	After 1 week caffeine restriction: SUI –0.5 g (7%) DO –0.3 g (5%) After increasing fluid intake: SUI +0.3 g (4%) DO +6.2 g (105%) After decreasing fluid intake: SUI –0.7 g (9%) DO –1.5 g (25%)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Urgency episodes /day in IDO group only (change in median from baseline)	After 1 week caffeine restriction: DO +0.2 (4%) After increasing fluid intake: DO +2.4 (46%), $P < 0.003$ After decreasing fluid intake: DO –0.9 (17%), $P \leq 0.042$	

Dietary factors (caffeine and fluid intake) (2 of 2 tables)

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Wyman 1991[206]	Case series EL = 3	To investigate an association between fluid intake and voiding patterns over 1 week	126	F ≥ 55 years with UI who were enrolled in a study of behaviour management (Fantl 1991, *n* = 126).[205] Urodynamic diagnosis: 29% DO, 71% stress UI	Correlation between fluid intake and urinary outcomes	$r = 0.38$, $P = 0.0001$ diurnal frequency $r = 0.22$, $P = 0.02$ nocturnal frequency $r = 0.34$, $P = 0.0001$ leakage	Funding: National Institute for Aging, National Centre for Nursing Research, National Institutes of Health. Mean fluid intake 1.7–1.8 litres/day in each diagnostic group.
Creighton 1990[196]	Before and after study EL = 3	An investigation of the urodynamic effects of 200 mg caffeine (twin-channel cystometry and uroflowmetry, 30 mins after intake)	30	20 women with DO; symptoms exacerbated by caffeine containing drinks 10 asymptomatic women (controls)	Pressure rise on filling (cmH_2O) unclear whether mean or median	Cases: With caffeine 17 (0–42) without caffeine 11 (0–25), $P < 0.03$ Controls: 2 (0.5)	Funding: none declared. No sig. changes in other urodynamic parameters in either group.
Tomlinson 1999[197]	Case series EL = 3	Evaluate relationship between caffeine intake and UI, during the initial 2–4 week self-monitoring phase of a behaviour	34	F ≥ 55 years with UI (≥ 2 episodes/week)	Caffeine intake/day* Fluid intake/day Urine loss/day	Fell: 900 to 480 ml (47%) Increased: 1680 to 1870 (11%) Fell: 23.4 g to 14.2 g (39%)	Funding: National Institutes of Nursing Research, National Institutes of Health, Johnson and Johnson supplied 'products'. *all median changes for women who were encouraged to reduce caffeine intake specifically. change in caffeine intake not significantly

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		management programme (one arm of a RCT[199] described in the behavioural management section)			Daytime leakage episodes/day	Fell: 2.33 to 1.0 (57%)	associated with change in any outcome (standard linear regression analysis).
					Voiding interval, h/daytime	Fell: 2.26 to 2.18 (4%)	
James 1989[198]	Case series EL = 3	Investigate effects of chronic caffeine intake on UI in psychogeriatric patients with UI	14 (8 women)	M/F, 64–89 years, psychogeriatirc patients who underwent a 13-week programme of alternating caffeine intake or abstinence	Day leakage episodes (mean, SD)	Caffeine intake*: 4.38 (1.57); 4.71 (1.29) Caffeine free: 2.85 (1.16); 3.14 (1.17)	Funding: none declared. *2 periods of caffeine intake, 2 caffeine-free periods.
					Night leakage episodes (mean, SD)	Caffeine intake*: 2.5 (0.34); 2.56 (0.27) Caffeine free: 1.91 (0.25); 2.10 (0.23)	

Smoking

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Tampakoudis 1995[207]	Case–control EL = 2–	160	Cases (*n* = 80): F mean age 47 years, UI, 63% smokers, 37% non-smokers; underwent urodynamics Controls (*n* = 80): F mean age 42 years, UI, 25% smokers, 75% non-smokers; underwent urodynamics	–	–	–	Smoking status (cases and controls)	Smokers: 63% cases vs 25% controls *P* < 0.0005, OR 4.2 (95% CI 2.16 to 8.23)* Non-smokers 37% vs 75%	Funding: none declared. Heavy smokers: (tar consumption 100–1500 g, nicotine consumption 15.84–240 g). Light smokers (tar 3.6–14.1 g, nicotine 3.6–14.1 g) Current stop start smokers: tar 0.1–3.4 g, nicotine 0.1–0.125 g). *calculated from data.
							Prevalence UI in cases	Smokers (*n* = 48); 19 (40%) stress UI (10 heavy, 5 light, 4 stop start); 29 (60%) urge UI (18 heavy, 6 light, 5 stop start) Non-smokers (*n* = 32); 21 (66%) stress UI, 11 (33%) urge UI *P* < 0.025 for urge UI in smokers vs non-smokers	

Weight

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Subak 2005[210]	RCT EL = 1–	48 randomised, 40 assessed at 3 months	Overweight and obese F experiencing at least 4 UI episodes per week Median (with 25% to 75% interquartile range [IQR]) baseline age was 52 years (IQR 47–59), weight was 97 kg (IQR 87–106) and UI episodes were 21 weekly (IQR 11–33)	A 3-month weight reduction program* *n* = 24 randomised, 19 analysed	No intervention for 3 months (then received the same intervention) *n* = 24 randomised, 19 analysed	3 months	Weight change kg (median, IQR)	–16 (9 to 20) vs 0% (–2 to 2), *P* < 0.0001	Funding: Mount Zion Health Services, and University of California Committee on Research. [EL = 1–] Only completers analysed. *weight reduction programme = low calorie liquid diet (max. 800 kcal /day), encouraged to increase physical activity until exercising 60 min per day, and taught 'standard cognitive and behavioural skills' to assist in modifying eating and exercise habits. Pts met weekly in group sessions led by a nutritionist, exercise psychologist, or behaviour therapist and followed a structured protocol. Following the weight reduction program the wait-list control group experienced a similar median reduction in weekly UI episodes (71%).
							Change in weekly UI episodes and scores (median changes)	–60% (IQR 30% to 89%) vs –15% (IQR –9% to 25%) *P* < 0.0005 (mean 51% vs 5%)	
							Quality of life (median change in scores)	IIQ: –45 vs –2%, *P* = 0.01 UDI: –33 vs +3%, *P* < 0.0001 SF-36 physical component: –19 vs –1%, *P* = 0.003 SF-36 mental component: –5% vs 0, *P* = NS	
				All pts assessed beyond randomised phase		9 months (6 months after end of tx)	All outcomes above	All sig. improved vs baseline	
Bump 1992[211]	Case-series EL = 3	13	F mean age 41 years (22–65), morbidly obese (> 45 kg over ideal body weight); mean pre-op weight 131.5 kg (100–153), mean BMI 49.4 kg/m^2 (38–62) 12 had bothersome UI symptoms; 2 urge, 3	Gastric bypass surgery	–	Mean 14.5 months (range 11–24)	Leakage episodes/week	–12.5, *P* = 0.001 (93%) vs baseline	Funding: none declared. Mean weight after surgery: 88 kg (SD 17), *P* << 0.009. Mean BMI post-op 33 kg/m^2.
							Day and night-time frequency	No sig. change	
							Self-reported cure	9/12 no bothersome symptoms, *P* < 0.04. 7/10 with stress UI and 8/9 urge UI cured	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			stress, 7 mixed. Urodynamic diagnosis (*n* = 6); 2 detrusor instability, 2 stress UI, 2 DO and stress UI				Objective cure (urodynamics)	4/6	
Subak 2002[214]	Case series EL = 3	10	F mean age 48 years, mean BMI 38.3 ±10.1) kg/m^2, enrolled in weight reduction programs (low calorie liquid or reduced calories solid diet; ≥ 4 UI (mean13 [±10]) leakage episodes/week. Type of UI; 6 urge, 1 stress, 3 mixed Exclusions: UTI, urinary retention, drug tx for UI, planned UI surgery	Weight loss	–	3 months (duration of weight loss program)	≥ 50% reduction in leakage episodes/week	6/6 among women achieving weight loss of ≥ 5% vs 1 of 4 women with < 5% weight loss (P < 0.03)	Funding: American College of Obstetricians and Gynaecologists; Pharmacia and Upjohn Research Award. 8 of 10 lost weight. 6 lost ≥ 5% of baseline weight. Mean weight loss was 15 kg (mean change in BMI –5.3 ± 6.2 kg/m^2).
							Leakage episodes/week	Mean change –5 (–40%) Median change –6	
Deitel 1988[212]	Case series EL = 3	138	Morbidly obese F (mean age 35 years [17–56]) who had lost ≥ 50% of their excess weight following bariatric surgery	Weight loss (bariatric surgery)	–	Between 2 and 5 years	Prevalence of stress UI	Fell from 61% to 12% after stabilisation of weight loss (between 2 and 5 years)	Funding: none declared. Aim of study was to evaluate gynaecologic-obstetric disorders after loss of massive excess weight
							Mean weight after stabilisation of weight loss	79 kg (SD 13) from a pre-operative mean weight of 124 kg (SD 23)	
Ahroni 2005[213]	Case series EL = 3	195 (83% F)	M/F mean age 44 years who had undergone LAGB; to be considered for surgery patients had to have BMI ≥ 35, or have lower BMI with significant co-morbidities that were likely to	Laparoscopic adjustable gastric banding (LAGB)	–	1 year	Changes in weight (mean)	BMI –13.5 kg/m^2 % excess body weight lost 45.7% (± 17.1)	Funding: none declared. Pts were seen for band adjustments as needed throughout the year. Aim of study was to establish weight loss, change in co-morbidities (self-reported presence or absence of 12
							Stress UI (in 77% who completed 1 year interview)	19% at baseline 46% 'much better' 18% better 36% no change	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			significantly improve by weight loss Mean BMI was 46 (SD 8), mean weight 127 kg				Complications	Rate 9.2% 1.5% slipped bands 2.1% port problems 4.1% temporary stoma occlusion 0.5% banding removed 0.5% (*n* = 1) death (pneumonia 2 weeks after procedure)	conditions, 1 of which was stress UI); medication usage, and general health status after the LAGB procedure.

Physical exercise

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Nygaard 1997[215]	Cohort EL = 2+	Investigate the prevalence of stress or urge UI in past participants in long-term high impact exercise (gymnastics or track and field) compared with low impact exercise (swimming)	104	F, past USA Olympians	Prevalence of stress or urge UI according to prior participation in high or low-impact exercise	No significant differences: Urge UI: 34% high impact vs 17% low Stress UI: 41% vs 50%	Funding: none declared. BMI reported to be a risk for regular stress and urge UI.
Eliasson 2005[216]	Cohort EL = 2+	To describe physical activity and urinary leakage before, during and after the first childbirth	725 enrolled, 665 (81%) answered both questionnaires*	F mean age 28 (17–43) in their first pregnancy. Mean BMI 22.5 (range 16.6–41.3) The physical activity/exercises were classified according to their impact on the pelvic floor, and the women were divided into three groups: high-impact exercise (*n* = 327), low-impact exercise (*n* = 84) and the inactive group (*n* = 254)	Prevalence	39% before pregnancy: 44% in high-impact group, 30% low-impact, and 35% in no activity grp 62% during pregnancy: 64% in high-impact group, 60% low-impact, and 63% in no activity grp 75% at 1 year post-partum	Funding: Centre for healthcare sciences Karolinska Institutet, Stockholm. *women answered one questionnaire during the 36th gestation week and another 1 year post-partum. High-impact exercise = gymnastics, running, jumping, dancing, ball sports and strength training. Low-impact = walking, bicycling, swimming, riding.
					Multivariate analysis of risk factors (type of exercise considered)	Pre-pregnancy high-impact activity OR 1.4 (95% CI 1.0 to 2.0), *P* = 0.038	

Physical therapies

Pelvic floor muscle training for treatment of UI

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Bo 1999[226] Bo 2000[939] (QOL report of PFMT vs control grp only)	RCT EL = 1+	122 randomised, 107 analysed*	F mean age~47–52 years, stress UI, > 4 g leakage (pad test with standardised vol.) Exclusions: other type of UI, involuntary detrusor contractions > 10 cm H_2O on cystometry, abnormal bladder function (residual urine > 50 ml, maximal uroflow < 15 ml), previous surgery for stress UI	PFMT (*n* = 25)	Electrical stimulation (ES) (*n* = 25) Vaginal cones (*n* = 27) Control (*n* = 30)	6 months tx	Pad test (provocative with standardised volume [200 ml]), mean change, g, (95% CI)	–30.2 (–43.3, –16.9) vs –7.4 (–20.9, +6.1) vs –14.7 (–27.6, –1.8) vs –12.7 (–27.2, +1.8) [–78 vs –13 vs –30 vs –25%] *P* ≤ 0.02 PFMT vs all grps	Funding: Norwegian Fund for Postgraduate studies in Physiotherapy, Norwegian Research Council. Coloplast AS provided continence guard, Vitacon AS the electrical stimulators and cones.
							Objective cure (≤ 2 g leakage on pad test with standardised vol.)	44 vs 28 vs 15% vs 7%, *P* = 0.02 (unclear which comparison *P* value relates to)	*ITT results reported to be similar (no data) although ES vs control grp 'weaker' in when compared in this analysis.
							Subjective assessment (5-point ordinal scale), % reporting	Continent/almost continent: 48 vs 12 vs 19% vs 3% Improved: 44 vs 52 vs 44% vs 0% Unchanged: 8 vs 28 vs 37% vs 87% Worse 0 vs 8 vs 0% vs 10%	Physio taught women re: anatomy and physiology of pelvic floor and lower urinary tract, and continence mechanisms. Correct PFM contraction taught, and assessed by vaginal palpation.
							Subjective cure (UI 'unproblematic')	56 vs 12 vs 7% vs 3%, *P* < 0.001 PFMT vs other grps	PFMT: 8–12 high intensity contractions 3×/day at home, additional training in grps 1×/week for 45 min with physio, in lying, standing, sitting, kneeling positions. Contraction held for 6–8 s, 3–4 fast contractions then added, rest 6 s. Body awareness, breathing, relaxation exercises, and strength training for abdominal, back
							Leakage episodes /3 days (mean change [95% CI])	–1.2 (–2.0, –0.4) vs –0.7 (–1.5, +1.1) vs +0.8 (–1.2, +2.8) vs +0.3 (–0.5, +1.1) [–60 vs –30 vs +30 vs +10%] *P* ≤ 0.03 PFMT vs cones/control, *P* = 0.02 ES vs control	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							24 h pad test (mean change, g)	–6.6 (–12.1, –1.1) vs –0.5 (–8.9, +7.9) vs –22 (–55.7, +11.7) vs –7.1 (–20.2, +6.0) [–46 vs –2 vs –42 vs –17%] *P* = NS for all comparisons	and thigh muscles performed in grp sessions. Audiotape with verbal guidance for 12 max. contractions available for home training.
							Leakage index (frequency of urine leakage during sneezing, coughing, laughing, walking, running, jumping, lifting on a 5-point scale: 5 always, 4 often, 3 sometimes, 2 seldom, 1 never)	–0.9 (–1.1, –0.7) vs –0.2 (–0.4, 0) vs –0.3 (–0.5, –0.1) vs +0.1 (–0.1, +0.3) [–32 vs –7 vs –10 vs +3%] *P* ≤ 0.04 all active tx grps vs control, and PFMT vs ES or cones	ES: MS 106 twin device, 30 min/day biphasic intermittent current, 50 Hz frequency, pulse width 0.2 ms, 0–120 mA with individually adapted on-off cycles (on-time range 0.5–10 s, off-time 0–30 s). Physio observed ES in clinic once/month. Cones: Mabella cones used 20 min/day, pts progressed through 3 weights (20, 40, 70 g) according to ability to retain cones.
							Social activity index (9 different social situations assessed on 10 cm VAS; 0 impossible, 10 no problem taking part)	+0.6 (0.2, 1.0) vs +0.6 (0.2, 1.0) vs +0.1 (–0.3, +0.5) vs –0.2 (–0.8, +0.4) [+7 vs +7 vs +1 vs –2%] *P* ≤ 0.02 all active tx grps vs control, and PFMT vs ES	Control group offered use of Continence Guard device, proportion using this not stated. Active tx grps met phyiso 1×/month for motivation, monitoring of PFM strength, and tx adjustment if necessary.
							PFM strength (mean change, cmH_2O)	+8.2 vs +3.8 vs +3.6 vs 'no sig., change' in control grp *P* ≤ 0.03 PFMT vs all grps	Physio evaluated PFM function during contraction. Muscle strength evaluated

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects	0 PFMT 2 (8%) ES (1 tenderness, and bleeding, 1 discomfort) 4 (15%) cones (1 abdominal pain, vaginitis, 1 bleeding). 32% ES and 52% cone groups reported motivation problems with stimulator/devices	by balloon catheter connected to pressure transducer. Withdrawals: 4 PFMT, 7 ES, 1 cones, 1 control.
							QOL (BFLUTS) [PFMT vs control only]	Greater improvement in PFMT grp vs control in 4/5 parameters: interference with social life or physical activity, overall interference with life, unsatisfied if had to spend rest of life with symptoms as they are now	
Miller 1998[227]	RCT EL = 1+	27	F mean age 69 years (60–84), mild-moderate stress UI, leakage ≥ 1/week and up to 5×/day, direct visualization of urine loss during cough Exclusions: systemic neuromuscular disease, previous bladder surgery, active UTI, inability to contract PFM despite instruction and examination, POP beyond hymenal ring.	PFMT (with the Knack) (*n* = 13)	Control (*n* = 14)	1 week	Leakage (standing paper-towel stress test; mean (SD) area (cm^2) measured after 3 consecutive coughs of given intensity	Medium cough: 0.4 (1.04) vs 21.2 (44.8) Deep cough: 32.7 (33.9) vs 30.4 (44.2), *P* = 0.03	Funding: Public Health Service Grants. PFMT: PFM physiology and contraction including the Knack (just before and during a hard cough), taught; checked by vaginal palpation. Control group had no treatment initially, then underwent active tx for 1 week.
							PFM strength (digital palpation scores, 0–21), mean (SD)	11.2 (4.3) vs 10.8 (4.9) at 1 week	
Henalla 1989[228]	RCT EL = 1+	104 randomised, 100 analysed and followed up to 1 year	F age not stated, urodynamic stress UI Exclusions: complicated history of UI e.g. history of	PFMT (*n* = 26)	Electrical stimulation (*n* = 25) Topical oestrogen	3 months tx, further 9 months follow-up	Cure (negative pad test) or improvement	65% vs 32% vs 12% vs 0 (3 months), *P* < 0.001 PFMT vs baseline At 12 months: 54% vs 28% 12% vs 0	Funding: none declared. PFMT: pts checked own PFM contraction using index and middle fingers; 5×5 s contractions/hour.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			fistula, > 1 previous surgical procedure for UI; major prolapse		(*n* = 24) Control (*n* = 25)		Unchanged symptoms	35 vs 68 vs 87% vs 100% (3 months)	Seen weekly by physio to check progress. ES: interferential current, 0–100 Hz freq according to pt's tolerance, 10 weekly sessions of 20 min at physio dept. Topical oestrogen: conjugated equine oestrogens, 2 g via a vaginal applicator every night. Control: no treatment. Type of pad test not stated.
							Pad weights	No numerical data. Sig. reduction reported in PFMT and ES grps, $P < 0.02$ vs baseline (3 months)	
							MUCP	No numerical data. Sig. increase reported in oestrogen grps, $P < 0.001$ vs baseline (3 months)	
Ghoniem 2005[229]	DB RCT EL = 1+	201	F 29–75 years (mean 51–54), urodynamic stress UI (18%) or positive cough stress test and normal micturition frequency of < 8 voids day (82%); ≥ 2 leakage episodes/day. 11% had prior continence surgery Exclusions: advanced POP, active or recurrent UTIs, continence surgery within 1 year, current	Duloxetine 80 mg + PFMT (*n* = 52)	Duloxetine 80 mg (*n* = 52) PFMT (*n* = 50) Placebo (no active tx) (*n* = 47)	12 weeks tx	Leakage episodes (median change from baseline)	–57 vs –57 vs –35 vs –29% Responder rate (≥ 50% reduction in leakage episodes): 61 vs 57% vs 26% vs 25% $P \leq 0.004$ duloxetine ± PFMT vs PFMT alone or no active tx	Funding: Eli Lilly and Company, and Boehringer Ingelheim. Primary aim of study was to compare the effectiveness of duloxetine + PFMT vs control. The study used a double-dummy design. PFM contraction checked at baseline. PFMT: written instructions to perform 3×10 long and 2×10 rapid contractions 4 days/week (total 200 contractions/week), plus instructions to contract PFM with physical events
							I-QOL (mean change in score)	+13.1 vs +8.3 vs +7.8 vs +4.8% $P = 0.011$ duloxetine + PFMT vs no active tx	
							Patients Global Impression of Improvement (% reporting improvement)	71 vs 54 vs 65% vs 42% $P = 0.005$ duloxetine + PFMT vs no active tx	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			device or drug tx for UI, prior formal PFMT, prior hip fracture or replacement				Adverse effects (both duloxetine grps vs placebo [no duloxetine])	Any 82% vs 69% nausea 39% vs 5% dizziness 18% vs 5% dry mouth 18% vs 3% constipation 14% vs 3% insomnia 12% vs 1% somnolence 11% vs 1% asthenia 6% vs 0% ($P \leq 0.029$ duloxetine vs placebo for all effects) Discontinuation for adverse effects by each grp: 31% vs 23% vs 2% vs 0	known to cause leakage. Placebo (sham) PFMT: predominant hip abductor contraction (legs crossed at ankles, knees and hips flexed), same number of contractions as PFMT grp. Duloxetine daily dose taken as 40 mg twice daily.
Burns 1993[230]	RCT EL = 1+	135, 123 completed and analysed	F mean age 62 years, predominant stress UI, ≥ 3 episodes/week, urodynamic stress (91%) or mixed (9%) UI, residual urine < 50 ml, peak urine flow > 15 ml/s	PFMT (n = 43)	PFMT + biofeedback (n = 40) Control (n = 39)	8 weeks tx, (follow-up at weeks 20–21 and 32–33; data not reported by tx group)	Leakage episodes (mean change)	8 weeks: –54 vs –61 vs –6%, $P < 0.001$ active tx vs control	Funding: National Institute on Aging, National Center for Nursing Research. PFMT: initial instruction by 12 min video, 4×20 contractions increased to 200/day over 4 weeks. Leaflet also provided. Further instruction available at weekly visits. Biofeedback: vaginal probe attached to EMG and digital integrator. 3–10 s quick-sustained PFM contractions at biofeedback sessions once/week. Control: no treatment for 8 weeks; after 2nd urodynamic evaluation, offered PFMT or PFMT + biofeedback.
							Self-reported cure	16 vs 23% vs 3%, $P < 0.005$ active tx vs control	
							Self-reported improvement	50–99% improvement: 44 vs 45 vs 15 $P < 0.05$ active tx vs control 0–49% improvement: 40 vs 32% vs 82%	
							MUCP (mean change, cmH_2O)	–3 vs 0 vs +11%	
							PFM performance (mean change, μV)	Quick: +3 vs +71% vs 3%, $P \leq 0.005$ PFMT + biofeedback vs other grps Sustained: +6 vs 100% vs 11%	
Lagro-Janssen 1992[231,232]	Quasi RCT EL = 1–	110 randomised n	F mean age ~43 years (20–65), UI ≥ 2× month.	Behaviour therapy (n = 54)	Control (tx delayed by 3 months)	3 months tx, follow-up at 3 months for	Severity of UI (% dry or 'mild' UI at 3 months)	Total grp: 57% vs 4% P value not stated	Funding: 5 year follow-up; Dutch prevention fund. Control and active grps

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Lagro-Janssen 1998[233] (5 year follow-up of total grp)			Urodynamic assessment of UI (60% stress, 18% mixed, 16% urge; 33 from both grps had stress UI[232]) Exclusions: previous UI surgery, neurological diseases, UTI		(*n* = 56)	comparison, and at 1 year after treatment	Leakage episodes (mean change at 3 months)	Total grp: –63 vs +9%, *P* < 0.01 *Stress UI subgroup:* –72 vs +10%, *P* < 0.01	received initial advice and instructions about protective aids e.g. incontinence pads. Control grp did not receive tx for first 3 months of trial but thereafter offered behaviour therapy. Behaviour therapy: PFMT for stress UI, bladder training for urge UI, bladder training followed by PFMT for mixed UI. Initial PFMT instruction given by GP, written instructions then given for 5–10 sessions/day of 10 exercises to be done during normal daily activities. Contraction checked by vaginal palpation. Bladder training: emphasis on fixed voids; increasing voiding interval by 15 min, target 7 voids at an ordinary fluid intake. Results not presented according to type of UI in this publication, though results in women with PFMT treated with stress UI have been published
							Subjective assessment at 3 months	Improved/dry 74% vs 3% no change 24% vs 94% deteriorated 2% vs 3%. *Stress UI subgroup:* improved/dry 85 vs 0 no change 15% vs 88% deteriorated 0% vs 12%. In control grp after active tx: 74 vs 24% vs 2%	
							Long-term effects (at month 12 active grp, month 15 'control' grp)	Improved/dry 67% both grps; no change 33% both grps, deterioration 0 both grps	
						5 year follow-up of total grp[233]	Leakage episodes /week (mean differences between 1 and 5 years)	+2.65 (95% CI 0.67 to 4.62), *P* < 0.01 Stress UI subgroup: +2.06 (95% CI –0.28 to 4.39)	
							Improvement (vs pre-tx)	69% reported improvement or dryness 22% no change 9% worse	
							Satisfaction	67% satisfied 13% not satisfied	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Severity (dry/mild/moderate/severe)	40% same category 45% moved into contiguous category 15% moved by 2/3 categories	separately.[232] 5 year follow-up: Of the 88 pts, 14% had additional therapy, (2% oestrogens, 2% anticholinergics, 10% physio). 2 pts with exceptional changes in leakage episodes not included in analysis (+64 and +157 change).

Different pelvic floor muscle training regimens

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Bo 1990[234,235] Bo 1996 (5 year follow-up of intensive arm)[240] Bo 2005 (15 year follow-up of both arms)[241]	RCT EL = 1+	57 randomised, 52 analysed**	F mean age 45 years (24–62), genuine stress UI Exclusions: DO or UTI	Intensive PFMT (*n* = 23)	Standard PFMT (*n* = 29)	6 months tx and follow-up	Self-reported cure	2/23 vs 0/29 (9% vs 0%)	Funding: Foundation for Education and Research in Physical Therapy and the Research Council for Science and the humanities. Mean duration of symptoms 8.5 years (2–27 in 'intensive' grp, vs 45.9 years (35–63) in 'standard' grp. Standard: physio gave individual instruction in pelvic anatomy and correct contractions (checked by vaginal palpation). Home PFMT with monthly clinic visit for biofeedback (perineometer). 8–12
							Self-reported cure or improvement	22/23 vs 19/29 (96% vs 66%)	
							Pad test (change in 90 s stress test)	–19.9 g ($P < 0.01$ vs baseline [73%]) vs –7.3 g;	
							Leakage index (mean change)	–1.1 vs –0.5, $P < 0.01$ (–37 vs –16%) #leakage index: a 5 point ordinal scale covering leakage during physical activities.	
							PFM perineometry (mean value at 6 months, cmH_2O)	22.5 vs 15.3, $P < 0.01$	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Subjective assessment of leakage during walking, jumping, running, lifting (5 point ordinal scale)[235]	Sig. greater improvement in intensive grp in each situation vs standard grp*, $P < 0.05$	strong contractions 3×/day. Intensive: as standard, plus 45 min exercise class to music 1× week for 6 months. Class included sets of 8–12 contractions with 6–8 s holds in standing, sitting, lying, kneeling positions. Also strength training for back, thigh, and abdominal muscles, relaxation training and body awareness. *At baseline, more women in intensive grp were participating in sports or fitness activities. **reasons for exclusion, all from intensive grp: 2 could not attend classes, 1 attended < 50% of classes, 2 other health problems.
							Participation in 9 social situations (10 cm VAS, 0–10 impossible-no problem taking part)[235]	Sig. greater improvement in intensive grp in each situation vs standard grp*, $P \leq 0.03$	
							5 year follow-up ('intensive' PFMT grp only) [240]	3/23 treated surgically 14/20 satisfied with tx, 15/20 no visible leakage during cough PFM strength maintained Increase in leakage index scores and pad test, $P < 0.05$	
				n = 21 of 23	*n* = 26 of 29	15 years	All outcomes (P = NS for all)	Outcomes: severity index, leakage index, pad usage, problems with bladder emptying (14% vs 19%), interference of UI on everyday life (none 38% vs 54%), urge UI (14% vs 38%), satisfaction (satisfied or almost 81% vs 73%)	Response rate at 15 years 91% No contact made between 5 year follow-up and 15 year follow-up. PFMT > 1/week undertaken by 38% vs 19%.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Glazener 2001[236] Glazener 2005[237] provides 6 year follow-up data	RCT EL = 1++	747 randomised	F mean age 29 years, UI 3 months postnatally (stress 52%, urge 15%, mixed 31%),	PFMT and bladder training (*n* = 371)	Control ('standard' postnatal care) (*n* = 376)	Tx and follow-up 1 year after delivery	Prevalence of UI	60% vs 69% absolute difference 9.1% (95% CI 1.0 to 17.3), *P* = 0.037	Funding: Wellbeing (grant sponsored by Glaxo Wellcome), and Health Research Council New Zealand. Individualised PFMT: instruction re pelvic floor anatomy and muscle contraction regimens, then programme of 8–10 sessions/day, target 80–100 contractions. Nurse assessment and advice months 5, 7, 9, postpartum. Women with frequency or urgency also had bladder training (to increasing voiding interval, plus advice to avoid caffeinated drinks) months 7, 9. Control: standard postnatal management which could include information on PFM exercises, and women could seek medical advice. At 6 years, parity unchanged in 54%. 39% had 1 more birth, 5% had 2, 1% had 3.
							UI ≥ once/week	19.7 vs 31.8%, absolute difference 12.1% (95% CI 4.7 to 19.6), *P* = 0.002	
							Severity (0–10 ordinal scale; no problem-can't think of anything worse) (*n* = 142 and 142)	Mean scores: 2.8 vs 3.6, absolute difference 0.8 (95% CI 0.22 to 1.36), *P* = 0.007	
							Pad usage	Any pad use; difference between grps: 7.5 (95% CI 0.9 to 14.3) Mean no. pad changes: 0.15 (95% CI 0.04 to 0.26)	
							General wellbeing (very well, *n* = 276 and 244)	47.1 vs 45.1% absolute difference 2.0 (95% CI –6.5 to 10.6)	
		516 (69%) followed up to 6 years		*n* = 263	*n* = 253	6 years after delivery	Prevalence of UI	76% vs 79% absolute difference –3.0 (95% CI –10.2 to 4.1), *P* = NS	
							UI ≥ once/week	38% vs 39% absolute difference –1.1 (95% CI –9.5 to 7.3), *P* = NS	
							Severity (0–100 mm VAS; no problem-can't think of anything worse)	Mean (SD): 35.3 (25.1) vs 31.4 (23.8), absolute difference 3.9 (95% CI –1.0 to 8.8), *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Wilson 1998[238]	RCT EL = 1–	230 randomised, 145 (63%) analysed at 1 year, 89 (39%) at 22–44 months	F UI 3 months postpartum (57% stress UI, 26% mixed, 15% urge)	Intensive PFMT: PFMT (*n* = 19) Cones (*n* = 21) PFMT + cones (*n* = 14)	Control (*n* = 91)	1 year post-partum	Prevalence UI	47 vs 48 vs 57% vs 76% (*P* = 0.003 for intensive grp combined [50%] vs control) *P* = NS between PFMT vs cones grps	Funding: Health Research Council New Zealand. [EL = 1–] 52% vs 22% withdrew; only completers analysed. Intensive grp: instruction by physio 4× at hospital, ~3, 4, 6, 9 months after delivery. PFMT; 8–10 sessions/day, fast and slow contractions, target 80–100 contractions. Perineometer used to teach awareness of PFM contraction, and to record strength. Cones: 9 cones in each set, increasing in weight from 20 to 100 g, retained for 15 min 2×/day. Control: standard PFMT taught by physios (antenatally, class instruction on pelvic floor anatomy and exercises; postnatally, daily instruction from second postnatal day or tape on weekends). Mean no. daily contractions performed 16.9 (13.3–20.6) intensive grp vs 14.8 (12.2–17.4) control grp.
							Pad test (g) results at 1 year ('test done at home, duration of test unclear)	2.1 (–0.3, 4.5) vs 0.6 (0.1, 1.1) vs 0.5 (0.1, 0.9) vs 2.6 (0.1, 5.1) Change in intensive vs control groups: –70 vs + 138%; endpoint results 1.1 vs 2.6 g; *P* = NS between grps	
							Perineometry (cmH_2O)	No sig. differences between grps in maximum or sustained values at 1 year	
						24–44 months post-partum	Prevalence UI	58% intensive grp combined vs 54% control, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Janssen 2001[242]	RCT EL = 1+	530 randomised (414 completed; ITT analysis used)	F (mean age ~48 years) with stress (60%), urge (8%), or mixed (32%) UI. Duration of UI > 5 years in ~48% Exclusions: neurological causes, pelvic tumour/infection, severe vaginal prolapse	Group PFMT (*n* = 404)	Individual PFMT (*n* = 126)	1 year (3 months tx, further 9 months follow-up)	Leakage (mean change from baseline)	Episodes/week: –8.2 (15) vs –7.4 (14.3), *P* < 0.001 vs baseline (–57 vs –47%) Nocturnal loss/month –14.7 (20) vs –15.5 (18.2), *P* < 0.01 vs baseline (–72 vs –88%)	Funding: Ziekenfondsraad. Grp PFMT had 9× 2 h sessions, 8–10 pts per grp. Individual PFMT had 11× 30 min sessions. The same PFMT was taught; 5×/day at home, increasing in number and duration each time. Later aim was to exercise twice daily during 'waiting' moments. Not reported whether assessment of PFM contraction undertaken at baseline. 5% had prior bladder training and 52% prior PFMT. No sig. differences between grps in any outcome. No sig. differences between those who withdrew and those who completed study.
							Severity of incontinence	14% vs 22% dry 44% vs 42% mild 37% vs 29% moderate 5% vs 7% severe, *P* = NS	
							Self-perceived change of urine loss	78% vs 85% improved vs baseline	
							Compliance	Proportions reporting exercising during and after tx period not sig. different between grps	
Demain 2001[243]	RCT EL = 1–	44 randomised, 39 analysed	F ≥ 18 years (range 18–75); duration of symptoms range 1–540 months Exclusions: pregnancy, pelvic surgery < 3 months, history of pelvic malignancy, UTI, previous physio for UI (< 12 months)	Group PFMT (*n* = 20)	Individual PFMT (*n* = 19)	12–14 weeks	Pad test (loss, g)*	Median change in grp vs individual; –1.7 vs –1.2, *P* = NS	Funding: West Midlands NHS Exec Research Initiative Small Projects Scheme. Pelvic floor contraction taught using digital vaginal examination. All underwent bladder training (delayed voiding) and a standardised PFE programme (initially 5 slow, 5 fast contractions, 10× /day, repeated to fatigue).
							IIQ score (range 0–100)*	Median change –14.3 vs –7.1, *P* = NS	
							VAS score (100 mm)*	Mean change –18.7 vs –15.4, *P* = NS	
							Symptom Severity Index score (0–20)*	Median change –3 vs –1, *P* = NS	
							Max. frequency/day*	Mean (SD) 3.2 (2.5) vs 3.0 (2.2), *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Mean frequency/day* (SD)	2.0 (1.7) vs 2.5 (1.9), *P* = NS	Group PFMT: 4–12 women, 3×1 h sessions. Individual PFMT: 1× 45 min appointment. ICS standardised pad test used. Study conducted in community physio unit (UK). No baseline data therefore unable to report % change. Authors comment that there were 'some minor differences in outcome measurements between the two arms at baseline but there were considered small and unlikely to confound interpretation of outcomes'.
							Leakage episodes/week*	Median change –4.5 vs –4.0, *P* = NS	
Ewings 2005[239]	RCT EL = 1+	234 (190 [81%] of whom returned questionnaire)	F at 'relatively high-risk' of developing UI; scored at least 9 on Sandwell incontinence following childbirth risk assessment tool (SIFCRAT) and/or had already experienced incontinence Recruited from those giving birth at Taunton and Somerset Hospital over 19 week period from Nov 1991 to March 2002 38% vs 36% were primiparous; 65% vs 62% had UI before and/or during current pregnancy	One-to-one instruction on PFMT (*n* = 117; 90 followed up) [114 received one-to-one; 21 attended 1st grp class, 5 attended 2nd)	Standard care* (*n* = 117; 100 followed up)	6 months post-partum	BFLUTS questionnaire; specifically the q whether the woman experiences any loss of urine during coughing, sneezing, or exercising	60% vs 47% (RR 1.28, 95% CI 0.98 to 1.67) *P* = NS	Funding: NHS RandD Project Grant Scheme. RCT nested within a cohort study of risk factors for UI in pregnant women. *verbal promotion of PF exercises, with a leaflet of explanation. One-to-one grp had instruction on pelvic floor function and exercises from a physio while still in hospital, and invited to attend PF exercise class on 2 occasions, 2 and 4 months after delivery.

PFMT and drug treatment

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Ishiko 2001[244]	RCT EL = 1+	73 randomised, 66 analysed	Postmenopausal F (54–75 years), stress UI	PFMT + estriol 1 mg/day (*n* = 32)	PFMT (*n* = 34)	2 years tx	Cure rate (zero score on 15 point UI questionnaire [Gaudenz 1979])	78% vs 68%, *P* < 0.001	Funding: none declared. PFMT 15 mins/day, videotape given. 7 withdrew (6 from choice, 1 hepatic adverse event; data not given by treatment group).
Millard 2004[245]	RCT EL = 1++	480 randomised (75% women)	M/F mean age 53 years (18–90), with frequency (≥ 8 voids/24 h) urgency and urge UI (≥ 1 episode/24 h) for ≥ 6 months Exclusions: stress UI, 'significant' postvoid residual volume, neuropathy, glaucoma, UTI, positive urine cytology, use of anticholinergic tx past 2 weeks	Tolterodine 2 mg b.d. + PFMT (*n* = 227)	Tolterodine 2 mg b.d. (*n* = 253)	24 weeks tx	Urge UI episodes/24 h	–64 vs –70%, *P* = NS	Funding: Pharmacia Corporation. PFMT: 10 s contraction, 10 s rest; 50 contractions/day, incr. to 75. 3.3% had tolterodine dose reduced to 1 mg b.d. Pts not permitted to undertake bladder training or other exercise programmes. All changes in outcomes sig. from baseline in both grps. *other than dry mouth, only overall incidence reported.
							Frequency/24 h	–23 vs –27%, *P* = NS	
							Urgency episodes/24 h	–79 vs –83%, *P* = NS	
							Volume voided (mean, ml)	+18% vs 15%, *P* = NS	
							Self-reported improvement	82% vs 86%, *P* = NS	
							Adverse effects*	Dry mouth 30% (both grps) headache 6% constipation 5% nausea 3% dry eyes 3% dizziness 2%	

Weighted vaginal cones

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Arvonen 2001[246]	RCT EL = 1–	40 randomised, 37 completed and analysed	F aged 25–65, stress UI Exclusions: cysto/rectocele, prolapse, UTI, 'altered vaginal tissue', medication affecting	Weighted vaginal cones ('balls') (*n* = 18)	PFMT (*n* = 19)	4 months	Stress pad test (g leakage)	Sig. greater reduction in median for vaginal cones vs PFMT: from 30 to 1 (range 0–100) vs 10 to 5 (range 0–90)* *P* = 0.03 Cure (*n*) 9 vs 5 (50% vs 26%)	Funding: Ipex Medical AB. [EL = 1–] analysis for completers only. *G leakage in balls grp 2–170 vs 3–80 in PFMT grp at baseline Both grps undertook training at home, with 3 clinic visits. Ability to

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			the urinary tact or kidneys				Muscle strength (vaginal palpation, 0–5 ordinal scale)	No sig. change in either grp, no sig. difference between grps	contract PFM checked at baseline. Vaginal balls: 50and 65 g weights used for 2 months, then 80and 100 g. Maximal standing contractions with higher weight, 10 contractions 2×/day. Submaximal contractions with lower weight, 15 min 1×/day. PFMT: 20 maximal contractions 2×/day; 15 submaximal 1×/day.
							Subjective assessment	Cure 22% vs 0% improved 39% vs 58% unchanged 28% vs 32% worse 11% vs 11%	
Cammu 1998[247]	RCT EL = 1+	60	F mean age 56 years, genuine stress UI (mean ~14 leakage episodes/week) Exclusions: genital prolapse, in the post-partum period, DO, outflow obstruction, intrinsic urethral sphincter deficiency	Weighted vaginal cones (*n* = 30)	PFMT (*n* = 30)	12 weeks tx	Leakage episodes/week (mean change)	–36 vs –61%, *P* = NS between groups	Funding: none declared. Ability to contract PFM checked at baseline. Perineometer used to teach contraction at clinic visits. WVC: seen every 2 weeks. Set of 5 (20–70 g); start with heaviest able to retain, and hold for 15 min 2×/day during daily routine. Increase weight when comfortable with the last weight. PFMT: weekly 30 min private training session with a physio. Individually tailored training schedule and the Knack. 14 withdrew from WVC grp at 1st follow-up visit, reasons: unpleasant feeling (5), time consuming (3), unable to introduce cone (2), interference with menstrual cycle (2), muscle fatigue (2). Withdrawals remained in cone grp but received PFMT (ITT analysis).
							Subjective improvement (100 mm VAS)	Severity: 44% vs 45%, *P* = NS Psychological distress 43% vs 61%, *P* = NS	
							Subjective cure or improvement	57% vs 53%, *P* = NS	
							Cure (negative stress test)	40% vs 40%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Laycock 1993[248] (2 RCT reports)	RCT EL = 1–	46 randomised (40 completed and analysed)	F mean age ~40 years, urodynamic stress UI Exclusions: previous physio for stress UI, pregnancy, neurological dysfunction, pace-maker, pelvic malignancy (past or present)	PFMT + cones (*n* = 17)	Electrical stimulation (*n* = 23)	6 weeks PFMT, unclear for ES 2 years follow-up of completers (*n* = 19 responded, 15 ES, 4 PFMT + cones)*	Subjective assessment	Cure 12% vs 4% Improved 29% vs 57% No change 53% vs 39% (*2 years: 30% of ES grp maintained cure/improvement, no data for PFMT + cone grp)	Funding: Action Research. Nomeq supplied electrical stimulation equipment. ES: interferential therapy via Endomed 433, bipolar electrode, mean 10 tx sessions, first 15 min, subsequent 30 min (10 min each of 1 Hz, 10–40 Hz [sweep], 40 Hz), frequency not stated. Pts agreed not to practice PFM exercises. PFMT: physio gave individual instruction following digital palpation of pelvic floor; 5 max. voluntary contractions every h during the day; cones supplied at 2nd visit; exercised with 'appropriate' cone for 10 min 2×/day for 6 weeks. [EL = 1–] analysis for completers only. Unclear duration of ES tx.
							Pad test (provocative)	Cure 18% vs 4% Improved 41% vs 39% No change 29% vs 35% Worse 6% vs 9% *P* = 0.003 for changes in both grps vs baseline	
							PFM strength (digital palpation, 0–5 ordinal scale)	Increased in ES grp vs baseline *P* = 0.0035	
							Frequency of wetting or voiding	Improvements in both grps vs baseline *P* ≤ 0.02, no sig. difference between grps	
		30 randomised (26 completed)	F mean age 45 years (16–66)	Electrical stimulation (ES, *n* = 15)	Sham ES (*n* = 11)	Duration of tx unclear (10 tx sessions) follow-up of ES grp after 16 months*	Subjective assessment	Cure 0 Improved 33% vs 27% No change 60% vs 18% Worse 7% vs 55% (*20% sustained improvement at 16 months)	Funding: Action Research. Nomeq supplied electrical stimulation equipment. ES: interferential therapy via Endomed 433, bipolar electrode, mean 10 tx sessions, first 15 min, subsequent 30 min (10 min each of 1 Hz, 10–40 Hz [sweep], 40 Hz), frequency not statedt. Pts agreed not to practice PFM exercises. Sham ES: no current applied (device modified by supplier). PFM assessed by perineometry before and after tx.
							Pad test (provocative)	Cure 13 vs 0 Improved 60% vs 46% No change 7% vs 1% Worse 7% vs 36% (overall reduction 66% vs 28%, *P* = 0.009)	
							PFM strength (mmHg)	+5.4 (*P* = 0.02 vs baseline) vs +0.9	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Frequency of wetting or voiding	no sig. difference in wetting in either grp voiding: –2 (P = 0.004 vs baseline) vs –1	
Laycock 2001[249]	RCT EL = 1–	101	F 20–64 years, stress UI (mean ~2 leakage episodes/day) Exclusions: medication affecting the urinary tact, on HRT for < 3 months, neurological conditions, moderate/ severe urge UI or prolapse, UTI	Weighted vaginal cones (n = 41)	Biofeedback (n = 40) PFMT (n = 20)	3 months tx	Leakage episodes/day (mean change)	–48 vs –27 vs –73%, P = NS between grps	Funding: SSL-International (UK) and Cardio Design (Australia). Clinic visits 6× during the study. WVC: instruction to retain cone for 2 min whilst walking around, and when coughing/jumping. When both manoeuvres repeated 10×, further weights added (throughout tx period). Used 10 min/day. Written instructions provided. Weights available not stated. PFMT: individualised programme developed after digital assessment; 10 min/day. Written instructions given. BF: perineometry (PFX), vaginal probe, individualised programme developed after digital assessment; 10 min/day. 73% vs 55% vs 80% completed the study. [EL = 1–] No baseline data other than for outcomes measured, unclear whether ITT analysis used.
							PFM muscle strength (cmH_2O, mean change)	+56 vs +63 vs +38%, P = NS	
							KHQ (mean change)	+22 vs +21 vs +36%, P = NS	
Olah 1990[250]	RCT EL = 1+	69 randomised, 60 received tx 54 completed 4 weeks tx (69 analysed as randomised);	F 24–73 years, stress UI Exclusions: PFMT within 6 months	Weighted vaginal cones + PFMT (n = 33)	Electrical stimulation +PFMT (n = 36)	4 weeks tx, follow-up to 6 months	Subjective assessment	Cure: 12% vs 11% (4 weeks), 30% vs 33% (6 months) Improvement: 45% vs 64% (4 weeks), 21% vs 42% (6 months) Unchanged: 12% vs 8% (4 weeks), 3% vs 3%(6 months)	Funding: none declared. All pts given PFMT (no details). WVC: physio supervision 1×/week. 9 cones of 20–100 g weight; pts asked to train PFM while retaining heaviest cone possible, 2×/day for 15 min; increase weight when able to retain current cone. ES: interferential therapy at clinic

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		47 assessed at 6 months					1 h pad test (mean change, g)	–49 vs –68% (4 weeks) –90 vs –70% (6 months)	3×/week for 15 min; 4 electrodes (2 abdomen, 2 thighs), 0–100 Hz, intensity according to tolerability. 9 excluded after randomisation, at initial assessment, because: vagina too narrow for cones (7), discomfort (1 ES), irregular bleeding prevented use (1 WVC).
							Mean weight of cone held	Passively: 44 ± 23 g vs 44 ± 26 g (4 weeks), 36 ± 25 g vs 37 ± 25 g (6 months) Actively: 65 ± 24 g vs 56 ± 27 g (4 weeks), 54 ± 33 g vs 52 ± 27 g (6 months)	
Seo 2004[251]	RCT EL = 1+	120	Women with stress UI, mean 42.7–44.5 years	Vaginal cone (with PFMT) (*n* = 60)	Functional electrical stimulation biofeedback (*n* = 60)	6 weeks	Pad test (units unclear, mean change)	–2.8 vs –2.2* (–43% vs 39%), *P* = NS	Funding: none declared. Cones: dumbbell shaped, weight 150 gram. PFMT consisted of 5 s contraction, 10 s relaxation, cycle repeated 3–5 times for at least 5 min, ≥ once daily. FESB grp: 2× 20 min sessions/week, alternating FES and biofeedback. FES applies simultaneous electrical stimulation of 35 Hz and 50 Hz for 24 s, cycle repeated every 20 min.
							MUCP (mmH_2O, mean change)	+16.0 vs +14.4* (26% vs 23%), *P* = NS	
							Maximal vaginal pressure (mmHg, mean change)	+4.2 vs +15.9* (18% vs 89%), *P* = NS	
							Duration of PFM contraction (s, mean change)	+3.8 vs +5.3* (69% vs 109%) *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Subjective measures of UI (Daytime freq, episodes and qty leakage, difficulty exercising, sex life, daily life, avoiding places, personal relationships, QOL)	88% vs 92% 'improved' from baseline Scores for all parameters fell in both grps; no sig. differences between grps in improvements in any parameter	
Pieber 1995[252]	RCT EL = 1+	46	Women pre-menopausal (mean age 43 years), grade 1–2 stress UI Exclusions: grade 3 stress UI, previous continence surgery, pelvic relaxation > grade 2, DO	Weighted vaginal cones + PTMT (*n* = 21)	PFMT (*n* = 25)	12 weeks tx	Subjective assessment (all pts)	Cure 5 (24%) vs 3 (12%) Improved 6 (29%) vs 9 (36%) No between-grp analysis reported	Funding: none declared. Ability to contract PFM checked by vaginal palpation at baseline. WVC: set of 5 (20–70 g); start with heaviest able to retain, and hold for 15 min/day during daily routine. Increase weight when comfortable with the last weight. PFMT: physio instructed 'correct' PFMT and lifting techniques. Target 100 contractions/day, and the Knack. Individual exercise plan developed for each patient. Pts visited physios every 2–4 weeks.
							Urodynamics (*n* = 27, who attended urodynamics follow-up)	No sig. difference between groups in any parameter (MUCP, pressure transmission ratio; all values increased)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Delneri 2000[253]	RCT EL = 1–	20	Women mean age 50 years (29–81), genuine stress UI Exclusions: DO, inversion of perineal command, absent pubococcygeal contraction, neurological disease	Weighted vaginal cones (*n* = 10)	Electrical stimulation (*n* = 10)	4 weeks tx (cones), ES 16 days	UPP, MUCP Pad test	No significant differences between groups reported (end of tx values)	Funding: none declared. [EL = 1–] No baseline data for outcomes measured, and limited reporting of methods. 2 from cone grp refused urodynamic follow-up. WVC: set of 5 (20–70 g); women taught exercises with cones in place, training with heaviest cone able to retain 20–25 min/day ES: 12 sessions; 15 min at 20 Hz, 15 at 50 Hz; 4 s pulse, 8 s rest. PFM and subjective assessment (VAS) also conducted but methods and units not reported

PFMT with biofeedback

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Berghmans 1996[254]	RCT EL = 1+	40	Women, aged 18–70 years, urodynamic stress UI (mild-moderate [grade 1–2]) Exclusions: pronounced lesions of pudendal nerve, neurogenic bladder, urological or gynaecological surgery, pacemaker	PFMT + biofeedback (*n* = 20)	PFMT (*n* = 20)	4 weeks tx	48 h pad test (mean change, g) Cured/improved/worse (*n*) Leakage episodes/week	–57 vs –54%, *P* = NS 3/14/3 vs 5/14/1 No numerical data	Funding: none declared. PFMT: anatomy and function of pelvic floor, vaginal palpation every week, 12 'treatment sessions' 3×/week in standing, crawling, side position, 25–35 min; home practice 3×/day. Duration of contractions 3–30 s, repeated 10–30 times. PFMT combined with coughing, climbing stairs, lifting, jumping, completed the program. Biofeedback: vaginal probe attached to portable EMG. Contract-relax period, number of cycles, and tx time varied for treatments 1–12; sensitivity and threshold individualised to pts. 4 pts in biofeedback grp vs 0 had previous tx with medication and /or physical therapies

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Castleden 1984[255]	RCT, cross-over EL = 1–	19	Women, mean age 55 years (23–85), stress UI	PFMT + biofeedback (*n* = 19)	PFMT (*n* = 19)	4 weeks tx (2×2 week periods)	VAS score at 4 weeks (scale not described)	+23.9 (0, +79) vs +6.7 (–32, +26)	Funding: Kingsdown medical supplied perineometer. PFMT: 4–5 contractions every hour and interrupted micturition. Perineometer with vaginal catheter used at least 1×/day. [EL = 1–] Limited information, especially re units for results. No baseline data therefore unable to report % changes for outcomes.
							Perineometer readings at 4 weeks (units not given)	+2.0 (–3, +6) vs +1.5 (–1, +6)	
							Change in symptoms (*n*)	Cure 14/19; worse 1/19 at 4 weeks	
Glavind 1996[256]	RCT EL = 1+	40 randomised, 34 completed	Women, mean age, genuine stress UI Exclusions: DO, previous UI surgery	PFMT + biofeedback (*n* = 19)	PFMT (*n* = 15)	4 weeks tx, follow-up at 3 months	1 h pad test	–88.4% (95% CI –78%, –94%) vs –54% (–2.1%, –78%)	Funding: none declared. Pts ability to contract PFM assessed by digital palpation. PFMT: 2–3 individual instruction; held contractions for 5–10 s, in supine, sitting, standing positions. Home exercise daily at least 3×/day and as often as possible. Biofeedback: Dantec 21L20, 4 sessions 1×week, vaginal electrode and rectal catheter.
							Objective cure (unclear whether measured by pad test)	58% vs 20%, *P* = NS	
							Subjective assessment	Cure: 26% vs 0% Improvement 42% vs 29%	
							Acceptability of tx	75% vs 52%	
Sherman 1997[257]	RCT EL = 1+	39	Women (active female duty soldiers), mean age 33 years, urodynamic UI (77% stress; 23% mixed)	PFMT + biofeedback (*n* = 23)	PFMT (*n* = 16)	8 weeks tx	Subjective assessment of time between voids, degree of urgency, ability to stop urine stream, activity level, volume per void, severity	No sig. differences in changes between grps	Funding: none declared. PFMT: initial educational session, exercises 10–10 contract-rest cycle ×5, home practice 20 min 2×/day. Pts put on bladder training schedules and taught urge control to use 'when applicable'. Pelvic examination at baseline to assess pelvic support and muscle tone. Biofeedback: J&J Biofeedback system (EMG), vaginal and
							Leakage episodes /day (mean change)	–61 vs–67%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Voids/night	–60 vs–79%, *P* = NS	abdominal electrodes. Biofeedback home trainers given to people during the first week of tx. Withdrawals: 1 BF grp, 5 PFMT grp: 'no difference' between those who withdrew vs continued, or in pad test results at 1st assessment.
							Urodynamic parameters	No sig. differences between grps in changes in bladder capacity, MUCP, detrusor contraction pressure	
							PFM maximal muscle contraction	No sig. difference between grps	
Shepherd 1983[258]	RCT EL = 1–	22	Women, mean age 48 years, urodynamic stress UI	PFMT + biofeedback (*n* = 11)	PFMT (*n* = 11)	6 weeks treatment, follow-up at 18 weeks	Self-reported cure	8/11 vs 3/11 (73% vs 27%)	Funding: none declared. PFMT: weekly clinic visits, home exercise program. No further information. Biofeedback: intravaginal exercises connected to visual biofeedback. [EL = 1–] Insufficient information regarding the interventions.
							Self-reported cure or improvement	10/11 vs 6/11 (91% vs 55%)	
Aukee 2002[259] and 2004[260]	RCT EL = 1+	35 randomised* (31 attended 1 year follow-up) at 1 year	Women, mean ~51 years (21–70), with urodynamic stress UI; no previous surgery for UI; abdominal leak point pressure > 90 Exclusions: genital prolapse beyond hymen, pregnancy, severe concomitant diseases	PFMT (*n* = 15)	PFMT + EMG biofeedback (*n* = 15)	3 months tx, 1 year follow-up	PFM activity, µV (supine and standing) at 3 months	Increases in both grps from baseline, *P* < 0.001, PFMT + EMG vs PFMT *P* = 0.024	Funding: none declared. PFMT; 5 sessions (weeks 0, 1, 4, 8–12), and practised at home (20 min/day 5×/week). Mean no. training days at home was 56.2 (range 21–87). Home biofeedback grp given FemiScan device, containing a training programme and sound processor for verbal instructions. Mean no. training days at home was 68 (range 9–130); mean 47.5 days (range 6–93) without the device.
							24 h pad test at 3 months (adjusted for differences in baseline values)	–18.1 g vs –17.3 g from baseline, *P* = NS	
							Leakage index# at 3 months (adjusted)	–2.1 vs –8.8 from baseline, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects at 3 months	3 vs 2 pts reported pain while training. 2 pts from PFMT + EMG grp did not use EMG (found vaginal probe uncomfortable).	After 3 month tx period, pts advised to continue PFMT on own initiative. #leakage index contains 13 types of physical exertions that trigger UI in women with SUI (1 never, 5 always), measured on ordinal scale of 1–5.
							% had surgery for UI at 1 year	PFMT vs PFMT + EMG: 9/19 vs 5/16, (47% vs 31%) *P* = NS	*Discrepancy in pt numbers between Aukee 2002 (first 30 pts) and 2004 (final number, 35).
Pages 2001[261]	RCT EL = 1–	51 randomised 40 analysed	Women, mean age 51 years (27–80), mild-moderate SUI Exclusions: significant medical illness; drugs influencing bladder control and functioning	PFMT (*n* = 27)	PFMT + biofeedback (*n* = 13)	3 months (1 month tx, 2 further months follow-up)	Frequency	From baseline (no between grp comparisons): Daytime reduced in PFMT grp; night reduced in both grps, *P* < 0.01	Funding: none declared. [EL = 1–] 11 (46%) from biofeedback grp excluded after randomisation owing to concurrent illness or decision to withdraw. Physical therapy consisted of group therapy 5×/week for 60 min, plus initial educational session about PFM and incontinence. Also encouraged to do ~100 contractions at home/day. BF grp had introductory session then individual therapy for 15 min 5×/week (Gemini 2000 TM apparatus). *PFM contraction assessed by investigator, and by speculum and manometric measurements.
							Cure (no incontinence)	69% vs 62%	
							PFM contraction*	Both grps increased strength of voluntary contraction and cough-induced contraction, and improvement in closure of introitus, *P* < 0.05 from baseline	
							Adverse effects	None	
Sung 2000[262,263]	RCT EL = 1–	90	Women ≥ 18 years, stress UI	PFMT (*n* = 30)	PFMT + electrical stimulation biofeedback (*n* = 30 Control (no tx,	6 weeks	Leakage episodes (mean [SD] change, unclear whether in no per day/week)	–0.2 (0.5) vs –1.0 (1.2) vs 0 (0.7), [–37 vs –9% vs 0%] *P* < 0.001 ES grp vs others	Funding: Hallym Academy of Science (Korea). [EL = 1–];unclear whether randomisation refers to patient selection into the study, or

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
					n = 30)		Quantity of leakage (units and method of measurement not stated)	–0.2 (0.4) vs –0.7 (0.8) vs 0 (0.4), [–9 vs –28% vs 0%] *P* < 0.001 ES grp vs others	allocation of treatment. PFMT: Physio instruction, home training following instructions on videotape. Electrical stimulation given alternately with biofeedback (Elite compact device): 2×20 min/week; ES 24 s, 35 and 50 Hz.
							BFLUTS	No between-grp comparisons. Improvements in ES grp in difficulties in daily lives, fluid restriction, physical activities, personal relations, *P* < 0.001 vs baseline	
							Peak PFM pressure (perineometer, mean [SD] change, mmHg)	+1.0 (2.4) vs +6.2 (4.9) vs –4.5 (6.2), [+3 vs +18 vs –12%] *P* < 0.001 active grps vs control	
							PFM duration of contraction (s), mean change (SD)	+0.6 (0.6) vs +0.7 (1.2) vs –0.1 (0.6), [40 vs 44 vs –6%] *P* < 0.001 ES grp vs others	
Morkved 2002[264]	RCT EL = 1+	103 randomised, 94 analysed	Women (mean age ~47), urodynamic stress UI (24 also had urge UI) Exclusions: involuntary detrusor contractions, residual urine > 50 ml, previous surgery for stress UI, UTI, use of	PFMT + Biofeedback (*n* = 53)	PFMT (*n* = 50)	6 months	Objective cure*	58% vs 46%, *P* = NS	Funding: Norwegian industrial and regional development fund, Norwegian national insurance administration, Trondheim regional hospital. PFMT individualised (1/week 4 months, every 2 weeks 2 months). Home training; 10 high intensity contractions/day. BF using BF-106 device,
							Subjective cure	40% vs 30%, *P* = NS	
							Cure (48 h pad test)	65% vs 57%, *P* = NS	
							Mean PFM strength, cmH_2O (vaginal balloon catheter)	At 6 months 12.3 (95% CI 9.5 to 15.1) vs 11.1 (8.1, 14.1), *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			concomitant txs, other diseases, neurological or psychiatric disease				Mean Social activity index score[#]	At 6 months 0.4 (95% CI –0.1 to 0.6) vs 0.3 (0.0, 0.5), *P* = NS	vaginal probe, individualised for each pt. *≤ 2 g leakage on provocative pad test with standardised bladder volume 300 ml saline. [#]9 social settings, scale 0–10 impossible-possible to participate.
Wang 2004[265]	RCT EL = 1+	120 randomised, 103 completed	Women 16–75 years, OAB > 6 months, frequency ≥ 8×/day, urge UI ≥ 1×/day, no other conservative tx Exclusions: pregnancy, concurrent medical conditions, genital prolapse > stage II, residual urine > 100 ml	PFMT (*n* = 40)	Biofeedback+PFMT (*n* = 38) Electrical stimulation (*n* = 42)	12 weeks	Self-reported improvement or cure of urge UI	38 vs 50% vs 51%, *P* = NS	Funding: National Science Council. PFM strength measured by 1 finger palpation (Oxford grading method), and vaginal pressured measured using balloon probe. PFMT; at home, PERFECT scheme, 3×/day. ES: Intravaginal electrode, biphasic pulsed current, freq 10 Hz, pulse width 400 μs, 10 s on, 5 s off, intensity 20–63 mA or 40–72 mA, 20 mins/session, twice/week. Duration of compliance with home programme; median 14.5 (0–44) days PFMT, 8.5 (0–44) days BF+PFMT. Baseline differences in gravidity, parity and menopausal status (BF+PFMT vs ES); leakage episodes/day 0.86 PFMT vs 0.92 BF+PFMT vs 2.09 ES. *Power using Oxford grading system (0–5), vaginal pressure using balloon probe.
							Self-reported cure of urge UI	30 vs 38% vs 40%	
							PFM parameters (mean change)*	Power: –2 vs –2.5 vs 0 Time of fast contraction: –5.8 vs –6.2 vs –3.0 Vaginal pressure: –36.0 vs –38.4 vs –8.9 *P* ≤ 0.012 for all comparisons of PFMT or BF +PFMT vs ES	
							QOL (King's Health Q), mean changes (SD) in total score	50.3 ± 171.4 vs 185.9 ± 176.6 vs 180.1 ± 176.0, *P* ≤ 0.004 for PFMT vs other groups	
Aksac 2003[266]	RCT	50	Postmenopausal women taking HRT,	PFMT + biofeedback	PFMT + palpation (*n* = 20)	8 weeks	1 h pad tests	–94% vs –89% vs +3%	Funding: none declared. BF: Myomed-932 device

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 1+		urodynamic stress UI	(*n* = 20)	Control (HRT only *n* = 10)		Perineometry (mean change, cmH_2O)	+30.9 vs +17.2 vs +1.3 (162 vs 85% vs 7%) (actual values 50 ± 11.5 PFMT+BF vs 37.5 ± 8.7 PFMT + palpation, *P* < 0.001)	vaginal probe in EMG pressure mode; 20 min, 40 cycles of 10 s activity and 20 s relaxation, 3×/week. Digital palpation: 5 s contraction, 10 s relaxation, 10×, 3×/day. HRT: estradiol 2 mg + norethisterone 1 mg/day. †scale 0 to 5 where 0 = no contraction, 1 = minimal lasting < 1 s, 2 = weak contractions lasting 1–3 s, 3 = fingers of therapist elevated, contraction lasts 4–6 s, and can be repeated 3×, 4 = as 3 but contraction lasts 7–9 s, 5 = as 4 but lasts ≥ 9 s and pt able to repeat 4×. *Scale of 1–4, 1 = once/day, 2 > 1/week, 3 < 1/week, 4 = 1/month. (All parameters improved from baseline in both PFMT grps, and vs control grp *P* < 0.001. No sig. changes in control grp).
							PFM strength digital palpation†	+1.6 vs +1.3 vs 0	
							Incontinence frequency* (change in mean score)	+1.3 vs +1.2 vs +0.3	
Wong 2001[267]	RCT EL = 1+	38	Women, 30–62 years, urodynamic stress UI Exclusions: 2nd/3rd degree uterine prolapse, previous failure of PFMT, previous surgery for UI, neurological pathology	PFMT + biofeedback (PF and abdominal muscles) (*n* = 19)	PFMT +biofeedback (PF muscles) (*n* = 19)	4 weeks	Leakage episodes/week	–2.0 vs –5.0, (57% vs 55%) *P* = NS	Funding: none declared. PFMT: 4× 30 min sessions 2×/week, fast and slow contractions. Biofeedback: PRS9300 device. For PFMT + biofeedback (PF and abdominal muscles) group, 1 vaginal probe and 1 attached to abdominal wall; PF muscles group had vaginal probe only).
							Pad test (mean change, g)	–8.6 vs +13.9, (69% vs 153%) *P* = NS	
							PFM strength (mean change, cmH_2O)	+5.4 vs +8.8, (47% vs 68%) *P* = NS	
							PFM endurance (mean change, s)	+1.3 vs +0.9, (26% vs 16%) *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							IIQ-7	–4.8 vs –14.3, (25% vs 50%) $P \leq 0.04$	
							UDI-6	–8.0 vs –33.3, (22% vs 67%) $P \leq 0.04$	

Electrical stimulation therapy vs sham

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Sand 1995[268]	RCT EL = 1+	52 randomised, 44 completed	Women mean age 53 years, urodynamic stress UI, no current UI tx Exclusions: DO, ISD, pacemaker, prior PFM stimulation, pelvic implanted devices, UTI, vaginal infections, urinary retention, genital prolapse to introitus	Electrical stimulation (ES) (n = 35)	Sham ES (n = 17)	15 weeks	Leakage (pad test), mean change	–30 g vs +2.3 g, P = 0.005	Funding: none declared. ES using Innova device; 2-channel stimulation. Pulse duration 0.3 ms, current range 0–100 mA; max. tolerated current used. Sham device had max. output of 1 mA. Device used 2×/day, target 30 min, for 12 weeks. 29 (56%) women postmenopausal (17 ES grp, 12 sham), taking HRT or had 'adequate' oestrogen levels. 24 (46%) had previously undergone PFMT. 2/7 withdrawals in ES grp owing to vaginal irritation. 1 withdrawal in sham grp.
							Leakage episodes (diaries), mean change	Per 24 h: –1.2 vs +0.8, P = 0.04 Per week: –4.1 vs +6.9, P = 0.009	
							QOL (SF-36)	No sig. difference between grps in changes in scores	
							Self-reported improvement (10 point VAS)	Greater improvement in leakage and stress UI scores in ES grp, $P \leq 0.02$ vs sham	
							PFM strength (mmHg), mean change	+4.6 vs –1.1, P = 0.02	
							Adverse effects	Vaginal irritation 14% vs 12% pain 9% vs 6%	
Yamanishi 2000[269]	RCT EL = 1+	68 (57% women)	M/F mean age 70 years (35–87), urge UI Exclusions: previous drug tx or PFMT or surgery for UI, POP in women	Electrical stimulation (ES) (n = 37)	Sham ES (n = 31)	4 weeks	Freq/volume chart	No numerical data. Reductions in nocturia and leakage episodes greater in ES grp, $P \leq 0.03$	Funding: none declared. ES used square waves with pulse width of 1 ms, freq 10 Hz, max. current 60 mA, 2×/week; vaginal electrode (women). Sham device had no stimulus output. *> 50% reduction in UI frequency or > 50 ml increase in cystometric
							Cure (freq/vol. chart and cystometry)	22% vs 4%, P = 0.03	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Improvement*	81% vs 32%, *P* = 0.0001	capacity Scale used to measure QOL not reported.
							Cystometry	Bladder capacity at 1st desire to voidand max. cystometric capacity incr. in ES vs reduction in sham, *P* ≤ 0.03	
							Adverse effects	ES: 1 (3%) vaginal pain, 1 faecal incontinence; sham: 2 'disagreeable feeling'	
Luber 1997[270]	RCT EL = 1+	54 randomised, 44 completed	Women, mean age 54 years, urodynamic stress UI, chose not to have PFMT Exclusions: POP ≥ grade II, DO, PVR urine > 100 ml, vaginal intraepithelial neoplasia, UTI, ISD	Electrical stimulation (ES) (*n* = 26)	Sham ES (*n* = 28)	12 weeks	Subjective improvement or cure*	25% vs 29%, *P* = NS	Funding: Kaiser Research Foundation. ES: 2× 15 min sessions/day, using Hollister, Evanston IL device. Pulse width 2 ms, freq 50 Hz, 10–100 mA. In sham grp, wiring from stimulator to vaginal probe covertly discontinuous. *score 3–5 on 1–5 VAS of improvement. #negative urodynamic stress test with full bladder.
							Objective cure#	16% vs 13%, *P* = NS	
							Valsalva LPP, cmH_2O (mean change)	+7.0 vs –4.0, *P* = NS	
							PVR volume (cm^3) mean change	+5.0 vs –2.0, *P* = NS	
							Cystometogram max. volume (cm^3) mean change	+49.0 vs +23.0, *P* = NS	
							UI episodes/24 h, mean change	–0.4 vs –0.3, *P* = NS	
Jeyaseelan 2000[271]	RCT EL = 1+	27 randomised, 24 analysed	Women, Urodynamic stress UI Exclusions: neurological conditions, previous ES for UI, prolapse, pregnancy, pacemakers, cardiomyopathy, UTI, pelvic floor surgery < 6 months	Electrical stimulation (ES) (*n* = 13)	Sham ES (*n* = 14)	8 weeks	PFM strength (perineometry, cmH_2O), mean change	+88 vs +25%, *P* = NS	Funding: Manchester University Medical Bequest Fund. ES: by PS1 device, 1 h/day; background low freq (to target slow twitch fibres) and intermediate freq. (to target fast twitch fibres). Sham: 1×250 ms impulse every minute for 60 min. 3 withdrew as tx 'too demanding' (2 ES, 1 sham).
							PFM endurance (perineometry, cmH_2O), mean change	+73% vs –6%, *P* = NS	
							Pad weight (g, median, range)	+ 0.5 (–33, +71) vs +0.1 (–15, +61), *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Leakage (median no/week, range)	0 (–5, +4) vs –2 (–4, 0), *P* = NS	
							IIQ	–0.3 vs –11%, *P* = NS	
							UDI	–31 vs +9%, *P* = 0.01	
Brubaker 1997[272]	RCT EL = 1+	121	Women aged ≥ 25 years (mean ~57), stress UI (50%), DO (23%), mixed UI (27%) Exclusions: ≤ 3 leakage episodes/week, UTI, inadequate genitourinary oestrogen, PVR > 100 ml, implanted electrical device, GU surgery ≤ 6 months, medication change ≤ 3 months	Transvaginal electrical stimulation (ES) (*n* = 61)	Sham ES (*n* = 60)	10 weeks (8 weeks tx)	Subjective improvement (not defined)	35% vs 17%, *P* = 0.027	Funding: none declared. InCare provided device free. ES: by InCare Microgyn II device; freq 20 Hz, 2–4 s work-rest cycle, pulse width 0.1 ms, 0–100 mA. Sham grp used same device; 1 wire disconnected so no current supplied. QOL reported; measured using 41-point scale modified from cancer-specific tool. Frequency of UI and no. of accidents reported at 6 week sonly, not at endpoint.
							Urodynamic diagnosis of DO	–50% (*P* = 0.0004 vs baseline) vs –6% (*P* = NS vs baseline).	
							Urodynamic diagnosis of stress UI	No sig. change reported (no numerical data)	
Barroso 2004[273]	RCT EL = 1+	36	Women, mean age 55 years; stress, mixed or urge UI Exclusions: 1st degree prolapse, intrinsic sphincter deficiency, pacemaker, pregnancy, postmenopausal climacteric phase, UTI, GU surgery < 6 months, previous ES of PFM, drugs affecting voiding function	Transvaginal electrical stimulation (ES) (*n* = 24)	Sham ES (*n* = 12)	12 weeks	Maximum bladder capacity (mean change [SD], ml)	+96.4 (87.2) vs +27.5 (60.2), *P* = 0.02	Funding: two government funds (FAPERGS, FIPE). ES: freg 20–50 Hz (20 for urge/mixed, 50 for stress), pulse width 300 µs, asymmetric biphasic pulses, intensity 0–100 mA, 5–5 s work-rest cycle; used 2×20 mins/day. Sham applied no current. *leakage episodes higher in ES grp at baseline (4.1 vs 3.0, *P* = 0.03). All results reported as mean change (SD).
							First desire to void (ml)	+23.7 (38.0) vs –1.5 (38.9), *P* = NS	
							Frequency/24 h	–3.5 (2.4) vs –1.3 (1.9), *P* = 0.01	
							No. nocturnal voids/24 h	–1.0 (1.3) vs –0.5 (1.0), *P* = NS	
							Leakage episodes/24 h*	–2.8 (1.8) vs –0.0 (1.1), *P* < 0.001	
							Episodes of voiding urgency	–4.2 (2.6) vs –0.5 (1.2), *P* < 0.001	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Berghmans 2002[275]	RCT EL = 1–	68	Women > 18 years (range 25–80) with Detrusor Activity Index (DAI) ≥ 0.5 (mean 0.85 [SD 0.16]) Exclusions: mechanical intravesical obstruction, urinary calculus, repetitive UTI, colpitis, pacemaker, pregnancy/lactation, physical therapies in last 3 months, drugs for UI in past 4 weeks, neurogenic UI	Electrical stimulation (clinic and home, *n* = 17) Lower urinary tract exercises (LUTE, *n* = 18)	LUTE + clinic ES (*n* = 19) Control (no tx, *n* = 14)	9–11 weeks	Change in detrusor activity index (DAI) scores	ES –0.28 (SD 0.33), *P* < 0.032 vs control LUTE –0.22 (0.32) LUTE + ES –0.02 (0.26) control –0.06 (0.19)	Funding: none declared. LUTE programme consisted of: info about LUT function; bladder retraining (urgency, increasing voiding interval), PFMT, toilet behaviour. 9 training sessions, 1/week. ES; EMG, vaginal via plug mounted electrodes, to max. 100 mA. 200 ms pulses (4–10 Hz). Study underpowered (target 80 pts). [EL = 1–] After randomisation, computer error meant 12 were excluded owing to not meeting DAI inclusion criteria, probably compromising the randomisation and balancing of groups. No significant differences reported between groups in baseline characteristics, though numerical data show differences in number of hysterectomies, nocturia, and duration of UI.
							Adverse effects	none	
							Change in no. UI accidents (medians)	OR 30.00 (95% CI 1.04 to 862.60)	
							Perineometer readings (PFM strength), medians	OR 0.37 (95% CI 0.03 to 4.62)	
Amaro 2005[274]	DB RCT EL = 1–	40	F mean age ~48 (40–79) with mixed UI but predominant urge UI None had prior PFMT, bladder training, of antimuscarinic therapy	Electrical stimulation, 3×20 min per week (*n* = 20)	Sham electrical stimulation (*n* = 20)	7 weeks tx	Urge UI prevalence	15% vs 32% *P* = NS	Funding: none declared. Groups said to similar at baseline, but limited data presented ES = Dualpex Uro 996. at 4 Hz, 2–4 s work-rest cycle and a 100 ms pulse width. Amplitude 0–100 mA, according to pt discomfort on feedback. Control grp used same type of wires.
							Frequency /24 h (change; unclear whether change in mean)	–4.5 vs –2.5, *P* = NS	
							PFM strength (perineometry, cmH_2O); change in mean	+14.2 vs +4	
							Satisfaction	80% vs 65%, *P* = NS	

Electrical stimulation and PFMT

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Hahn 1991[276]	RCT EL = 1+	20	Women, mean age 47 years (34–64), genuine stress UI, consecutively referred for surgery, offered conservative tx while awaiting operation Exclusions: DO	PFMT* (*n* = 10)	Electrical stimulation* (*n* = 10)	6 months tx* follow-up at 4 years (*n* = 19)	Cure (pad test)	1/10 vs 4/10	Funding: Neurologiskt Handikappades Riksforbund, and LIC Hygien. PFMT: instruction in pelvic floor anatomy and physiology, submaximal 2–2 s contraction-relax cycle, maximal 5–5 s cycle, 5–10×; endurance training, and during maneuvers that trigger stress UI. Pts self-monitored by vaginal palpation, phyiso checked PFM strength at every visit (1×week for 4 weeks then monthly for 5 months). ES: Contrelle device, vaginal electrode, intermittent stimulation with alternating pulses at a repetition frequency of 10, 20, 50 Hz. Used 6–8 h overnight. *women not cured at 6 months with the first tx were offered the other tx (13 women had both txs).
							Self-reported assessment	Cured 1 vs 1 Insignificant symptoms 5 vs 4 Improved 4 vs 3 Unchanged 0 vs 2	
							4 year follow-up	5 had Burch colposuspension (4 owing to inadequate effect of conservative tx, 1 symptom recurrence) 4 further improved, 8 unchanged, 2 symptom recurrence	
Smith 1996[277]	RCT EL = 1+	57 randomised*, 56 analysed	Women aged 24–82 years, urodynamic stress UI (32%), or DO (68%) Exclusions: type 3 stress UI, pregnancy, history of prolonged urinary retention, vaginal vault prolapse, diminished sensory perception, pacemaker, mixed UI as major component	PFMT (*n* = 9, stress UI)	Electrical stimulation (*n* = 9, stress UI)	4 months tx	Cure/ improvement/ failure (*n*)	1/3/5 vs 2/4/3, *P* = NS	Funding: none declared. *Randomisation based on type of UI. PFMT: initial instruction on correct contraction, provided with written information; repeated exercise 60×/day, increasing hold to 10 s, repeated 4–5×. ES: stimulator used 2 programmes simultaneously at 12.5 and 50 Hz. Stress UI pts started with 5 s contraction time (3–15), duty cycle 1–2, increasing time from 15, 30, 35–60 min/day; amplitude 5–10 mA, increasing to max. 80 mA. For pts with DO, same protocol used but amplitude did not exceed 25 mA.
							Objective improvement (≥ 50% reduction in no. pads/leakage episodes)	44% vs 66%, *P* = NS	
							Adverse effects	2 (22%) vaginal irritation with ES	
				Propantheline 7.5 mg to 45 mg	Electrical stimulation (*n* = 18, DO)	4 months tx	Cure/ improvement/ failure (*n*)	3/7/10 vs 4/9/5, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
				b.d./t.d.s. (*n* = 20, DO)			Objective improvement (≥ 50% reduction in no. pads/leakage episodes, and ≤ 10 fewer voids /24 h)	50% vs 72%, *P* = NS	
Hofbauer 1990[278]	RCT EL = 1–	43	Women, mean age 58, genuine stress UI	PFMT (*n* = 11)	Electrical stimulation (*n* = 11) PFMT + ES (*n* = 11) Sham ES (*n* = 10)	6 weeks tx, follow-up 6 months after tx	Self-reported cure	6/11 (55%) vs 1/11 (9%) vs 3/11 vs 0/10	Funding: none declared. PFMT: included PFMT, abdominal and hip exercises, 2×/week for 20 min with therapist. Home exercise daily. ES: 3×/week for 10 min, for 6 weeks. Lumbar and vaginal electrodes, output increased to noticeable contraction and pt added voluntary effort. Sham ES: as ES, but current so low 'no effect possible'. [EL = 1–] No baseline data (translation).
							Self-reported cure or improvement	7/11 vs 3/11 vs 7/11 vs 0/10	
							Urodynamics	'no significant changes' no numerical data	
Spruijt 2003[279]	RCT EL = 1+	37 randomised, 35 analysed	Women ≥ 65 years with UI (17% stress, 17% urge, 66% mixed), leakage > 10 ml /24 h Exclusions: persistent/ recurrent UTI, bladder pathology/dysfunction owing to other conditions, incontinence tx in past 6 months, genital prolapse to/beyond introitus, pacemaker	PFMT (*n* = 11)	Electrical stimulation (*n* = 24)	8 weeks	Subjective assessment*	45% vs 46%, *P* = NS	Funding: grant from Praeventiefonds, Den Haag, Netherlands. Electrical stimulation using Urogyn 8900; biphasic current pulses, 1 ms duration, frequency 50 Hz (stress UI) or 20 Hz (urge UI); intensity increased from 0–100 mA according to tolerability. Maximal electrical stimulation applied for 30 min 3×/week. 3 women had tx at home, others at outpatient clinic. For PFMT, verbal instruction given according to Dutch GP guidelines. *lower PRAFAB score (PRAFAB = protection, amount, frequency, adjustment, body image).
							Objective improvement (48 h pad test)	36% vs 29%, *P* = NS	
							Improvement in PFM strength (perineometry)	44% vs 71%, *P* = NS	
							DO removed (4 h ambulant urodynamics) (*n* = 25)	29% vs 22%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Knight 1998[280]	RCT EL = 1–	70 randomised, 57 completed 6 months, 51 completed 12 months	Women aged 24–68 years, urodynamic stress UI Exclusions: UTI, unstable bladder, unable to perform PFM contraction, pregnancy, breast-feeding, pelvic malignancy, pacemaker, neurological condition, diabetes	PFMT + biofeedback + low intensity ES at home (*n* = 19) PFMT + biofeedback + maximal intensity ES at clinic (*n* = 20)	PFMT + biofeedback (*n* = 18)	6 months tx, follow-up at 12 months*	Self-reported cure or greatly improved (points 4–5 on 1–5 scale)	47 vs 80% vs 56% (6 months) 44 vs 85% vs 67% (12 months) *P* ≤ 0.04 home vs clinic at 6 and 12 months	Funding: Action Research. PFM assessment carried out at initial consultation. PFMT: individual instruction and programme, up to 6×/day (contractions held for up to 10 s, 4 s rest, up to 10 fast contractions) for 6 months, then 1×/day for further 6 months *(so continued PFMT at lower frequency from months 6–12). Biofeedback by air-filled vaginal probe, used for 1 of 6 daily PFMT sessions. Home ES: DMI ltd, vaginal electrode, battery-operated unit. 10 Hz, occasional 35 Hz bursts, pulse width 200 μs, 5–5 s on-off. In clinic ES: VSI Neen Healthcare, mains-operated; 16×30 sessions at 35 Hz, pulse width 250 μs. [EL = 1–] Analysis for completers only. Smoking and prior pelvic surgery sig. higher in clinic grp at baseline (smoking: 25% vs 16% home ES, vs 0 control; Pelvic surgery 45% vs 12% control grp).
							Pad test (median change, g)	–77 vs –91 vs –91% (6 months) –98 vs –100 vs –100% (12 months) *P* = NS between grps	
							Objective cure (dry or < 2 g urine loss on pad test)	53 vs 80% vs 72% (6 months) 81 vs 84% vs 73% (12 months)	
							PFM strength (max. squeeze pressure [cmH_2O], median change)	33 vs 64% vs 41% (6 months) 47 vs 44% vs 53% (12 months)	
Lo 2003[281]	RCT EL = 1+	24	Women ≥ 20 years, stress or urge UI Exclusions: UI of other cause, altered mental state, severe disability requiring full assistance for daily living	PFMT (*n* = 12)	Electrical stimulation (Interferential therapy) +PFMT (*n* = 12)	4 weeks	Pad test (1 h), change in median value (no units)	–2.50 vs –4.50, *P* = NS	Funding: none declared. Baseline pad test mean (SD): 94.1 (16.4) in ES + PFMT grp vs 5.58 (7.73) in PFMT grp; medians 6.0 vs 3.5. Treatment undertaken in hospital, supervised by physio; 3×/week. PFMT: 10 sets ×5 contractions, repeated to 100 contractions. Strength measured
							PFM strength, change in median value	+2.38 vs +1.20, *P* = NS	
							Leakage episodes	+.0.30 vs –1.46, *P* = 0.006	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Nocturia	–0.20 vs –0.64, *P* = NS	by perineometry, units not stated. Electrical stimulation + PFMT: 50 contractions, ES for 15–30 min (Nemectrodyne 5 stimulator, 4-pole position method), further 50 contractions. ES freq range 0–100 Hz based on tolerability.
Blowman 1991[282]	RCT EL = 1–	14 randomised, 13 analysed	Women (age 33–68 years), genuine SUI without significant prolapse; max. bladder vols > 500 ml, no detrusor contraction on lying or standing	Electrical stimulation + PFMT (*n* = 7)	Sham ES + PFMT (*n* = 7)	6 weeks	Change in frequency/week (medians)	OR 1.33 (95% CI 0.33 to 43–38)	Funding: none declared. [EL = 1–]: outcomes not set out a priori. Conflicting numerical data in text and tables; unclear if randomisation used (only mentioned in summary). Perineometry used to assess PFM strength and for biofeedback. PFMT 4×/day at home, reinforced at fortnightly visits to clinic. ES used 60 mins/day (NT4 stimulator), freq 10 Hz, pulse width 80 μs for 4 weeks, then 35 Hz, 15 min/day for 2 weeks.
							Change in leakage episodes/week	OR 30 (1.04, 863) Median change from 5 to 0 vs 6 to 6	

TENS therapy – RCT

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Soomro 2001[283]	RCT, cross-over EL = 1+	43 (70% women)	Men and women, mean age 50 ± 15 years, idiopathic DO (frequency, urgency and urge UI) unclear whether all had urge UI	TENS (*n* = 43)	Oxybutynin 2.5–5 mg t.d.s. (*n* = 43)	2×6 weeks tx, 2 weeks washout	Functional capacity* (mean change)	+ 21% vs + 24%, *P* < 0.0004 vs baseline	Funding: none declared. Dual-channel TENS machines used, pads applied to perianal region (S2 to S3 dermatome), amplitude controlled to provide tickling sensation, freq 20 Hz, pulse width 0.2 ms on continuous mode. Used up to 6 h/day. 85% of oxybutynin grp took 5 mg t.d.s. *assessed by calculating the mean volume for all samples over 1 week.
							Urodynamics (change in volume)	Residual vol.: –13 vs +30% first desire to void +10 vs +80% Vol. At instability –6 vs +76%, *P* not reported	
							Frequency/day	–2 vs –2, *P* < 0.003 vs baseline	
							SF-36	No sig. change in any parameter from baseline	
							Bristol Urinary Symptom questionnaire	Sig. improvements in both grps in day- and night-frequency, and dissatisfaction with spending rest of life with current symptoms, *P* ≤ 0.04	
							Self-reported change	16% vs 20% better 53% vs 50% no better 24% vs 25% worse	
							Adverse effects	Dry mouth 6% vs 87% blurred vision 6% vs 53% dry skin 6% vs 30% skin irritation 28% vs 26%. Difficulty with instructions and machine (TENS only); 11%, 13%	

TENS therapy – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Hasan 1996[285]	Case series EL = 3	71 (41 [58%] women); subjective assessment, in 59 completers (83%)	M/F aged 19–82 years (mean 48) with idiopathic DO refractory to other treatments (antimuscarinic drugs in 59, simple bladder over distension in 57). Symptoms of frequency, urgency, urge UI, and enuresis	TENS was applied for 3 weeks via electrodes placed bilaterally over the perianal region (S2-S3 dermatomes) at a frequency of 50 Hz, pulse width 200 µs, and at an amplitude that produced a tickling sensation	Mean 3 weeks tx (2–4)	Bladder diary variables (mean change)	daytime frequency –25%, from 12 (SD 7) to 9 (SD 5) nocturia –50% from 3 (SD 2) to 2 (SD 2) urge UI (*n* = 45; –40% from 5 [SD 5] to 3 [SD 3] episodes/day) enuresis (*n* = 27; –67% from 3 [SD 2] to 1 [SD 1] episodes/week)	Funding: Northern Counties Kidney Research, and Northern Regional Helath Authority (UK). A further investigation into the urodynamic effects of TENS (possibly a single session) over the suprapubic region and posterior tibial nerve was undertaken in 36 patients (17 men, 19 women). No significant changes in urodynamic parameters were seen during TENS applied via these areas.
						Urgency	moderate to severe in 92% at baseline, which changed to mild-moderate in 53% and with 14% reporting 'significant' improvement after tx	
						Urodynamics (conducted in the 59 completers, and compared with the findings from no stimulation and stimulation at T12 ('placebo' stimulation).	Significant improvements in total bladder capacity, voided volume, and in number and frequency of unstable contractions with TENS vs no stimulation or placebo stimulation	
						Adverse effects	31% local skin reactions, which resolved on replacing the standard electrode pads with hypo-allergic pads	
Walsh 1999[284]	Case series EL = 3	32 (31 F); 25 F (78%) completed tx	M/F mean age 47 years, range 18–81, with refractory irritative voiding dysfunction; daytime frequency 11.3, nocturia 2.6 Of the 25 completers, 2 had DO, 23 sensory urge	TENS was applied bilaterally to the S3 dermatomes using a	1 week	Day time frequency (change from baseline)	76% reported improvement, 4% worsening	Funding: none declared. Symptoms returned to pre-treatment levels in all patients within 6 months. 13% purchased TENS machine at 6 month telephone follow-up; the
						Nocturia	56% reported improvement episodes changed by –31%	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
				current of 10 Hz, 200 ms pulse width in continuous mode for 12 h for 1 week		Urgency	60% reported improvement; 16% worsening	remainder had ongoing equally severe symptoms as prior to TENS tx.
						Adverse effects	1 case of skin excoriation at electrode site	

Posterior tibial nerve stimulation – controlled trials

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Karademir 2005[286]	RCT EL = 1– [EL = 3 w.r.t. PTNS effectiveness]	43 (38 [88%] F)	M/F mean age 42 years (21–69) with OAB and DO. Mean frequency ~11/day None had prior tx for UI	Posterior tibial nerve stimulation (using SANS)* 60 min stimulation once/week for 8 weeks *n* = 21	Posterior tibial nerve stimulation (using SANS)* + oxybutynin 5 mg daily 60 min stimulation once/week for 8 weeks *n* = 22	8 weeks tx	Frequency	% change: –37 vs –44% Response** complete 29% vs 27% partial 43% vs 55% none 29% vs 18% *P* = NS	Funding: none declared. [EL = 1–] No details of randomisation, no consideration of whether grps equivalent at baseline. *34G needle inserted 3–4 cm superior and medial to left medial malleolus % connected to SANS (200 µs pulse width, 20 Hz, amplitude 0.5–10 mA). Correct stimulation confirmed by dorsal flexion of big toe and/or plantar flexion of toes 2 to 5. **response: complete if > 70% improvement in symptoms, partial if 35–70% improvement, < 35% no response.
						Urgency	% change: –46 vs –61% Response** complete 19% vs 32% partial 48% vs 45% none 33% vs 23% *P* = NS	
						Urge UI	% change: –37 vs –44% Response** complete 14% vs 14% partial 5% vs 5% none 5% vs 0% *P* = NS	
						Adverse effects	Oxybutynin grp: 32% dry mouth 5% (*n* = 1) blurred vision PTNS: 5% haematoma 5% local tenderness lasting 1 week	

Posterior tibial nerve stimulation – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Vandoninck 2003[287] Associated references (probably earlier reports of some of same pts): van Balken 2001[288] Vandoninck 2003[289]	Case series EL = 3	90 (67 [74%] F)	M/F median age 51 years (19–82) with OAB syndrome. 75% had UI, and 59% DO Exclusions: UD stress UI	Posterior tibial nerve stimulation* 30 minute stimulation once/week for12 weeks	12 weeks tx	Leakage episodes /24 h (*n* = 60)	Mean change (range): –3 (–19 to +7), *P* < 0.01 Success (> 50% reduction) rate 56%	Funding: Cystomedix Inc. Multicentre study (5 sites); Netherlands and Italy. *using 34 G needle placed 3–4 cm above the medial malleolus; intensity 0–10 mA, frequency 20 Hz, pulse width 200 µs. **1 = some drops, 2 = small amount, 3 = severe urine loss needing change of clothing. Urodynamic findings reported but for 46 pts only.
						Frequency/24 h (*n* = 80)	Mean change (range): –3 (–18 to +12), *P* < 0.001 Success (frequency of < 8) rate 25%	
						Leakage severity**	Mean change (range): –1 (–3 to +1), *P* < 0.001	
						Mean voided volume	Mean change (range): +27 (–96 to +200), *P* < 0.001	
						QOL (mean score change, range)	I-QOL: +10 (–31 to +88), *P* < 0.001 SF-36: +4 (–42 to +56), *P* < 0.001	
						Adverse effects	Not considered in main report In Vandoninck 2003[289] (report of 35 pts), 'transient pain at stimulation site; diarrhoea, cramps, headache, lower back pain reported (no numerical data)	
Klingler 2000[290]	Case series EL = 3	15 (11 F)	M/F aged 40–92 with urgency-frequency syndrome (frequency > 8/day, ± nocturia > 2). All had DO 20% had evidence of interstitial cystitis on investigations, and 7% (*n* = 1) had neurological disease All had prior conservative treatment	Posterior tibial nerve stimulation (using SANS)* 30 min stimulations 4×/week for 3 weeks	3 weeks tx	Response	67% (*n* = 10) cure or partial response** 33% no response	Funding: none declared. *a 34 gauge needle inserted approx 4 cm posterior to tibia at a 30˚ angle towards the ankle, and connected to a SANS device. Stimulation: 0.5–10 mA, fixed pulse width 200 µs, freq 20 Hz. 'proper' stimulation identified by great toe flexion and/or plantar flexion of digits 2 to 5. Stimulation contd for 30 min. After 3 weeks tx, further tx was individualised; symptoms recurred in 2 pts who were treated with 4 stimulations within a week,
						Leakage episodes (mean change/day in responders)	–1.7 (41%)	
						Pad usage (in responders)	–2.9 (69%)	
						Urodynamic outcomes (*n* = 13)	No sig. change in PVR, bladder compliance, cough LPP, UPP DO on longer present in 9, 'improved' in 1 Sig. increases in: mean bladder capacity, mean bladder volumes at first sensation and at normal desire to void	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Adverse effects	*n* = 1 minor haematoma at puncture site	followed by once/week. **cure: frequency ≤ 8, nocturia ≤ 2, pad test 0–1 g, and DO asymptomatic Partial response: req 8–10, nocturia > 2, pad test 2–10 g, DO improved and subjectively "cured". No response: freq > 10, nocturia > 2, pad > 10 g, DO unchanged, subjectively unchanged.
Govier 2001[291]	Case series EL = 3	53 (90% F) 47 (89%) completed tx	M/F mean age 57 years (24–80) with refractory OAB (frequency ≥ 10/day and /or ≥ 3 at night), who had failed conservative treatment Exclusions: active UTI, neurogenic DO	Posterior tibial nerve stimulation (using SANS)* 30 min stimulations 1×/week for 12 weeks	12 weeks	Frequency (mean change/24 h; *n* = 48)	Day: –25%, *P* < 0.05 Night –21%, *P* < 0.05	Funding: none declared; 2 of 5 authors declared financial and/or other relationship with pharmaceutical co's. Multicentre study (5 sites). *A 34 gauge needle inserted 3–4 cm posterior to tibia and connected to a SANS device. Stimulation: 0–10 mA, fixed pulse width 200 μs, freq 20 Hz. 'proper' stimulation confirmed by great toe flexion. Stimulation contd for 30 min.
						Urge UI episodes/day	–35%, *P* < 0.05	
						Pelvic pain	–30%, *P* < 0.05	
						Adverse effects	2% (*n* = 1) moderate throbbing pain at needle site 2% moderate right foot pain 2% stomach discomfort	
Congregado Ruiz 2004[292]	Case series EL = 3	51	F mean age 55 years (18–74), not responded to conservative tx (antimuscarinics) 26 (51%) frequency-urgency, 43% urge UI, 6% interstitial cystitis. Baseline day frequency 9.2, night 2.9; day voided vol. 138 ml, night 184 ml;	Posterior tibial nerve stimulation* 30 min stimulations once/week for 10 weeks	Mean 21 months (6–36)	Frequency (mean change/24 h)	Day: –27%, *P* < 0.001 Night –52%, *P* < 0.001	Funding: None declared. Retrospective analysis of cases. *A 22 gauge needle inserted 5 cm above medial tibial malleolus. Pulses 0–10 mA. Change in % with hypogastric pain also reported as an outcome; –66%.
						Voided vol. (mean change/24 h)	Day: +59%, *P* < 0.05 Night +28%, *P* < 0.05	
						Leakage episodes (mean change/24 h)	Day: –62%, *P* < 0.05 Night –71%, *P* < 0.05	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			leakage episodes 2.1 day, 0.7 night Urodynamic findings: 26% DO, 25% normal, 4% underactive bladder, 33% hypersensitive bladder. No UD done in 8%			Adverse effects	Not specifically considered, but reported that "no infections, mechanism failures, or pain have been detected when using the technique"	
van der Pal 2006[293]	Case series EL = 3	30 (26 [87%]) F) 29 completed follow-up	M/F mean age 51 years (20–72) urge UI refractory to conservative tx (drugs: antimuscarinics, oestrogens, alpha-blockers, 105rethra105*n*105*n*105); ≥ 3 leakage episodes/24 h (mean 8); frequency 13, nocturia 2.2, mean voided vol. 128, pad usage 3.9 43% had prior surgery	Posterior tibial nerve stimulation* 30 min stimulations 3×/week for 4 weeks	4 weeks tx	Bladder diary (mean change with 95% CI)	Frequency –1.2 (–2.7 to 0.1), *P* = NS Nocturia –0.8 (–1.3 to –0.2), *P* < 0.01 Leakage episodes –4.1 (–6.2 to –2.0), *P* < 0.01 Mean voided vol. +51.8 (17 to 86.5), *P* < 0.01 Pad usage: –1.3 (–2.3 to –0.4), *P* < 0.01	Funding: CystoMedix Inc. *PTNS: pulse width 200 µs, frequency 20 Hz, intensity 0–10 mA; increased until flexion of big toe and/or fanning of other toes. For ongoing stimulation, current set according to tolerability (mean 3.2 mA, range 1–6.5).
						QOL	I-QOL: +19% score change, *P* < 0.01 SF-36: sig. improvement in 5 of 8 domains	
						Adverse effects	'minor bleeding or temporary painful/numb feeling at the insertion site or under sole of foot were rare'	
van der Pal 2006[294]	Case series EL = 3	11 (6 F)	As van der Pal 2006[293] M/F mean age 51 years (33–66) with OAB refractory to conservative treatment All previously treated successfully with PTNS (≥ 50% fewer leakage episodes and/or ≥ 50% lower frequency), and had continued tx as outpatients or at home Maintenance treatment had been used for mean 13 months (range 1–36)	PTNS tx withheld for 6 weeks than re-introduced for 4 weeks* 30 min stimulations 3×/week for 4 weeks	At 6 weeks after no tx	≥ 50% increase in leakage episodes and/or ≥ 50% increase in frequency	7 pts (64%)	Funding: CystoMedix Inc. *PTNS: adjustable intensity from 0 to 10 mA (mean 3.8), pulse width 200 µs, frequency 20 Hz.
						Subjective assessment	11 reported deterioration of symptoms	
					At weeks 4 after re-introducing tx	≥ 50% fewer leakage episodes and/or ≥ 50% lower frequency (vs end of 6-week no tx phase)	9 pts (82%)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			All stopped maintenance tx for 6 weeks, then re-treated as outpatients			Subjective assessment	8 of 11 improved and wished to continue tx	
						Other symptoms	Sig. improvement in: nocturia (–80%) voided volume (+75%) severity (scale 0–3; –54%) I-QOL scores (+31%)	

Magnetic therapy – RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
But 2003[295]	RCT EL = 1+	55	Women, mean age 56 years (range 34–78), UI (17% stress, 42% urge, 40% mixed) Exclusions: pregnancy, physical or mental disability, pacemakers, bladder infection, urolithiasis, recent drug tx (antimuscarinics, beta-blockers, diuretics)	Magnetic stimulation (*n* = 30)	Sham magnetic stimulation (*n* = 22)	8 weeks	Leakage episodes (day), mean change	–0.6 vs –0.2 (*P* = NS*)	Funding: none declared. Magnetic stimulation: continuous via Pulsegen device, pulse freq 10 Hz. Device inserted into small pocket of specially designed underwear. **P* values for each group vs baseline. No between-group comparisons reported for these parameters.
							Nocturia	–0.6 vs –0.7 (*P* = NS*)	
							PFM strength (units not stated)	Power of contraction (change in % of max.): + 3.9 (*P* = 0.007*) vs + 2.5 (*P* = NS*) Duration of contraction (s, change): +0.5 (*P* = 0.04*) vs 0 (*P* = NS*)	
							Pad weight (g, mean change)	–2.7 (*P* = 0.01*) vs –2.3 (*P* = NS*)	
							Self-reported improvement in UI symptoms	56% vs 26% (*P* = 0.0001 between grps)	
							Adverse effects	MS grp: 1 onset pre-existent lumbar-ischialgia; 2 pulsating sensation; 1 less pain during menstruation	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
But 2005[296]	DB RCT EL = 1–	39	Women, mean age 39 years (28–70), with mainly urgency related incontinence and occasional stress induced urine loss) Baseline leakage episodes not stated; frequency was 9 vs 8.2, nocturia 2.6 vs 1.8, pad use 3.9 vs 3.3 Exclusions: pregnancy, physical or mental disability, pacemakers, bladder infection, urolithiasis, recent drug tx (antimuscarinics, beta-blockers, diuretics)	Magnetic stimulation (*n* = 23)	Sham magnetic stimulation (*n* = 16)	8 weeks	Success (from 0 to 100% on VAS [≡ no UI]) Frequency* (change/24 h) Nocturia* (change/24 h) Pad usage* Adverse effects	42% vs 23%, *P* = 0.02 (No improvement in 22% vs 56%) –2.3 (26%) vs –0.6 (7%) –1.2 (46%) vs +0.1 (6%) –1.7 (44%) vs –0.5 (15%) none	Funding: Ministry for education, science and sport (Slovenia). [EL = 1–] no details of randomisation, no consideration of whether groups comparable ar baseline in outcome measures. Magnetic stimulation: continuous via Pulsegen device, pulse freq 18.5 Hz. Device inserted into small pocket of specially designed underwear. *$P \leq 0.007$ for magnetic grp vs baseline; *P* = NS for all changes from baseline in control grp. No between-group comparisons reported for these parameters. First sensation to void, bladder capacity, and UCP also reported – data not reproduced here.

Magnetic therapy – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Galloway 1999[297]	Case series EL = 3	83; 64 have completed tx	Women, mean age 55 years (35–83), stress UI (11% mixed) Exclusions: pregnancy, physical or mental disability, pacemakers, bladder infection, urolithiasis, recent drug tx (antimuscarinics, beta-blockers, diuretics)	Magnetic stimulation (*n* = 30)	6 weeks tx	Continence status (*n* = 50 evaluated) Leakage episodes/day Pad weight on 'dynamic pad test' (g, mean change)	34% dry 32% not using more than 1 pad per day 34% using > 1 pad per day –1.6 (48%), *P* = 0.001 –5 g (25%), *P* = 0.001	Funding: Neotonus Inc. Magnetic stimulation: 2×20 min sessions per week in a special chair (Neocontrol system). Pulses of current 275 µs; 10 min low-frequency stimulation (5 Hz) followed by rest for 1–5 min, and 10 min at 50 Hz. *P values for each group vs baseline. No between-group comparisons reported for these parameters. Adverse effects not considered.
Chandi 2004[298]	Case series	24	F mean age 50 years (35–68) with urge or mixed UI (50% had each). Median frequency	Magnetic stimulation built into a	8 weeks tx	Frequency (change in median; unclear whether per day)	–5, *P* < 0.001 vs baseline	Funding: none declared. Device = Neocontrol, pulses 275 µs, 10 Hz for 2×10 mins for urge UI, and

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		12 (5–22), median 24 h pad test weight 67 g (10–313), and median subjective score (VAS 0–6) of 5 (3–6) Exclusions: radiotherapy, neurological disease, pacemaker, arrhythmia, or metal implants	chair; 2×/week for 8 weeks		Pad weight (change in median score; pad test used unclear)	–36 g, $P < 0.05$ vs baseline	10 Hz for 10 min then 50 Hz for 10 min for mixed UI. Adverse effects not considered
						Satisfaction (change in median subjective score)	–2, $P < 0.001$	Criteria for success and cure given in methods but results not quoted. 14 (58%) were 'improved'; 3 were dry.

Behavioural therapies

Bladder training vs control

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Jarvis 1980[305]	RCT EL = 1+	60	Women 27–79 years, UI owing to idiopathic DO diagnosed by pressure-flow studies. (100% had urge UI, frequency and urgency, 68% urge and stress UI) Cystoscopy and urethral dilatation performed to exclude local disease	Bladder training (hospital inpatient) (n = 30)	Control (home environment) (n = 30)	6 month follow-up (duration of tx unclear)	% continent	90% vs 23%	Funding: none declared. Bladder training: explain rationale, pt instructed to pass urine at specific intervals during the day (~1.5 h, and no earlier) [frequency of nocturia ignored]; intervals increased by 0.5 h daily until 4 hourly void achieved. Pts asked to keep fluid balance chart, and introduced to someone successfully treated with the bladder training. Control: advised should be able to hold urine for 4 h, be continent, and allowed home. No between-group analysis.
							% symptom-free	83% vs 23%	
							Change in % reporting symptom	Daytime leakage episodes: –83 vs –23% Nocturnal leakage episodes: –89 vs –20% Urgency: –87 vs –23% Urge UI: –90 vs –23% Stress UI: –86 vs–20%	
Fantl 1991[205]	RCT EL = 1+	131 randomised, 123 completed tx	Women ≥ 55 years (mean ~68), community-dwelling, capable of independent or assisted toileting, ≥ 1 UI episode/week, urodynamically categorised as urtheral	Bladder training (n = 60)	Control (n = 63)	6 week tx (then all offered bladder training; follow-up to 6 months for grp as	Leakage episodes/week (change at 6 weeks)	None: 12% vs 3% ≥ 50% reduction: 75% vs 24% ($P < 0.001$ BT grp vs baseline) Increase in: 8% vs 43%	Funding: National Institute on Aging, National Center on Nursing Research. Bladder training: education, emphasising neurological control of lower urinary tract function, and scheduled voiding (every 30 or 60 min according to pt's baseline,
							Urine loss (pad test, g, mean change)	–54 vs +21% (P value not given)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			sphincter incompetence (72%), or DO ± sphincteric incompetence (28%) 19% had previous surgery for UI; 36% previous medical tx for UI Exclusions: uncontrolled diabetes mellitus, UTI, urinary obstruction, diverticulum, fistula, reversible cause of UI, permanent indwelling catheter			a whole)*	Daytime UI episodes/week (mean change)	–19 vs –3% (*P* value not given)	increased by 30 min/week if reduced no. UI episodes; target 2.5–3 h voiding interval.) Six-weekly clinic visits. No fluid modifications used. Control: returned to clinic at 6 weeks, without further intervention or clinic contact. All underwent bladder training after initial 6-week period. Sig. difference at baseline in duration of symptoms (13 ± 11 years BT vs 8 ± 10 years control, *P* < 0.05) and use of oestrogen supplementation (37% vs 21%, *P* < 0.05). *6 months follow-up; data available for total group only (bladder training and control grps subsequently given bladder training).
							Nocturnal UI episodes/week (mean change)	–44 vs –11% (*P* value not given)	
							QOL (IIQ) (mean change) (*n* = 82)	–55 vs –2% (*P* value not given)	
							6 month results (mean change between 6 month and end of 6-week tx period)*	Leakage episodes +2/week Urine loss +5 g Daytime UI episodes /week (+2) Nocturnal UI episodes/week (+1)	

Antimuscarinic drugs compared with bladder training

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Colombo 1995[306]	RCT EL = 1+	81 randomised, 75 analysed	Women, mean age ~48 years (24–65), socially embarrassing urge UI: and 1 of the following on cystometry: DO (36%), low-compliance bladder (23%), sensory bladder (41%) Exclusions: stable bladder at cystometry, neurologic disease, detrusor hyperreflexia,	Bladder training* (*n* = 37)	Oxybutynin 5 mg t.d.s. (*n* = 38)	6 weeks tx, 6 months follow-up of women cured at 6 weeks	Self-reported cure	73% vs 74% at 6 weeks % relapsed at 6 months: 1/27 vs 12/28	Funding: none declared. All postmenopausal women (*n* = 36 [44%] took 1.25 mg conjugated equine oestrogen /day for 4 weeks before baseline evaluation. *Bladder training: 6 weeks education – maximum interval between micturitions identified, pts encouraged to hold their urine until this interval plus 30 min. Thereafter interval progressively increased by 30 min every 4 or 5 days; to target voiding interval 3–4 h.
							Resolution of diurnal frequency	20/29 (69%) vs 18/32 (56%)	
							Resolution of nocturia	11/18 (61%) vs 3/11 (27%)	
							Volume (ml) at first desire to void (% change)	+33% vs +49%, *P* = 0.001 vs baseline both grps	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			age > 65 years, coexisting stress UI, genital prolapse, PVR urine > 50 ml, previous gynae/urogynae operations, prior drug tx for urge UI, urethral diverticula, fistulas, urinary tract neoplasia, bacterial or interstitial cystitis, bladder stones, previous pelvic radiotherapy				Volume (ml) at very strong desire to void (% change)	+21 vs +29%, *P* = 0.0002 vs baseline both grps	Oxybutynin dose halved in 18 (47%) owing to side effects; dry mouth (*n* = 15), constipation (*n* = 6), nausea (*n* = 5), dizziness (*n* = 2), reduced visual acuity (*n* = 1), tachycardia (*n* = 1). 6 withdrew; 4 oxy (3 dry mouth, 1 glaucoma); 2 bladder training (tx time-consuming).
Jarvis 1981[307]	RCT EL = 1+	50	Women, mean age ~47 years (17–78), UI owing to detrusor instability (100% had urge UI, 72% stress UI) Exclusions: neurological abnormalities, diabetes mellitus, UTI, drugs known to affect lower urinary tract function	Bladder training (hospital inpatient) (*n* = 25)	Flavoxate 200 mg t.d.s. + Imipramine 25 mg t.d.s. (out-patients) (*n* = 25)	4 weeks tx (unclear whether the results are those at 4 weeks)	% continent	84% vs 56%, *P* < 0.05	Funding: none declared.
							% symptom-free	76% vs 48%, *P* < 0.05	No details of bladder training given in published report.
							Change in % reporting symptoms	Daytime leakage episodes: –76 vs –52% Nocturnal leakage episodes: –81 vs –32% Urgency: –84 vs –56% Urge UI: –84 vs –56% Stress UI: –95 vs–71%	No statistical between-group comparisons other than for proportions continent, and symptom-free.
							Adverse effects	0 vs 14 (56%) (20% withdrew owing to adverse effects): 8 dizziness, 6 headache, 6 dry mouth, 4 nausea, 2 drowsiness, 1 vomiting	

Antimuscarinic drugs plus bladder training

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Szonyi 1995[308]	RCT EL = 1++	60 (93% women) randomised,	M/F ambulant and independent, 72–98 years (mean 82.2	Oxybutynin (2.5 mg b.d. to 5 mg	Placebo + bladder training	6 weeks tx	Daytime frequency, difference in median change*	difference not given – only CI (95% CI –27.0, –6.0) *P* = 0.003	Funding: Smith & Nephew pharmaceuticals supplied oxybutynin and placebo

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		57 analysed	SD 6.1); symptoms of urinary frequency, urgency and urge UI; DO diagnosed by water cystometry. (20/24 oxy vs 222/28 placebo incontinent during baseline) Exclusions: UTI, severe hepatic or renal disease, glaucoma, uncontrolled diabetes	t.d.s.) + bladder training (*n* = 30)	(*n* = 30)		Nocturia, difference in median change*	–6.0 (95% CI –5.0, +7.0)	tablets. Bladder training: instruction to delay micturition as long as possible when experienced the need to pass urine. Aim: to reduce frequency. Median doses taken were 5 mg/day oxybutynin (also modal dose), 10 mg placebo, *P* = NS. *difference between last 2 weeks of tx period and 2-week run-in period before tx. #4-point ordinal scale.
							Daytime incontinence episodes, difference in median change*	–9.5 (95% CI –11.0, +3.0)	
							Nocturnal enuresis, difference in median change*	–1.0 (95% CI –3.0, +2.0)	
							Self-reported benefit (yes/no)	22/28 (79%) vs 16/29 (55%), *P* = NS	
							Self-reported change# (*n*)	No change 7 vs 14 marginal improvement 3 vs 4 significant improvement 14 vs 8 cure 4 vs 3	
							Adverse effects	Dry mouth 93% vs 86% blurred vision 50% vs 59% heartburn 57% vs 45% constipation 50% vs 45% dry skin 50% vs 59%; *P* not reported	
Wiseman 1991[309]	RCT EL = 1+	37 (88% women) randomised, 34 analysed	M/F mean age 80 years (70–89), urinary frequency and urge UI caused by DO (confirmed by cystometry); mobile and able to toilet independently Exclusions: UTI past 4 weeks, bladder neck prolapse in women, severe liver/renal disease, uncontrolled	Terodiline (25 mg at night) + bladder training (*n* = 19)	Placebo + bladder training (*n* = 18)	6 weeks tx	Frequency /day (median difference between grps)	Per 24 h: –0.2 (95% CI –1.1 to 1.2) Daytime: 0.05 (95% CI –1.0 to 1.1) Night-time: –0.15 (95% CI –0.6 to 0.4)	Funding: Kabi, UK. Bladder training: instruction at beginning and every 2 weeks by home visit; delay bladder emptying by as along as possible whenever experienced the need to void.
							Leakage episodes /day (median differences between grps)	Per 24 h: 0 (95% CI –0.6 to 1.2) Daytime: 0.15 (95% CI –0.5 to 1.1) Night-time: 0 (95% CI –0.2 to 0.3)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			diabetes mellitus, glaucoma, other contraindications to antimuscarinic tx				Self-reported improvement	56% vs 44% (12% difference, 95% CI 44%, –22%)	
							Adverse effects	2 reports terodiline grp (1 oesophagitis, 1 dry mouth)	
Castleden 1986[310]	RCT EL = 1–	34 randomised (28 women), 33 completed	M/F, aged 30–91, incontinence, 'unstable bladder'.	Bladder training + imipramine* (*n* = 19)	Bladder training + placebo (*n* = 14)	Duration of tx unclear, follow-up to 11 months	Cure	14/19 (74%) vs 6/14 (43%), *P* = NS	Funding: none declared. Bladder training: voiding at 0.5 or 1 hourly intervals initially, increased by 0.5 h after dry for 48 h, to target voiding interval of 4 h. fluids allowed to 1500 ml, pts encouraged not to restrict fluids. *imipramine starting dose 25 mg for 1 week, increased to 50 mg, then increased by 25 mg every month depending on benefit and side effects. Mean dose taken 54 mg (range 25–100). At baseline, sig. more pts in the placebo grp were wet day and night (no numerical data, and no other baseline data).
							Urodynamics (mean values, time point unclear)	No sig. difference between grps in any outcome: Initial residual vol. (22.6 vs 40.3 ml) Volume capacity (265.3 vs 311.7 ml) Pressure capacity (52.8 vs 49.9 cmH_2O) Urethral capacity (52 vs 45.1 cmH_2O) Volume post incontinence (163.9 vs 160.8 ml)	
							Adverse effects	'frequent complaints' of dry mouth and constipation on imipramine; 1 confusion on imipramine 25 mg; 1 'feeling ill' on imipramine. No adverse effects in placebo grp	
Mattiasson 2003[311]	RCT EL = 1++	501 (75% women)	M/F, median age 63 years (19–86), symptoms of urinary frequency (≥ 8 voids/day), urgency, with/without urge UI (61% with) Exclusions: contraindications to antimuscarinic therapy, electrical stimulation or	Tolterodine 2 mg b.d. + bladder training (*n* = 244)	Tolterodine 2 mg b.d. (*n* = 257)	24 weeks tx	Frequency/24 h (median change [IQR])	–33% (–42, 21) vs –25% (–39, –13), *P* < 0.001	Funding: Pharmacia Corporation. Bladder training: instruction to attempt to increase time between voids, target 5–6 voids/24 h; maintain same fluid intake; tips on concentrating on other tasks when experiencing desire to void, deep breathing. Tolterodine dose could be
							Leakage episodes/24 h (*n* = 301, with UI at baseline, median change [IQR])	–87% (–100, –20) vs –81% (–100, –42), *P* = NS	
							Volume voided/void (median change [IQR], ml)	+31.5% (13, 56) vs +20% (3, 45), *P* < 0.001	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			bladder training past 3 months, indwelling catheter, ISC, use of antimuscarinincs or concomitant tx for OAB				Urgency episodes/24 h	–38% (–77, 14) vs –38% (–69, –8), *P* = NS	reduced to 1 mg b.d. weeks 1–2 if adverse effects occurred. 90% maintained dose at 2 mg b.d. *improvement; reduction of ≥ 1 point in score: deterioration; increase of ≥ 1 point.
							Pt perception (6-point rating scale, 0–5, no- to many severe- problems)	67% vs 62% 'minor'. 76% vs 71% improved* 3% vs 5% deteriorated* *P* = NS all comparisons	
							Adverse effects	% reporting ≥ 1: 65% vs 69% Dry mouth 31% vs 35% headache 6% vs 8% constipation 3% vs 5% 20 (4%) pts reported 25 serious adverse events (2 in 1 pt; chest and abdominal pain considered drug related)	

Bladder training vs PFMT

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Yoon 2003[312]	RCT EL = 1+	50 randomised, 44 analysed	Parous F 33–55 years. Urine loss ≥ 1 g /30 min pad test, ≥ 14 voids in 48 h prior to evaluation Exclusions: UTI, previous surgery for UI, current drug tx for UI	Bladder training (*n* = 19)	PFMT (*n* = 13) No tx (*n* = 12)	8 weeks	PFM contraction index* (mean change)	+7.3 vs +8.1 vs –0.5 *P* < 0.01 vs baseline BT and PFMT grps	Funding: None declared. Bladder training: voiding interval increased weekly. PFMT: 30 contractions daily, with EMG feedback weekly. PFM strength measured by perineometry. *index is average pressure (mmHg) multiplied by duration (s). Eight pts from each grp withdrew. No between-grp comparisons reported.
							Leakage, 30 min pad test (mean change, g)	–0.8 vs –7.2 vs +0.7, *P* = NS vs baseline	
							Frequency of voiding (mean change)	Day: –6.9 vs –0.8 vs +1.1 Night: –1.8 vs +0.1 vs +0.1 *P* < 0.01 vs baseline in BT grp	
							Voided volume (mean change, ml)	+93 vs +27 vs –9, *P* < 0.01 vs baseline in BT grp	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Wyman 1998[313] (cystometry Elser 1999[940])	RCT EL = 1+	204	Community dwelling women ≥ 45 years (mean 61), ambulatory, mentally intact, toilet independently, UI > once/week, urodynamic diagnosis of stress UI or DO ± stress UI (stress UI [71%], urge UI [14%], stress and urge [15%]). Palpable PFM contraction a criterion for study entry Exclusions: reversible UI causes, uncontrolled metabolic conditions, PVR > 100 ml, UTI, genitourinary fistula, indwelling catheterisation, inability to contract PFM on digital examination	Bladder training (*n* = 68)	Biofeedback-assisted PFMT (*n* = 69) Bladder training + biofeedback-assisted PFMT (*n* = 67)	3 months tx, follow-up at 6 months	Leakage episodes/week (mean reduction)	–27 vs –43 vs –54% (3 months), *P* = 0.004 for combination vs other grps –31 vs –44 vs –46% (6 months), *P* = NS between grps	Funding: National Institute of Aging/National Institutes of Health. Bladder training: progressive voiding schedule, tailored to pt during weeks 1–6, starting with 30–60 min voids, increasing by 30 min each week is possible; unchanged weeks 7–12. PFMT: graded home exercise programme with audiotapes, plus 4 office biofeedback sessions (visual [balloon] and verbal); 5 fast, 10 sustained contractions, 12 s relaxation 2×/day, increasing to 50 daily contractions during week 3. PFM contraction also taught for urge and stress inhibition. Combination grp started with bladder training with PFMT added during week 3. After 3-month tx period, women encouraged to continue with tx as assigned. *at 3 months, women with urge ± stress UI in the combination therapy reported sig. lower scores vs PFMT group.
							Cure	18 vs 13% vs 31% (3 months) 16 vs 20% vs 27% (6 months) *P* = 0.05 for combination vs other grps at 3 months; *P* = NS between grps at 6 months	
							≥ 50% reduction in leakage episodes	51 vs 56% vs 70% (3 months) 46 vs 56% vs 59% (6 months) *P* = NS between grps	
							No change/ increase in leakage episodes	28 vs 23% vs 13% (3 months) 31 vs 26% vs 17% (6 months) *P* = NS between grps	
							IIQ-revised* (mean reduction from baseline score)	–24 vs –25 vs –47% (3 months) –30 vs –22 vs –29% (6 months) *P* = NS between grps*	
							UDI (mean reduction from baseline score)	–27 vs –24 vs –46% (3 months) –28 vs –28 vs –38% (6 months) *P* = NS between grps	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Pt perception of improvement	Much better: 38 vs 30% vs 52% (3 months, *P* = 0.011 combination tx vs other grps), 35 vs 37% vs 53% (6 months) Somewhat better: 27 vs 46% vs 38% (3 months), 27 vs 33% vs 22% (6 months) No change: 30 vs 21% vs 7% (3 months), 32 vs 25% vs 21% (6 months) Worse/much worse: 5 vs 3% vs 3% (3 months), 7 vs 5% vs 4% (6 months) *P* = NS between grps	
							Treatment satisfaction	Very: 64 vs 73% vs 82% (3 months), 60 vs 66% vs 78% (6 months) Slightly: 9 vs 16% vs 11% (3 months), 18 vs 17% vs 10% (6 months) Neutral: 21 vs 10% vs 5% (3 months), 13 vs 16% vs 9% (6 months) Dissatisfied/very dissatisfied: 6 vs 2% vs 2% (3 months), 8 vs 2% vs 3% *P* = NS between grps	
							Cystometry (*n* = 181; 73% genuine stress UI, 13% DO, 14% GSI + DO)[940]	No sig. between-grp differences in first sensation to void, max. cystometric capacity, MUCP, UCP, mean/max. pressure transmission ratio, straining urethral axis	

Multicomponent behavioural therapy studies

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Dougherty 2002[199]	RCT EL = 1++	218 randomised. 178 completed ≥ 1 follow-ups. 147 followed up to 6 months, 111 (51%) to 12 months, 65 (30%) to 18 months, 46 (21%) to 24 months	F ≥ 55 years (mean 68), community-dwelling, involuntary urine loss ≥ 2×/week of ≥ 1 g/24 h; stress (16%), urge (16%), or mixed (68%) incontinence Exclusions: bladder cancer, kidney disease, indwelling urinary catheter, residual urine ≥ 100 ml, caregiver needed but unavailable	Behaviour management (*n* = 94)	Control (*n* = 84)	6 months tx, follo-up to 2 years	Pad test (mean change in leakage/24 h, g)	6 months: –17 vs –10 *P* = 0.01 2 years: –34 vs + 84, *P* = 0.01	Funding: National Institute of Nursing Research, National Institutes of Health. Behaviour grp: 3 sequential phases, according to pt response and goals – the maximum programme was; 2–4 weeks self-monitoring, 6–8 weeks bladder training, 12 weeks PFMT with biofeedback (no. of training sessions unclear). Self-monitoring used if: mean ≥ 2 caffeinated drinks/day; average daily fluid intake < 1500 ml or > 4000 ml; fluid intake after 6 pm and nocturia ≥ twice/night; daytime voiding interval > 4 h; constipation. Bladder training protocol: scheduled voiding, aiming to increase interval by 30 min each week, target 2.5–3 h between voids. PFMT: 15 repetitions/day increased by 15 repetitions every 3 weeks to 45
							Leakage episodes /24 h (mean change)	6 months: –2.1 vs –1.0, *P* ≤ 0.02 2 years: –2.1 vs –0.5, *P* ≤ 0.02	
							Frequency /24 h (mean change)	6 months: –0.9 vs –0.8, *P* = NS 2 years: –0.4 vs +0.7, *P* = NS	
							Voiding interval (mean change h)	6 months: +0.2 vs +0.2 *P* = NS 2 years: 0 vs –0.1, *P* = NS	
							Quality of life (IIQ, mean score)*	6 months: 38.9 vs 44.7 *P* ≤ 0.05 2 years: 35.1 vs 42.1, *P* ≤ 0.05	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Subjective report of urine loss severity (7 pt ordinal scale; 1 = worst bladder control, 7 = best)	6 mth score: 5.88 vs 4.66 $P \leq 0.05$ 2 years: 5.65 vs 4.91 $P \leq 0.05$	contractions/day, 3×/week for 12 weeks, with EMG (sensors applied perianally and abdominally). No mention of whether ability to contract PFM assessed at baseline. Control: received feedback on information obtained at the baseline visit, which did not constitute or promote tx. *range of possible scores 29–116, lower scores indicate higher QOL. 10% vs 2% behaviour vs control grps taking medication for UI; 23% vs 35% using diuretics; 52% vs 64% previous gynae surgery; 40% vs 18% taking HRT; 17% vs 13% current smokers (*P* = NS for all comparisons).
Burgio 1998[314,315] Goode 2002 (report of urodynamic findings)[317] Johnson 2005[316] also related (see below)	RCT EL = 1+	197 randomised, 190 analysed, 169 completed 8-weeks tx	F, community-dwelling, mean age 67.7 years (55–92), urge UI 2×/week for ≥ 3 months, and urodynamic evidence (49% urge UI, 51% mixed UI) Exclusions: continual leakage, PVR urine vol. > 200 ml, uterine prolapse past introitus, impaired mental status, narrow-angle	Biofeedback-assisted behavioural treatment (BT), *n* = 65	Oxybutynin 2.5 mg to 5 mg t.d.s. (*n* = 67) Placebo t.d.s. (*n* = 65)	8 weeks	Leakage episodes/week (mean change, SD)	–81% (25) vs –69% (37) vs –39 % (80); *P* = 0.04 for BT vs oxy, *P* < 0.001 BT vs plac, *P* = 0.009 oxy vs plac	Funding: National Institute on Aging, National Institutes of Health. Behavioural grp: sequential phases; biofeedback-(anorectal)- assisted PFMT, 15 exercises 3×/day, max. 10 s each (2 weeks); urge strategies (2 weeks); repeat biofeedback PFMT if not had ≥ 50% reduction in frequency of accidents (2 weeks); review and reinforcement (2 weeks). Ability to contract PFM checked at first visit by anorectal biofeedback.
							Pt description of progress	Better or much better: 100 vs 82% vs 66%, *P* < 0.001 BT vs oxy/plac About same/worse: 0 vs 18% vs 34%	
							Pt satisfaction (somewhat or complete)	100 vs 89% vs 62%, *P* < 0.001 BT vs oxy/plac	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			glaucoma, unstable angina, decompensated heart failure, malignant arrhythmias				Adverse effects	Dry mouth: 35 vs 97% vs 55% ($P < 0.001$ for oxy vs BT/plac) Inability to void: 6 vs 22% vs 3% ($P = 0.002$ for oxy vs BT or plac) Constipation: 22 vs 39% vs 37%, P = NS Blurred vision: 10 vs 15% vs 10%, P = NS Confusion: 6 vs 8 vs11%, P = NS	In BT grp, 74% received a single session of biofeedback; other 26% had second anorectal biofeedback or combined bladder-sphincter biofeedback. Daily dose of oxybutynin taken: 2.5 mg (8%), 5 mg (19%), 7.5 mg (24 %), 10 mg (17.9%), 15 mg (27%). Overall, 32% had urethrocele, 71% cystocele, 47% rectocele. *pts who underwent pre- and post-treatment urodynamics less likely to have atrophic mucosa (35% vs 50%, $P < 0.04$).
							Urodynamic findings (n = 105; 33 BT, 35 oxy, 37 plac)* Mean change in volume, ml	First desire to void: +18.8 vs +44.4 vs +8.9 Strong desire to void: +40.5 vs +69.9 vs +7.8, P = 0.013 oxy vs plac Bladder capacity: +17.3 vs +68.9 vs –6.0, $P \leq 0.02$ oxy vs other grps	
Johnson 2005[316]		131 (66%) of 197 who had nocturia	As for Burgio 1998[314,315] secondary analysis of pts who had nocturia at baseline (at least one episode of nocturia per night; mean 1.9 in each grp)	Biofeedback-assisted behavioural treatment (BT), n = 47	Oxybutynin 2.5 mg to 5 mg t.d.s. (n = 46) Placebo t.d.s. (n = 38)	8 weeks	Nocturia (change from baseline)	Mean (SD): –0.5 (0.6) vs –0.2 (0.5) vs +0.1 (0.7) Median reduction: 0.5 vs 0.3 vs 0* Pts with 50% less nocturia than baseline: 23 vs 9% vs 3%, P = 0.03	Funding: same as Burgio 1998 Reported that there were not sig. differences in baseline characteristics between the population with or without nocturia. *$P < 0.001$ behavioural vs placebo; $P = 0.007$ oxy vs placebo; $P = 0.02$ behavioural vs drug tx.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Burgio 2000[325] (extension study of Burgio 1998[314,315])	Cohort [EL = 2+]	As Burgio 1998[314,315]	As Burgio 1998[314,315] Women who completed 8 weeks biofeedback-assisted behavioural treatment or oxybutynin who were not completely dry or not completely satisfied with the outcome were offered the alternative tx in addition to their initial tx.* Some from the oxy group crossed over to BT. Placebo recipients were offered either active tx	BT + oxybutynin (*n* = 8)	Oxybutynin 2.5 mg to 5 mg t.d.s. + BT (*n* = 27) Oxy crossed over to BT (*n* = 19) Placebo crossed over to BT (*n* = 34) Placebo crossed over to drug (*n* = 10)	8 weeks	Leakage episodes/week (change in mean from week 8 to week 16)	BT + oxy (*n* = 8) from –58 to –89%, *P* = 0.034 Oxy + BT (*n* = 27) from –73 to –84%, *P* = 0.001 Oxy crossed over to BT (*n* = 19) from –59 to –77%, *P* = NS Placebo crossed over to BT (*n* = 34) from –23 to –64%, *P* = 0.002 Placebo crossed over to drug (*n* = 10) from –45 to –77%, *P* = 0.012	
Burgio 2002[318]	RCT EL = 1++	222 randomised, 195 completed	F, community-dwelling, mean age 65 years, urge UI 2×/week for ≥ 3 months,and urodynamic evidence (68% urge UI, 32% mixed UI) Exclusions: continual leakage, PVR urine vol. > 150 ml, uterine prolapse past introitus, impaired mental status, decompensated heart failure	Biofeedback-assisted behavioural training (BT), *n* = 73	Behavioural training with feedback from vaginal palpation (*n* = 74 Self-help (*n* = 75)	8 weeks	Leakage episodes /week (mean, SD) Patient perceptions of tx* Pt description of progress (better or much better) Satisfaction (somewhat or complete)	–63% (43) vs –69% (33), vs –59% (39), *P* = NS between grps Bio- and verbal- feedback grps better than self-help grp in: description of, and satisfaction with progress, restriction of activities *P* ≤ 0.05. Verbal feedback also better than self-help in accidents are smaller, comfortable with tx, *P* ≤ 0.01 96 vs 98% vs 86% 98 vs 100% vs 95%	Funding: National Institute on Aging, National Institutes of Health. Biofeedback assisted behavioural grp: biofeedback (anorectal balloon probe) –assisted PFMT, 15 exercises 3×/day, max. 10 s each (2 weeks); urge strategies (2 weeks); repeat biofeedback PFMT if not had ≥ 50% reduction in frequency of accidents (2 weeks); review and reinforcement (2 weeks). The 'control' behavioural treatment differed in method of biofeedback (palpation not anorectal). Ability to contract PFM checked at first visit by anorectal biofeedback. Self-help: written instructions of the 8 week behavioural programme. *8 aspects: pt description of

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							IIQ	Improvement in 4 of 4 domains in all grps, $P < 0.001$ vs baseline	progress, having fewer accidents, accidents are smaller, able to wear less protection, comfortable enough with tx to continue indefinitely, satisfaction with progress, incontinence restricting activities, feeling disturbed about incontinence.
							SF-36	Improvement in 5 of 8 domains in all grps, $P < 0.05$ vs baseline	
							Bladder capacity, mean change (n = 30, 35, 42)	+48 ml vs +63 ml, vs +37 ml, P = 001 vs baseline, P = NS between grps	
Goode 2003[319]	RCT EL = 1++	200 randomised, 155 completed (attrition greater in self-help grp [19% vs 12% vs 37%, P = 0.001])	F, community-dwelling women, > 40 years (mean 56), predominant stress UI, 2×/week for ≥ 3 months, and urodynamic evidence (34% stress UI, 66% mixed UI) Exclusions: continual leakage, PVR urine vol. > 150 ml, uterine prolapse past introitus, MMSE score < 24, decompensated heart failure, HbA1C ≥ 9	Biofeedback-assisted behavioural training (BT), n = 66	Behavioural training with electrical stimulation (n = 67) Self-help (n = 67)	8 weeks	Leakage episodes /week (mean, SD)	–69% (32) vs –72% (33), vs –53% (43), P = 0.005 vs baseline, $P \leq 0.02$ for BT grps vs self-help	Funding: National Institutes of Health. Biofeedback assisted behavioural grp: biofeedback (anorectal balloon probe) –assisted PFMT, 15 exercises 3×/day, 2–4 s contractions (visit 1, week 1); stress strategies; the 'knack', managing urgency (visit 2, week 3); review and reinforcement, adjustment of home exercise regimen, repeat biofeedback PFMT if not had ≥ 50% reduction in frequency of accidents (visits 2–4, weeks 2, 4, 6). The behavioural training with electrical stimulation group had the same tx plus ES (Hollister InCare, vaginal probe, biphasic pulses, freq 20 Hz, pulse width 1 ms, current up to 100 mA depending on tolerability). ES used 15 min on alternate days. Ability to contract PFM checked at first visit by anorectal biofeedback. Self-help: written instructions of the 8 week behavioural programme. *7 aspects: pt description of progress, having fewer accidents,
							Patient perceptions of tx*	Differences between grps in % much better and completely satisfied, but not in other parameters. Much better: 57 vs 77% vs 30% ($P \leq 0.05$ BT+ES vs other grps and BT vs self-help) (better or much better: 96 vs 96% vs 80%) Completely satisfied: 66 vs 81% vs 50%, P = 0.002 BT+ES vs self-help (somewhat or completely satisfied 98 vs 98% vs 88%)	
							IIQ	Improvement in 4 of 4 domains in all grps, $P < 0.001$ vs baseline	
							SF-36	No sig. changes in any grp	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Bladder capacity, mean change (*n* = 30, 36, 16)	–3 ml vs +43 ml, vs +29 ml, *P* = 001 vs baseline, *P* = NS between grps	accidents are smaller, able to wear less protection, comfortable enough with tx to continue indefinitely, satisfaction with progress, incontinence restricting activities.
							Adverse effects	Vaginal irritation in 6% BT + ES grp	
Subak 2002[320]	RCT EL = 1+	152 randomised, 123 analysed	F ≥ 55 years (mean ~69), community dwelling, capable of independent toileting; ≥ 1 UI episode/week over 6 months (24% stress, 38% urge, 37% mixed) Exclusions: UTI, uncontrolled diabetes mellitus, urinary obstruction, overflow, or functional incontinence	Bladder training (*n* = 66)	Control* (*n* = 57)	6 weeks	Leakage episodes/week (mean change)	–4.4 vs –2.2, *P* = 0.001	Funding: Kaiser Foundation Research Institute. BT: 6× 20 min group sessions on bladder training, once/week. Initial session 45 min, with anatomy of urinary tract, normal voiding, UI symptoms and causes. Individualised voiding schedules developed. PFMT (verbal and written instruction) given. Voiding intervals increased by 30 min every week to target voiding frequency every 2.5/3 h. No fluid modifications used. No mention of whether ability to contract PFM checked. *control grp received no instruction but kept diaries for 6 weeks; after 6 weeks, this grp given behaviour therapy. 12 week and 6 months results also given in trial report, but only for total group.
							Frequency/week (mean change)	Day: –1.3 vs +0.8 Night: +0.9 vs –0.2 *P* = NS both comparisons	
							Pt perception of helpfulness of programme (at 6 months, all pts)*	33% great deal of help, 26% moderately helpful, 29% slightly, 12% not at all	
McFall 2000[321,322]	RCT EL = 1+	145 randomised, 108 competed tx	F ≥ 65 years, UI ≥ 3 months, living independently (77% had symptoms of stress UI, 74% symptoms of urge UI) Exclusions: severe uterine prolapse, haematuria,	Behavioural therapy (*n* = 72; data from 49)	Control (usual care) (*n* = 73; data from 59)	10 weeks	Leakage episodes/week (mean change)	–2.9 vs –0.6, *P* = 0.004 Day: –4.1 vs –1.2, *P* = 0.02 Night: +1.8 vs –0.3, *P* = NS	Funding: none declared. Behavioural therapy: 5× small grp sessions every 2 weeks: information and training in; skill-building in relation to bladder training (coping, problem-solving), managing urgency, performing PFM exercises. (no further details of PFMT).
							% with ≥ 50% reduction in leakage episodes	61% vs 38%, *P* = 0.03	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			diverticulum, fistula, unresolved or recurring UTI, PVR > 100 ml blood glucose > 5.6 mmol/l, cognitive impairment				QOL (SF-36)# (physical function, mental health, vitality, health perception, impact subscales)	No sig. effect or difference reported for either grp in any subscale.	
McDowell 1999[323] Engberg 2002[324] although described as one RCT,[941] these studies are effectively 2 separate RCTs, with tx given dependent on cognitive status	RCT EL = 1+	105 (91% women); 93 analysed	Cognitively intact homebound M/F (MMSE ≥ 24), mean age 77 years, UI > 2/week for > 3 months Exclusions: severe pelvic prolapse, PVR > 100 ml, unable to toilet independently	Biofeedback-assisted PFMT (*n* = 48)	Control* (*n* = 45)	8 weeks (*after which control grps crossed over to active tx arm)	Leakage episodes/day	Mean change –61% vs +48%, *P* = 0.004 Median change –75% vs –6%, *P* < 0.001	Funding: National Institute for Nursing research grant. Biofeedback (EMG) assisted PFMT: biofeedback used to teach correct PFM contraction; repeated up to 4 times during tx, depending on progress; PFMT 3 sessions of 10–15 exercises /day, 1 standing, 1 sitting, 1 lying down. Following PFMT, urge or stress strategies used (in 81% and 42% respectively), with bladder training if voiding > once/2 h. Control: nurses visited pts socially every 1–2 weeks. No discussion of UI. After 8 week study, control grp offered active tx for 8 weeks. 85 in total completed active tx protocol, –74% change in leakage episodes/day vs baseline, *P* < 0.001.
		19 (68% women)	Cognitively impaired homebound M/F (MMSE < 24), mean age 83 years, UI > 2/week for > 3 months, had full time caregiver Exclusions:	Prompted voiding (*n* = 9)*	Control (*n* = 10)	8 weeks	Leakage episodes (mean change) % wet (mean change)	Per 24 h: –47 vs –27%, *P* = NS daytime: –50 vs –37%, *P* = NS Day: –43 vs –35%, *P* = NS Day and night: –41 vs –23%, *P* = NS	Prompted voiding: nurses visited pt and carer every week, caregiver instructed to check if pt wished to void every 2 h, then check if wet; praise correct 'response', encourage to toilet at 2 h. Prompted voiding time adjusted to pt if they self-initiated toileting. No intervention at night. Caffeine

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			PVR > 100 ml (ultrasound)				Self-initiated toileting (mean change ±SD)	+3.1 ± 4.8 vs +1.9 ± 2.1, *P* = NS	eliminated from diet. Control: nurses visited pts socially every 1–2 weeks. No toileting information or support given. Prompted voiding: at baseline, control had sig. more day and night-time UI episodes (*P* = 0.04), and sig. greater % of day and night voids were incontinent, *P* = 0.02. ITT results shown. After 8 week study, control grp offered prompted voiding for 8 weeks. 15 in total completed prompted voiding protocol, –22% change in daytime leakage episodes vs baseline.

Prompted voiding RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Hu 1989[327]	RCT EL = 1+	143 randomised, 133 completed tx, 113 completed follow-up	F, ≥ 65 years (mean 85), nursing home residents, UI during daytime (mean 2/day), able to recognise own name; required assistance with activities of daily living, 13% ambulatory, mean MMSE score 13. Mean residual vol. ~100 ml, mean bladder capacity ~285 ml	Prompted voiding (*n* = 72)	Control (*n* = 71)	13 weeks tx, further 22 weeks follow-up	Wet episodes/day (mean change, %)	–0.6 (26%) vs –0.2 (8%) *P* < 0.05 (13 weeks) –0.5 vs –0.1 (35 weeks), *P* value not given	Funding: National Institute on Aging. National Canter for Nursing Research. Behaviour programme delivered by nursing assistants; hourly prompted voiding, assisted pt to the toilet, praised successful toileting, special attention if pt dry on scheduled check. Pts encouraged to inform assistant if needed to toilet in between prompted voids. Implemented 14 h/day (7 am to
							n with 100% improvement	1 (1.5%) vs 0 (13 weeks)	
							n with ≥ 50% improvement	25 (38%) vs 10 (15%) (13 weeks)	
							n with no improvement	16 (25%) vs 24 (35%) (13 weeks)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			Urodynamic categories: normal cystometogram ± urgency) 41%; DO with urge 15%; DO without urge 23%, stress UI 16%, overflow incontinence 5%.				Self-initiated requests (mean change)	+1.5 vs +0.5 (13 weeks) +0.7 vs +0.5 (35 weeks) [values estimated from graph]	9 pm), 7 days /week. Control grp received usual continence care (prompted voiding not enforced). Wet checks done hourly. Change from baseline to last month of tx period reported.
Schnelle 1983[328]	RCT EL = 1+	21 (71% women)	M/F, nursing home residents, mean age ~82 years (48–96), not physically capable of independent toileting, 95% had diagnosis of 'organic brain syndrome' or senile dementia	Prompted voiding (*n* = 11)	Control (*n* = 10)	3 weeks tx	% checks wet (mean change)	–15 vs +0.4%	Funding: none declared. Hourly wet checks and prompted voiding from 7 am to 7 pm, social reinforcement if dry. Control group; had wet checks only.
							Requests for toileting assistance (mean change, *n*/day)	+1.7 vs –0.1	
Schnelle 1989[326,329]	RCT EL = 1+	126 (75% women)	M/F, nursing home residents, mean age 82 years, UI ≥ 2× in 5 day period, mean MMSE score 8; 89% unable to stand unassisted; 20% totally dependent. Urodynamic diagnosis: 25% normal CMG, 31% DO, 12% high residual (> 100 ml), 12% stress UI, 10% mixed UI, 10% unknown	Prompted voiding (*n* = 63)	No prompted voiding (usual care) (*n* = 63)	10 days at 4 sites, 20 days at 1 sites	% checks wet	–41% vs 0%	Funding: none declared. Hourly prompted voiding from 7 am to 7 pm. Those who responded to hourly prompted voiding moved to 2 hourly; social reinforcement if dry.
							% appropriate toileting (toileting into receptacle /total continent and incontinent voids)	+300% vs 0	
Schnelle 2002[330]	RCT	190 randomised	Nursing home M/F residents, mean age	Functional incidental	Control (usual care)	32 weeks	UI (% checks wet, mean change)	–14% vs +1% ($P < 0.01$ FIT grp vs baseline)	Funding: National Institutes of Health, National Institute on Aging.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 1+	(84% female), 148 completed 32 week follow-up	~87 years, UI, free of catheter, able to follow one step instruction, MMSE score ~13; 60–63% ambulatory Exclusions: requiring post-acute skilled care; terminally ill	training (FIT), including 2 h prompted voiding (*n* = 94)	(*n* = 96)		Urine toileting ratio (no. times toilet or toilet substitute used/ total no. voids; mean change)	+44 vs –4% (*P* < 0.01 FIT grp vs baseline)	FIT: care processes designed to increase activity and functional ability and integrated with incontinence care; implemented every 2 h 5 days/week from ~8 am to 4.30 pm; residents prompted to toilet and changed if wet, encouraged to walk (max. 10 min), or wheel chairs if immobile and repeat sit-to-stands up to 8×. All given upper body resistance training (arm curls/raises) once/day. Fluids offered before and after each care episode. Wetness check every hour from 8 am to 4 pm (2 days during baseline and last week of tx). Other outcomes measured; distance walked/wheeled, standing time, faecal incontinence.

Timed voiding RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Colling 1992[332]	Cluster RCT EL = 1–	113 randomised (82% women), 88 completed	Nursing home M/F residents ≥ 65 years, ≥ 3 UI episodes/week in last 2 weeks, able to state name or place of residence, toilet with assistance of 1 person only. 73% urge UI, 27%	Individualised scheduled toileting ('pattern urge-response toileting' (*n* = 63)	Control (*n* = 50)	36 weeks (12 weeks baseline, 12 weeks tx, 12 weeks follow-up)	Leakage episodes/day (mean change vs baseline)	–0.9 vs 0 (24 weeks) –0.3 vs +0.7 (36 weeks)	Funding: Facilities reimbursed for staff time in the project. Cluster RCT because nursing home staff carried out the toileting programme. NH staff given 4 h educational programme (causes and consequences of UI, info re the programme). Project staff provided

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			mixed UI. Urodynamic residual vol. means 79 and 86 ml; vol. at strong desire to void means 243 and 235 ml				Volume voided	No numerical data. No sig. difference between grps at any time point (as shown by CI on graph)	encouragement to nursing staff throughout the programme to comply with the toileting schedule. Toileting schedule: toilet within 30 min prior to an individual's mean time of voiding, as captured during 12 week baseline using electronic data logger. Withdrawals; 12 vs 13 active vs control grps. Although a cluster RCT, findings reported for individuals not by nursing home.
Tobin 1986[333]	RCT EL = 1+	278 (83% women)	M/F, residential home residents, mean age 82 years, 78% had 'chronic brain failure' (score of ≤ 6 on 10-point mental status questionnaire), 93% women and 97% men had UI owing to unstable bladder contractions (overall 74% had unstable bladder, 19% unstable bladder and stress UI; 3% stress UI alone, 4% 'other')	Timed voiding for unstable bladder + propantheline 15 mg + flavoxate 200 mg q.d.s.; and PFMT for females with stress UI (*n* = 174)	No advice (usual care) (*n* = 104)	8 weeks	Daytime leakage episodes (% reporting improvement)	40/102 (39%) vs 26/89 (29%), *P* = NS (remainder unchanged)	Funding: none declared. Timed voiding: 2 hourly voiding. [EL = 1–] it is unclear how many offered PFMT, or what training entailed. Also, antibiotics were given for UTI, and ethinylestradiol 30 µg/day for 3 weeks for women with atrophic vaginitis (number not stated).
							Night-time leakage episodes (% reporting improvement)	39/95 (41%) vs 18/79 (23%), *P* = 0.016 (remainder unchanged)	
							Pad test (% showing improvement)	16/65 (25%) vs 11/45 (24%), *P* = NS 43% vs 44% unchanged 32% vs 31% worse	
Jirovec 2001[334]	RCT EL = 1–	118 (69% women) randomised, 74 completed	M/F mean age 80 years, memory-impaired, having caregiver support at home. 60% some symptoms of urgency, 18% positive stress test, PVR (bladder scan) mean	Individualised scheduled toileting with 3×2 month visits (*n* = 38) or 1×6 month visit* (*n* = 39)	Control (*n* = 41)	6 months	% with reduced leakage episodes/day	28/44 (64%), *P* < 0.05 vs baseline vs 15/30 (50%) no between-grp comparisons	Funding: National Institute of Nursing Research. Individualised training programme; scheduled toileting according to voiding pattern (most ~2 h), education re fluid intake (consistent, minimum 6× 8 oz glasses/day);

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			64 ml	[results from both grps combined; 44 analysed]			Leakage episodes/day (mean change)	–0.06 (14%) vs –0.02 (4%)	monthly phone calls, advice on environment (Obstacles to urine control), visits every 2 or 6 months (*group originally randomised to 3× 2-month or 1× 6-month visit – because incontinence similar in both grps, results were combined). Control grp: given monthly visits and paid $25. Withdrawals; 33 vs 11 active vs control grps.

Drug therapies

Antimuscarinic drugs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Haab 2004[341]	DB RCT EL = 1+	561 (85% women)	M/F, aged 19–88 years (mean ~57), OAB* for ≥ 6 months; urge UI (median 16–17 episodes/week), frequency ≥ 8 voids/24 h (median 10), urgency ≥ 1/day (median7–8) capable of independent toileting Exclusions; contraindications to antimuscarinics, stress UI (> 1 episode/week), clinically significant bladder outlet obstruction and/or PVR vol. > 200 ml, genitourinary conditions	Darifenacin ER 15 mg/day (*n* = 115) Darifenacin ER 7.5 mg/day (*n* = 229) Darifenacin ER 3.75 mg/day (*n* = 53)	Placebo (*n* = 164)	12 weeks tx	Leakage episodes/week (median change)	–73 vs –68 vs –59 vs –56% *P* = 0.017 dar 15 mg vs placebo; *P* = 0.01 dar 7.5 mg vs plac	Funding: Pfizer Inc. Preparation of manuscript supported by an educational grant from Novartis Pharma AG. Editorial and project management services from Thomson Acumed. Unclear why the blocked randomisation schedule used was chosen, leading to twice as any pts treated with 7.5 mg as 15 mg doses. Overall compliance was > 86%. *6% had neurogenic OAB.
							Frequency /day (median change)	–15 vs –16 vs –14 vs –8% *P* < 0.001 for dar 15 mg and 7.5 mg vs plac	
							Urgency /day (median change)	–29 vs –29 vs –21 vs –13%, *P* ≤ 0.005 for dar 15 mg and 7.5 mg vs plac	
							Severity of urgency on 100 mm VAS (median change)	–17 vs –14 vs –10 vs –8%, *P* ≤ 0.002 for dar 15 mg and 7.5 mg vs plac	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			that could cause urinary symptoms, recent urogenital surgery, hepatic disease, pts intending to start bladder training programme				Mean vol. Voided (median change)	+20 vs +9 vs +5 vs +5%, $P \leq 0.04$ for dar 15 mg and 7.5 mg vs plac	Baseline urgency severity score ~54–58 on 0–100 scale (0 = mild, 100 = severe).
							Nocturnal awakenings/week owing to OAB (median change)	–13 vs –14 vs –18 vs –14% P = NS between grps	
							Adverse effects (%)	Overall 53 vs 52 vs 45 vs 40 Occurring in ≥ 3% of any grp: dry mouth 31 vs 19 vs 12 vs 9 constipation 14 vs 14 vs 4 vs 7 dyspepsia 8 vs 2 vs 4 vs 2 gastritis 0 vs 0.4 vs 4 vs 0.6 headache 4 vs 1 vs 2 vs 2	
Steers 2005[342]	DB RCT EL = 1+	398 randomised (84% women); 3 pts not treated after randomisation	M/F aged 22–89 years (mean 58), OAB* for ≥ 6 months; urge UI (median 14–16/week), frequency ≥ 8 voids/24 h (~10), urgency ≥ 1/day (~8) capable of independent toileting Exclusions; contraindications to antimuscarinics, stress UI, clinically significant bladder outlet obstruction and/or PVR vol. > 200 ml, genitourinary conditions that could cause urinary symptoms, faecal	Darifenacin ER 7.5 mg/day, increasing to 15 mg after 2 weeks if required (n = 268)	Placebo (n = 127)	12 weeks tx	Leakage episodes/week (median change)	–62 vs –49%, P = 0.035 responder rates 62% vs 49% P = 0.012	Funding: Pfizer Inc. Preparation of manuscript supported by an educational grant from Novartis Pharma AG. Editorial and project management services from Thomson Acumed. Overall compliance was ≥ 84%. Dose increased by 59% of darifenacin vs 68% of placebo grp., P = NS. Baseline urgency severity score 53 on 0–100 scale (0 = mild, 100 = severe).
							Frequency /day (median change)	–19 vs –10%, $P \leq 0.001$	
							Urgency /day (median change)	–28 vs –11%, $P \leq 0.001$	
							Severity of urgency on 100 mm VAS (median change)	–17% vs –6%, $P < 0.05$	
							Mean vol. Voided (median change)	+11% vs +5%, $P < 0.05$	
							Nocturnal awakenings/week owing to OAB (median change)	–18% vs –13%, P = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			impaction or severe constipation, urogenital surgery in last 6 months, indwelling catheter or ISC				Adverse effects (%)	≥ 1 AE: 41 vs 21 Constipation 21 vs 8 dry mouth 19 vs 9 headache 7 vs 5.5. 6 vs 2 discontinuations owing to AE, mainly constipation (*n* = 6 vs 1) and dry mouth (2 vs 0)	
Cardozo 2005[343]	DB RCT EL = 1–	72 (71% women)	M/F mean age 54, urgency for ≥ 6 months Exclusions; contraindication to antimuscarinics, stress UI, voiding difficulty, genitourinary conditions that could cause urinary symptoms, pts intending to start bladder training programme	Darifenacin ER 30 mg (*n* = 36)	Placebo (*n* = 36)	2 weeks tx	Urgency severity (100 mm VAS)	Median difference vs placebo –5.8 (95% CI –11.5, +0.4)	Funding: Pfizer Inc. and an educational grant from Novartis Pharma AG. Primary outcome was change in warning time (time from first sensation of urgency to voluntary voiding or incontinence, recorded during a 6 h clinic based monitoring period.) Groups were not balanced at baseline for the primary outcome (median 4.7 vs 9.3 min).
							Urgency episodes/24 h	Median difference vs placebo –0.2 (95% CI –1.0, +0.7)	
							Adverse effects (%)	≥ 1 AE: 75 vs 8 Dry mouth 64 vs 6, constipation 36 vs 6	
Zinner 2006[344]	DB RCT EL = 1+	445 randomised, 439 ITT analysis; about 85% completed the study	M/F with OAB, with mean ≥ 1 urge UI episode/day (mean ~18–21 a week) frequency ≥ 8 (mean 11), and ≥ 4 urgency episodes (mean ~82–85 per week). Mean warning time ≤ 15 min (mean ~ 4.5) 54% had prior OAB therapy (no further	Darifenacin ER 15 mg o.d. (*n* = 216)	Placebo (*n* = 229)	12 weeks tx	Warning time (median change within-patient)*	+42% vs 18%, *P* = NS	Funding: Novartis Pharma AG. *measured over 12 consecutive h; stop watch from 1st sensation to void, pt instructed to delay void as long as possible, then stop the watch at initiation of voiding.
							Frequency per 24 h (median change)	–2.2 vs –1.8 (20% vs 16%) *P* = NS	
							Urgency per week (median change)	–18.2 vs –15.6 (22% vs 18%) *P* = NS	
							Urge UI leakage episodes per week (median change)	–12.6 vs –9.8 (67% vs 46%) *P* = 0.035	
							Volume voided (median change, ml)	+22.6 vs +11.3 (15% vs 8%) *P* = 0.002	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			details) Exclusions: stress UI, marked cystocele or pelvic prolapse; catheterisation, bladder outlet obstruction, intention to start bladder training programme				QOL (OAB-q, KHQ)	Sig. improvement in all 5 domains of OAB-q with darifenacin vs placebo, $P < 0.05$ and in 4 of 9 domains of the KHQ (incontinence impact, role limitations, physical limitations, severity measures)	
							Adverse effects (%)	Any 64% vs 50% Discontinuations owing to AE 8% vs 4% 29% vs 6% dry mouth 18% vs 5% constipation 10% vs 8% UTI 8% vs 2% dyspepsia 6% vs 2% headache 4% vs 4% diarrhoea 4% vs 2% nausea	
Chapple 1990[345]	DB RCT cross-over EL = 1–	41 'included', 25 analysed (48% women)	M/F mean age 51 years, idiopathic DO confirmed by videocystometry (frequency mean 12/day, nocturia mean 3.3; 40% UI usually, 16% sometimes, 44% rarely; 76% urgency usually, 24% sometimes) Exclusions: bladder outflow obstruction, neurological disease, coexisting medical conditions that may affect the bladder	Flavoxate 200 mg t.d.s. then placebo (n = 11)	Placebo then flavoxate (n = 14)	2×2 week tx periods, 1 week washout in between	Frequency/day (mean change)	Results for only flavoxate-placebo arm after 1 or 2 weeks	Funding: none declared. *max. pressure rise, end filling pressure, volume at initial pressure rise, volume at which incontinence occurred, final tolerated filling volume, end residual volume, free flow rate, max. voiding pressure
							Cystometry*	Mean differences (95% CI) reported for flavoxate vs placebo. No sig. difference found in any parameter.	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Meyhoff 1983[346]	DB RCT cross-over EL = 1+	20	F, median age 51 years (22–79), urge UI (50% stress UI), DO, max. urinary flow rate > 15 ml/s, residual urine vol. < 50 ml. 25% had previous continence surgery. Baseline data (medians/3 days): 24 (12–64) voids, 2 (0–22) leakage episodes, 3 (0–16) nocturia episodes Exclusions: neurological disease, glaucoma, severe heart failure	Flavoxate 200 mg q.d.s.	Emepronium 200 mg q.d.s. Placebo	3×2 week tx periods, 1 week washout in between	Frequency/3 days (median at end of tx)	25 (11–64) vs 23.5 (12–70) vs 23 (12–53) *P* = NS between grps	Funding: flavoxate tablets supplied by Pharmacia Ltd, emepronium and placebo by Kabi Vitrum Ltd. Patients' preferences for drugs also reported.
							Leakage episodes/3 days (median at end of tx)	1 (0–17) vs 1 (0–11) vs 0 (0–14) *P* = NS between grps	
							Nocturia /3 days (median at end of tx)	3 (0–13) vs 2.5 (0–18) vs 0 (0–9) *P* = NS between grps	
							Adverse effects (*n*; most common)	Dry mouth 5 vs 8 vs 5 nausea, heartburn 7 vs 7 vs 2 None 7 vs 6 vs 7	
Milani 1988[347]	DB RCT EL = 1–	27	F mean age ~50 years, sensory and/or motor urge syndrome Exclusions: urogenital tract infections, neurological disease, predominant stress UI	Flavoxate 200 mg t.d.s. (*n* = 14)	Flavoxate 400 mg t.d.s. (*n* = 13)	4 weeks tx	Symptoms scores* (change in mean)	–3.3 vs –3.5[#]	Funding: none declared. *scoring system of 0–2 used for the following symptoms: diurnal and nocturnal frequency, incontinence, enuresis, urgency, dysuria. [#]baseline scores 6.5 vs 5.7.
							Urodynamics (mean change)	Sig. difference between grps in volume at 1st desire to void: +37% vs +48%, *P* < 0.01 Bladder volume at capacity: +7% vs +12% (*P* < 0.01 vs baseline for 400 mg t.d.s. grp)	
							Adverse effects	Nausea (3 in each grp)	
Lose 1989[348]	DB RCT cross-over EL = 1+	19	F, median age 53 years (29–78), DO with frequency, urgency or urge UI, and failed to respond to other drug tx (mainly antimuscarinics). 12 had suprapubic anti-incontinence procedure, 9 vaginal repair, 7	Doxepin 50–75 mg at night	Placebo	2×3 week tx periods, 2 week washout in between	Leakage /3 days (change in median)	Day: –3 (75%) vs –0.5 (13%) *P* = NS Night: –1 (100%) vs 0, *P* < 0.05	Funding: none declared.
							Frequency (change in median)	Day: –4 (15%) vs –4 (15%) *P* = NS Night: –3 (75%) vs 0, *P* < 0.001	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			hysterectomy. Median daytime frequency 26/3 days (range 4–99), leakage /3 days 4 (0–26), g urine loss 39 (0–101), nocturnal voids 4 (0–16), nocturia 1 (0–5) Exclusions: genital prolapse or cystocele indicating an operation, drugs affecting the lower urinary tract				1 h pad test (change in median, g)	–33 (84%) vs +1 (26%) *P* = NS	
							Urodynamics	first desire to void: +87 vs +33%, *P* = NS Max. cystometric capacity +58 vs +22%, *P* = 0.04 Residual vol. 0 vs –100%, *P* = 0.014	
							Adverse effects (*n*)	Any: 14 (68%) vs 3 (16%) Fatigue 8 vs 2 dry mouth 8 vs 2 dizziness 4 vs 1 weakness 1 vs 0 blurred vision 1 vs 0	
Abrams 1998[349]	DB RCT EL = 1+	293 (76% women)	M/F 19–80 years, urodynamic bladder overactivity; 94% had frequency (≥ 8 voids/24 h); 75% urge UI (mean 2.6–3.3/24 h), 98% also had urgency. ~30% had prior surgery affecting the lower urinary tract. 60% had prior drug tx for OAB Exclusions: clinically significant stress UI, detrusor hyper-reflexia, hepatic, renal, haematological disorders, UTI, bladder outlet obstruction	Tolterodine 2 mg b.d. (*n* = 118)	Oxybutynin 5 mg t.d.s. (*n* = 118) Placebo (*n* = 57)	12 weeks tx	Frequency /24 h (mean change)	–21 vs –19.5 vs –10.5%, (*P* = 0.0022 tol vs plac) difference in mean change between tol and oxy –0.5 (95% CI –1.1, +0.1)	Funding: Pharmacia and Upjohn. More pts in the placebo grp had previous drug therapy for OAB (75% vs 52% tolterodine, 60% oxybutynin, *P* < 0.05). Response to tx in this group was not considered separately. Doses could be halved during weeks 1–2 for pts with intolerable adverse effects. This occurred in 8 vs 32% vs 2%.
							Leakage episodes /24 h (mean change)	–47 vs –71 vs –19%, (*P* = 0.023 oxybutynin vs plac) difference in mean change between tol and oxy 0.4 (95% CI –0.2, +1.0)	
							Mean vol. Voided (mean change, ml)	+27 vs +31 vs +7% (*P* < 0.001 tol and oxy vs plac)	
							Subjective improvement	50 vs 49% vs 47%	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects (%)	Pts reporting ≥ 1 AE 89 vs 97 vs 81, $P \leq 0.023$ oxy vs other grps. Withdrawals owing to AE: 8 vs 17 vs 12 AE reported by > 10% in any grp: dry mouth 50 vs 86 vs 21 ($P < 0.001$ tol and oxy vs plac; and oxy vs tol); dyspepsia 9 vs 23 vs 5; nausea 3 vs 6 vs 11; upper RTI 10 vs 3 vs 14	
Drutz 1999[350]	DB RCT EL = 1–	277 (77% women); 147 (53%) analysed for efficacy	M/F (all females postmenopausal), 23–91 years, DO. 99% had frequency (≥ 8 voids/24 h); 88% urge UI (mean 3.4–3.7/24 h), 97% also had urgency. 35% had prior surgery affecting the lower urinary tract. 47% had prior drug tx for urge UI Exclusions: clinical sig. stress UI or voiding dysfunction, mean voided vol./24 h > 3 litre, hepatic or renal disease, UTI, uninvestigated haematuria or	Tolterodine 2 mg b.d. (n = 109 randomised, 70 analysed)	Oxybutynin 5 mg t.d.s. (n = 112 randomised, 41 analysed) Placebo (n = 56 randomised, 36 analysed)	12 weeks tx	Frequency /24 h (mean change)	–17 vs –17 vs –9.6%, (P = 0.036 tol vs plac) difference in mean change between tol and oxy 0 (95% CI –0.8, +0.8)	Funding: Pharmacia and Upjohn. More pts in the oxy grp had previous surgery for OAB (45% vs 27% tolterodine, 34% plac, $P < 0.05$). Results for pts previously receiving drug tx for urge UI not considered separately. Doses could be halved during weeks 1–2 for pts with intolerable adverse effects. This occurred in 7 vs 23% vs 4%. [EL = 1–] Efficacy
							Leakage episodes /24 h (mean change)	–45.9 vs –51.5 vs –27.8%, (P = NS tol or oxy vs plac) difference in mean change between tol and oxy 0 (95% CI –0.7, +0.7)	
							Mean vol. Voided (mean change, ml)	+34 vs +50 vs +12 ($P \leq 0.0075$ tol and oxy vs plac) (22 vs 34% vs 8%)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			secondary to malignancy, indwelling catheter or ISC, previous tolterodine tx, previous serious AE on oxy, bladder outlet obstruction				Adverse effects (all pts randomised) %	Pts reporting ≥ 1 AE; 78 vs 90 vs 75, $P \leq 0.013$ oxy vs other grps. Withdrawals owing to AE: 6 vs 21 vs 7, $P \leq 0.026$ oxy vs other grps. Dry mouth 30 vs 69 vs 15 ($P < 0.001$ oxy vs tol)	assessed in protocol correct population (completers, dose not reduced, no protocol violations).
Dmochowski 2003[351]	DB RCT EL = 1+	361 (93% women)	M/F mean age ~63 years, currently benefiting from tx for OAB (47% tolterodine, 50% oxybutynin, 3% others); frequency (≥ 8/24 h; mean ~12), urge UI (≥ 1/24 h; mean ~4–5), mean voided vol. ≤ 350 ml Exclusions: urinary tract surgery within 6 months, interstitial cystitis, urethral syndrome, painful bladder syndrome, overflow UI	Tolterodine ER 4 mg o.d. (n = 123)	Transdermal oxybutynin 3.9 mg/day (n = 121) Placebo (n = 117)	12 weeks tx	Frequency/24 h (mean change)	–18 vs –15 vs –11% P = 0.0025 tol vs plac, P = NS other comparisons	Funding: Watson Pharma. 2 weeks washout of current tx preceded 12 weeks tx. Oxybutynin applied twice a week on the abdomen. No details of efficacy according to previous antimuscarinic tx.
							Leakage episodes/24 h (mean change)	–64 vs –62 vs –42% $P \leq 0.01$ tol or oxy vs plac, P = NS tol vs oxy	
							Subjective cure of urge UI	38 vs 39% vs 22%, P = 0.014 tol or oxy vs plac	
							Mean voided volume (mean change)	+18 vs +19 vs +5%, P value not given	
							QOL (mean change in scores)	IIQ-travel: –22 vs –23 vs –11 (47 vs 47% vs 26%) $P \leq 0.005$ active tx vs plac UDI-irritative sympts: –28 vs –25 vs –18 (42 vs 40% vs 29%) $P \leq 0.01$ active tx vs plac	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects (%)	Withdrawals owing to AE: 1.6 tol vs 11 oxy With tolterodine antimuscarinic AE most common, included: constipation 5.7 vs 3.3 plac; dry mouth 7.3 vs 4.1 vs 1.7 (*P* = 0.038 tol vs plac) With oxy: application-site reactions most common; erythema 8.3 vs 1.7, pruritus 14 vs 4.3	
Homma 2003[352] Related publications: Homma 2004[942] Takei 2005[395]	DB RCT EL = 1+	605 (70% women)	M/F (Japan and Korea), mean ~59 years (25–88), urgency, frequency (≥ 8/24 h; mean ~11), urge UI (≥ 5/week; mean ~20). 24% prior drug tx for OAB Exclusions: stress UI, daily urine vol. > 3 litre, mean voided vol. > 200 ml, hepatic or renal disease, contraindication to antimuscarinics, UTI, interstitial cystitis, haematuria, bladder outlet obstruction, indwelling catheter or ISC, electrostimulation or bladder training within	Tolterodine ER 4 mg o.d. (*n* = 239)	Oxybutynin 3 mg t.d.s. (*n* = 244) Placebo (*n* = 122)	12 weeks tx	Leakage episodes/week (median change)	–78.6 vs –76.5 vs –46.4% *P* ≤ 0.017 tol or oxy vs plac, *P* = NS tol vs oxy	Funding: Pharmacia Corporation. 2 weeks washout of current tx preceded 12 weeks tx. 98 vs 93% vs 94% of each grp took ≥ 75% of medication. Response for pts previously treated for OAB not reported.
							Frequency /24 h (median change)	–2.0 vs –2.1 vs –1.1 *P* ≤ 0.011 tol or oxy vs plac, *P* = NS tol vs oxy	
							Mean volume voided (median change, ml)	+17.2 vs +22.3 vs +6.6 (19 vs 19% vs 11%) *P* ≤ 0.008 tol or oxy vs plac, *P* = NS tol vs oxy	
							Subjective assessment	Improvement 72 vs 73% vs 59%, *P* = NS Deterioration 5 vs 5% vs 8%	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			14 days				QOL (King's Health Q)	Selected results presented. No sig. difference reported between tol and oxy in any domain.	
							Adverse effects (%)	Withdrawals 10 vs 23 vs 16; owing to AE: 5 vs 17 vs 9 AE reported in ≥ 5% of any grp: dry mouth 34 vs 54 vs 10 (P < 0.001 tol vs oxy); constipation 7 vs 6 vs 5 abdominal pain or tenderness 6 vs 5 vs 3 dyspepsia 4 vs 8 vs 3 headache 4 vs 4 vs 7 difficulty in micturition 1 vs 9 vs 2	
	Case series EL = 3	188	M/F mean age 64 years, ~66% female, had been treated with tolterodine (n = 80), oxybutynin (n = 74) or placebo	Tolterodine ER 4 mg o.d.	–	Continued tx to 12 months*	Efficacy	Median reduction in leakage episodes 93%, frequency 21%, voided vol. increase by 20%	*Japanese arm of study only.[395]

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			(*n* = 34)				Safety	34% dry mouth 27% nasopharyngitis 9% constipation 6% diarrhoea 6% arthralgia 6% back pain 5% headache 77% completed treatment: withdrawals owing to AE (44%), lack of efficacy (35%), withdrew consent (16%), or loss to follow-up or protocol violation (5%)	
Dmochowski 2002[353]	DB RCT EL = 1+	520 (92% women)	M/F mean age 61 years, history of OAB, ± neurological disease (proportion with not stated); 100% had urge UI (≥ 10 episodes/week; mean 30–38), frequency ≥ 8/day, mean voided vol. ≤ 350 ml; 66% also had stress UI. 22% had previously used antimuscarinics Exclusions: UI owing to chronic illness, drugs, or anatomical weakness or abnormalities; lower urinary tract surgery within 6 months; interstitial cystitis, urethral syndrome, overflow UI, painful bladder syndrome, narrow angle glaucoma, > 5	Transdermal oxybutynin 3.9 mg* (*n* = 123) 2.6 mg (*n* = 131) 1.3 mg (*n* = 128)	Placebo (*n* = 130)	12 weeks tx	Leakage episodes/week (mean change)	–22 vs –17 vs –19 vs –19# *P* = 0.017 for 3.9 mg vs placebo	Funding: all authors had financial interest and/or other relationship with Watson Pharmaceuticals. *system applied twice weekly to the abdomen; mg refers to dose released over 24 h. #absolute numbers given as no single baseline mean value quoted for each grp. 86% completed double-blind period. Withdrawals not given per tx grp. 'Basic' info on bladder function/control, and fluid management given to all pts. During the study pts also instructed to maintain usual fluid intake and programme
							Subjective cure of UI	13 vs 5 vs 9% vs 8%	
							Frequency/day (mean change, SD)	–19 vs –15 vs –15 vs –14% *P* = 0.045 for 3.9 mg vs placebo	
							Voided volume (mean change, ml)	+19% (*P* = 0.006 vs plac) vs +16% (*P* = 0.016 vs plac) vs +7% vs +7%	
							QOL (mean change in scores)	IIQ: –39% for 3.9 mg vs –28% placebo (*P* = 0.033 vs 3.9 mg) No results for 2.6 mg or 1.3 mg grps UDI; no data. Difference between 3.9 mg and plac 'not significant'	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			caffeinated drinks/day				Adverse effects (%)	Application-site reactions: erythema 6 vs 5 vs 3 vs 2 pruritus 17 vs 14 vs 11 vs 6 dry mouth: 10 vs 7 vs 5 vs 8 (*P* = NS oxy grps vs plac) dizziness 4 vs 3 vs 2 vs 4 nausea 2 vs 4 vs 5 vs 5 constipation 1 vs 2 vs 5 vs 3	of non-pharmacological management e.g. PFMT, timed voiding/bladder training. Of those previously treated with antimuscarinics, 'similar trends' in results were reported, with sig. benefit with 3.9 mg oxy vs placebo.
	Open-label oxy dose-titration [EL = 3]	411 (87% completed)		Transdermal oxybutynin (dose titration)	–	12 weeks (weeks 13–24)	Leakage episodes/week (mean change from end RCT)	–23 (3.9 mg and 2.6 mg grps) –25 (1.3 mg)	Dose taken: 3.9 mg (51%) 2.6 mg (34%) 1.3 mg (15%).
							Frequency /week (mean change)	+0.6 (3.9 mg) –1.3 (2.6 mg) –1.2 (1.3 mg)	
							IIQ (mean change)	–64 to –85	
Enzelsberger 1995[354]	RCT EL = 1–	52 randomised, 43 analysed	F 55–64 years, frequency (> 5/12 h), nocturia (> 2/night), and urgency; idiopathic DO. 11 oxy and 10 placebo had prior continence surgery Exclusions: genuine stress UI, neurological disorders	Intravesical oxybutynin 20 mg in 40 ml H_2O (*n* = 26 randomised, 23 analysed)	Placebo (40 ml sterile H_2O) (*n* = 26 randomised, 20 analysed)	12 days tx, urodynamics repeated after further 2 weeks	Frequency /day (change in median)	Diurnal: –3.5 vs –1.3 Night: –3.3 vs –1.1 *P* < 0.05 vs baseline for oxy	Funding: none declared. [EL = 1–] Withdrawals: 3 oxy owing to daily catheterisation, 6 placebo owing to 'lack of obvious improvement'. These pts not included in any analyses. Not a blinded study.
							Urodynamics	Stable bladder 82% vs 0 Cystometric capacity (median change): +105 ml *P* < 0.05 vs baseline vs +12 ml	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects (%)	Dry mouth 17 vs 10 blurred vision 8 vs 5 constipation 8 vs 15 dizziness 13 vs 0 UTI 17 vs 10 *P* not reported	
Ouslander 1995[331]	RCT, cross-over EL = 1+	75 (78% women) randomised, 63 completed	M/F mean age ~86 years, cognitively impaired nursing home residents (MMSE < 24 in 93%), who did not meet continence criteria (≤ 1 UI episode/day) after 7 day prompted voiding trial. Involuntary bladder contraction on cystometry or history compatible with urge UI and a bladder capacity < 300 ml on single cystometry. Able to state own name. 15 (25%) females had stress UI Exclusions: short-term rehab or medical instability, poor prognosis, no daytime UI, permanent indwelling catheter, severe behavioural disturbance during wet check. Angle closure glaucoma, or poorly controlled open angle glaucoma	Oxybutynin* + prompted voiding 3–5 day washout Placebo + prompted voiding (*n* = 63)	Placebo + prompted voiding 3–5 day washout Oxybutynin* + prompted voiding (*n* = 63)	20 days tx	% wet checks (absolute mean change from baseline)	Oxy vs placebo: –6.3 vs –2.8%, *P* = 0.01	Funding: none declared. *oxybutynin dose 2.5 mg t.d.s. for 10 days, increased to 5 mg t.d.s. for 10 days of UI episodes > 1/day; otherwise continued on 2.5 mg t.d.s. Prompted voiding done every 2 h during the day. Wet checks done hourly from 7 am to 7 pm (7 am results not included in data). Wet checks done for last 3 days of each 10 day tx period. #headache, dry mouth, blurry vision, joint pain, constipation, trouble sleeping, hesitancy, straining, incomplete bladder emptying, tremor, reflux/heartburn.
							Responders (> 33% reduction in % wet checks)	32% vs 19%, *P* = NS	
							Leakage episodes/day (mean change)	–2.0 vs –0.9 (23% vs 10% vs overall baseline 8.6)	
							% with ≤ 1 leakage episode/day	40% vs 18% *P* = 0.005	
							Total incontinence volume (% change, ml)	–23 vs –7%	
							Number continent voids (mean change)	+0.4 vs –0.3 (7 vs –5% vs overall baseline 6.1)	
							Total continent volume (% change, ml)	+7% vs –10%	
							No. dry runs (mean change)	–0.2 vs –0.3 (5% vs 7% vs overall baseline 4.2)	
							No. self-initiated toiletings (mean change)	–0.2 vs –0.3 (25% vs 38% vs overall baseline 0.8)	
							Adverse effects	No sig. differences between grps in self-reported adverse effects#	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Diokno 2002[403]	Case series EL = 3	1067 (85% women)	M/F mean age 64 years, urge or mixed UI Exclusions: genitourinary conditions that may cause UI, clinically significant medical conditions	ER oxybutynin*		1 year	Continuation	46% continued tx for 1 year reasons for withdrawal: AE 24% (dry mouth 8%); lack of efficacy 10%, personal 6%, non-compliance 4%, administrative 8%, miscellaneous 2%	Funding: none declared. *starting dose 5 mg o.d., increased weekly in 5 mg increments to 30 mg max.
							Individual IIQ (leakage affecting lifestyle, scale 0–2; not at all to all the time)	Change from baseline –0.5 (from 0.9), $P < 0.001$	
							Sleep Impact Questionnaire (Night-time awakenings rating 1–6; none – all the time)	Change from 2.2 to 1.1, $P < 0.001$ from baseline	
Dorschner 2000[355]	DB RCT EL = 1–	107 randomised, 98 analysed (79% women)	M/F mean age ~67 years, frequency (> 7/24 h), urgency, urge or mixed UI, voided vol. < 300 ml. Baseline mean frequency 8.7 propiverine, 7.1 plac; leakage episodes 0.9 vs 0.4; voided volume 164 vs 187 Exclusions: UTI, voiding dysfunction, serious cardiac disorders	Propiverine 15 mg t.d.s. (n = 49)	Placebo (n = 49)	4 weeks tx	Frequency/24 h (mean change)	–22 vs –8.4%	Funding: Apogepha. The main focus of the study was cardiac safety. 9 excluded from efficacy analysis for: no 24 h ECG (3), premature withdrawal (2), infringement of urological exclusion criteria (4). Baseline frequency and leakage higher in active tx grp vs placebo, and voided volume lower. no between-grp analyses reported in
							Leakage episodes/24 h (mean change)	–54.5 vs –36.6%	
							Volume voided (mean change)	+55.3 vs –1.6%	
							Volume voided (uroflow, mean change)	+25 vs +9%	
							Patient's assessment of UI symptoms	49% vs 31% symptom-free 40% vs 22% improved 12% vs 47% unchanged	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects	24 h ECG; sig. increase in min heart rate in propiverine grp vs placebo. No other differences in cardiac parameters measured 2 propiverine grp reported dry mouth	efficacy outcomes. ECG = electrocardiogram
Mazur 1995[356]	DB RCT EL = 1	185 (98% women)	M/F mean age 48–50 years, DO with urgency (57%) or urge UI (43%) Exclusions: neurogenic bladder, UTI, GI obstructions or cardiovascular diseases	Propiverine* 15 mg (*n* =) 30 mg (*n* =) 45 mg (*n* =) 60 mg (*n* =)	–	3 weeks tx	Frequency /24 h (mean change)	–26 vs –38 vs –32 vs –23%, *P* < 0.05 from baseline all grps	Funding: *all daily doses. #efficacy and tolerability rated on 100 mm VAS and 1–4 point ordinal scale (very good – insufficient).
							Voided vol. (mean change, ml)	+34 vs +50 vs +40 vs +23%, *P* < 0.05 from baseline all grps	
							Urodynamics	Sig. increase in vol. at 1st and at strong desire to void from baseline in all grps; sig. increase in bladder compliance with 30–60 mg grps. Intravesical pressure reduced in 30–60 mg gprs	
							Subjective assessment#	Efficacy scores (1–4): 2.79, 1.88, 2.1, 2.39 Tolerability: 2.15, 2.05, 2.27, 2.63	
							Adverse effects (most common)	Blurred vision 8 vs 16 vs 30% vs 26% Dry mouth 6 vs 22 vs 22% vs 27%	
Chapple 2004[357]	DB RCT EL = 1+	225 (~60% women)	M/F mean age 53–59 years, idiopathic DO; frequency (≥ 8/24 h;	Solifenacin 2.5 mg o.d. (*n* = 40)	Tolterodine 2 mg b.d. (*n* = 37)	4 weeks tx, follow-up to 6 weeks	Frequency/24 h (mean change)	–12 vs –18* vs –21* vs –23* vs –15 vs –9%	Funding: none declared. **P* < 0.05 vs placebo.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			mean ~11.5), UI or urgency (≥ 3 episodes during 3 day period). 100% had urge UI, 28% mixed Exclusions: neurogenic bladder, predominant stress UI, bladder outlet obstruction, interstitial cystitis	5 mg o.d. (*n* = 37) 10 mg o.d. (*n* = 33) 20 mg o.d. (*n* = 34)	Placebo (*n* = 36)		Leakage episodes/24 h (mean change)**	–41 vs –55 vs –46 vs –58 vs –27 vs –17%	**P = NS for solifenacin vs placebo.
							Urgency /24 h (mean change)**	–18 vs –42 vs –46 vs –43 vs –28 vs –20%	
							Volume voided /void (mean change)	+20 vs +28* vs +35* vs +45* vs +14 vs +14% *P < 0.05 vs placebo	
							CONTILIFE QOL (mean change)	–18 vs –22 vs –27 vs –33 vs –15 vs –8%, P ≤ 0.003 all sol grps vs placebo	
							Adverse effects (%)	≥ 1 AE: 15 vs 32 vs 34 vs 57 vs 32 vs 16; blurred vision: 2 vs 2.7 vs 14 vs 14 vs 0 vs 5; constipation: 2 vs 14 vs 6 vs 16 vs 3 vs 0 dry mouth: 0 vs 14 vs 14 vs 38 vs 24 vs 0 others occurring in 5–14% of solifenacin 20 mg grp: dyspepsia, headache, micturition difficulty, dysuria, retention, nasal dryness	
Cardozo 2004[358]	DB RCT EL = 1+	907 randomised and treated, 857 analysed (82%	M/F mean age 56 years (18–85), symptoms of OAB; frequency (≥ 8/24 h; mean ~12), urge UI or urgency (≥ 3 episodes during 3 day	Solifenacin 5 mg o.d. (*n* = 286) Solifenacin 10 mg o.d. (*n* = 290)	Placebo (*n* = 281)	12 weeks tx	Frequency/24 h (mean change)	–2.4 (20%) vs –2.8 (22%) vs –1.6 (13%) differences vs placebo; 5 mg 95% CI –1.3, –0.3; 10 mg 95% CI –1.7, –0.7	Funding: none declared. No information on response to tx in patients who had prior drug tx. *no baseline data

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		women)	period); 57% had UI, 47% urge UI. 34% had prior drug tx for OAB Exclusions: neurogenic bladder, predominant stress UI, bladder outlet obstruction, PVR > 200 ml, UTI, contraindication to antimuscarinic drugs				Leakage episodes/24 h (mean change)	Urge UI: –63 vs –57 vs –43% *P* = 0.014 sol 5 mg vs plac, *P* = 0.042 sol 10 mg vs plac Total: –61 vs –52 vs –28% *P* = 0.002 sol 5 mg vs plac, *P* = 0.016 sol 10 mg vs plac	therefore cannot calculate % change.
							Urgency episodes/24 h (mean change)	–2.84 (51%) vs –2.90 (52%) vs –1.98 (33%) differences vs placebo; 5 mg 95% CI –1.44, –0.28; 10 mg 95% CI –1.49, –0.35	
							Nocturia episodes/24 h (mean change)	–0.58 (25%) vs –0.71 (39%) vs –0.52 (16%) differences vs placebo; 10 mg 95% CI –0.38, –0.01	
							Volume voided /void (mean change)*	+30.8 ml vs +36.0 ml vs +10.7 ml (*P* = 0.0001 sol 5 and 10 mg vs plac)	
							Adverse effects (%)	Dry mouth 7.7 vs 23 vs 2.3 constipation 3.7 vs 9.1 vs 2.0 blurred vision 4.0 vs 5.9 vs 2.3 withdrawals owing to AE: 2.3 vs 3.9 vs 3.3	
Chapple 2004[359]	DB RCT EL = 1+	1081 randomised, 1033 analysed for	M/F mean age ~57 years (19–85), symptoms of OAB; frequency (≥ 8/24 h;	Solifenacin 5 mg o.d. (*n* = 266) Solifenacin 10 mg o.d.	Tolterodine 2 mg b.d. (*n* = 250) Placebo (*n* = 253)	12 weeks tx	Frequency/24 h (mean change)	–17 vs –20 vs –15 vs –8% *P* ≤ 0.015 all active grps vs plac	Funding: Yamanouchi Pharmaceutical Co. 'Estimated' differences between solifenacin and

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		efficacy (75% women)	mean ~12), urge UI or urgency (≥ 3 episodes during 3 day period); 93% had UI, 63% urge UI. 35% had prior drug tx for OAB Exclusions: neurogenic bladder, predominant stress UI, bladder outlet obstruction, PVR > 200 ml, UTI, contraindications to antimuscarinic drugs	(*n* = 264)			Leakage episodes/24 h (mean change)	Urge UI: –65 vs –63 vs –58 vs –40% *P* = 0.002 sol 5 mg vs plac, *P* = 0.0028 sol 10 mg vs plac Total: –59 vs –47 vs –59 vs –29%, *P* = 0.008 sol 5 mg vs plac, *P* = 0.0038 sol 10 mg vs plac	tolterodine groups also presented in published report, not reproduced here. No information on response to tx in patients who had prior drug tx.
							Urgency episodes/24 h (mean change)	–52 vs –55 vs –38 vs –33% *P* < 0.001 both sol grps vs plac	
							Volume voided/void (mean change, ml)	+25 vs +29 vs +20 vs +9% *P* < 0.001 all active grps vs plac	
							Adverse effects (%)	Dry mouth 14 vs 21.3 vs 18.6 vs 4.9 constipation 7.2 vs 7.8 vs 2.6 vs 1.9 blurred vision 3.6 vs vs 5.6 vs 1.5 vs 2.6 withdrawals owing to AE: 3.2 vs 2.6 vs 1.9 vs 3.7	
Haab 2005[360]	Case series* EL = 3	1633 (78% women)	Patients who completed 12 week RCTs[358,359]	Solifenacin 5 mg for 4 weeks, then 5 mg (42%) or 10 mg (58%; returned to 5 mg in 7%)	–	40 weeks	Frequency/24 h (mean change from week 12 to 52 [change from week 0 to 52])	–0.29 (–2.97)	Funding: Yamanouchi Pharmaceutical Co. *1 year uncontrolled tx follow-up of Cardozo 2004[358] and Chapple 2004.[359]
							Leakage episodes/24 h	–0.13 (–1.74)	
							Urgency episodes/24 h	–0.41 (–3.48)	
							Nocturia episodes	–0.06 (–0.70)	
							Volume voided	+3.7 (+39.8)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects (total % reporting during 52 weeks)	20.7 dry mouth 9.6 constipation 6.9 blurred vision	
Malone-Lee 2001[362]	DB RCT EL = 1–	177 (65% women)	M/F mean age 75 years (65–92), urgency, frequency (≥ 8/24 h; 85% with), ± urge UI (72% with; mean 2.3–5.1/24 h). 66% had prior drug tx for OAB, 60% with poor efficacy Exclusions: stress UI, urinary outflow obstruction, urinary retention, UTI, interstitial cystitis, unexplained haematuria, urinary catheterisation, electrostimulation, previous tolterodine tx	Tolterodine 1 mg b.d. (*n* = 61) Tolterodine 2 mg b.d. (*n* = 73)	Placebo (*n* = 43)	4 weeks	Frequency/24 h (median change [within-grp differences from baseline])	–0.7 (–1.9, 0) vs –0.7 (–1.1, –0.3) vs 0 (0, 0.7) *P* ≤ 0.005 active grps vs plac	Funding: Pharmacia and Upjohn. [EL = 1–] Baseline urge UI episodes sig. lower in tolterodine grps (2.3, 2.8 vs 5.1 placebo), *P* < 0.05; Frequency sig. higher in tolterodine grps vs placebo, *P* < 0.05; 12.0, 11.6, 9.9. Results for pts who had prior drug tx for OAB not considered separately.
							Leakage episodes/24 h (median change)	–0.3 (–0.8, –0.1) vs –0.7 (–1.3, –0.2) vs 0 (–0.4, 0.3) *P* = 0.0074 2 mg b.d. vs plac	
							Volume voided (median change)	+9 (0, 24) vs +16 (5, 30) vs 0 (–1, 10) *P* = 0.0099 2 mg b.d. vs plac	
							Adverse effects (%)	Withdrawals 13 vs 12 vs 9; owing to AE: 7 vs 10 vs 2 % reporting ≥ 1 AE: 70 vs 73 vs 63 dry mouth 30 vs 48 vs 9 (*P* ≤ 0.013 tol grps vs plac) diarrhoea 8 vs 4 vs 5 dyspepsia 6 vs 2 vs 9; abdominal pain 3 vs 6 vs 5; dizziness 5 vs 4 vs 7; constipation 5 vs 0 vs 2; nausea 2 vs 3 vs 2; abnormal accommodation 0 vs 3 vs 2; headache 5 vs 7 vs 2	
Jonas 1997[363]	DB RCT EL = 1+	242 (75% women)	M/F mean ~58 years (20–92), frequency (≥ 8/24 h; 94% with,	Tolterodine 1 mg b.d. (*n* = 99) Tolterodine 2 mg	Placebo (*n* = 44)	4 weeks tx	Volume at 1st contraction (mean change)	+47 vs +63 vs +29%, *P* = 0.03 tol 2 mg vs placebo	Funding: none declared. No bladder diary outcomes reported, or

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			mean 11–12), and urgency ± urge UI (83% with) Exclusions: stress UI, urinary outflow obstruction, urinary retention, UTI, interstitial cystitis, unexplained haematuria, urinary catheterisation, electrostimulation, bladder training	b.d. (*n* = 99)			Maximal cystometric capacity (mean change, ml)	+7 vs +16 vs +1%, *P* = 0.034 tol 2 mg vs placebo	patient's perception of change.
							Adverse effects (%)	≥ 1 AE: 31 vs 32 vs 39 dry mouth 8 vs 10 vs 2 UTI 5 vs 2 vs 5 abnormal accommodation 3 vs 5 vs 0 constipation 2 vs 3 vs 5 headache 3 vs 3 vs 2	
Jacquetin 2001[364]	DB RCT EL = 1+	251 (79% women)	M/F mean ~55 years (18–89), urodynamic OAB with symptoms of frequency (≥ 8/24 h; 93% with, mean 10–11), urgency and/or urge UI (75% with; mean 2.4–3.2/24 h). 64% had prior drug tx for OAB. 75% with poor efficacy response Exclusions: stress UI, voiding difficulty, UTI, interstitial cystitis, unexplained haematuria, urinary catheterisation, electrostimulation, bladder training	Tolterodine 1 mg b.d. (*n* = 97) Tolterodine 2 mg b.d. (*n* = 103)	Placebo (*n* = 51)	4 weeks tx	Frequency/24 h (mean change, SD)	–13 vs –13 vs –10% *P* = NS active grps vs plac	Funding: Pharmacia Corporation. In 75% who had poor efficacy response to previous treatment, 'good response' efficacy was seen in 49 vs 51% vs 37% of groups, *P* = NS between grp.
							Leakage episodes/24 h (mean change, SD)	–41 vs –41 vs–17% *P* = 0.0089 2 mg b.d. vs plac, *P* = 0.045 1 mg b.d. vs plac	
							Volume voided (mean change, SD)	+13 vs +12 vs +5% *P* = NS active grps vs plac	
							Adverse effects (%)	Withdrawals owing to AE: 3 vs 2 vs 2 % reporting ≥ 1 AE: 40 vs 53 vs 31 dry mouth 21 vs 34 vs 6 (*P* < 0.05 tol 2 mg b.d. vs plac) abdominal pain 6 vs 4 vs 4 constipation 4 vs 2 vs 4 headache 3 vs 3 vs 4	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Abrams 2001[365]	Case series EL = 3	714 (69% women)	80% from four 4-week placebo-controlled RCTs of tolterodine including Jacquetin 2001[364] Jonas 1997[363] Malone-lee 2001[362] Mean age ~60 years (18–92)	Tolterodine 2 mg b.d.	–	Up to 1 year	Withdrawals	38%: adverse events 15% withdrew consent 13% lost to follow-up 4% other 6%	Funding: Pharmacia Corp. 23% reduced dose to 1 mg b.d. 14% of the 89% for whom data are available had detrusor hyperreflexia.
							Efficacy (in 62% completers) vs RCT baseline	Frequency /24 h: median change –20%, mean –22% Leakage episodes: median change –74%, mean –45% Vol. voided, median change +18%, mean +21% Subjective improvement 69%	
							Adverse effects (%)	% reporting ≥ 1 AE: 77 dry mouth 44, (27 mild, 10 moderate, 3 severe) UTI 10 headache 6 abdominal pain 6 5 serious AE possibly related to tx: hernia, dyspepsia, pulmonary oedema, abdominal pain, acute urinary retention	
Millard 1999[366]	DB RCT EL = 1+	316	M/F mean age 60 (24–89), DO, frequency (≥ 8/24 h; mean 11; 98% with), urge UI (≥ 1/24 h; mean 3–4; 88% with). 46% had prior drug tx for OAB, 9% with poor efficacy	Tolterodine 1 mg b.d. (*n* = 123) Tolterodine 2 mg b.d. (*n* = 129)	Placebo (*n* = 64)	12 weeks tx	Frequency/24 h (mean change)	–20 vs –21 vs –12% *P* ≤ 0.005 both tol grps vs plac	Funding: Pharmacia and Upjohn. Results for pts who had prior drug tx for OAB not considered separately.
							Leakage episodes/24 h (mean change)	–43 vs –50 vs –37% *P* = NS between grps	
							Subjective cure of UI	11 vs 19% vs 10%, *P* = NS between grps	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			response Exclusions: voided vol. > 3 litre/24 h, stress UI, voiding difficulty, UTI, interstitial cystitis, unexplained haematuria, urinary catheterisation, electrostimulation, bladder training				Subjective improvement	41 vs 59% vs 38%, $P \leq 0.01$ tol 2 mg vs 1 mg or plac	
							Volume voided/24 h (mean change)	+18 vs +23 vs +6%	
							Adverse effects (%)	Withdrawals owing to AE 6 vs 2 vs 0 % reporting ≥ 1 AE: 74 vs 73 vs 78 dry mouth 24 vs 39 vs 13 dry eyes 2 vs 6 vs 2	
Van Kerrebroeck 2001[367–371,943] [QOL outcomes[372,373]]	DB RCT EL = 1+	1529 (81% women)	M/F, aged 21–93 years (mean ~60 years), frequency (≥ 8/24 h; mean ~11; 92% with), urge UI (≥ 5/week; mean 23; 97% with), symptoms of OAB for ≥ 6 months Exclusions: stress UI, daily urine vol. > 3 litre, contraindications to antimuscarinics, voiding difficulty, UTI, interstitial cystitis, unexplained haematuria, urinary catheterisation, electrostimulation, bladder training	Tolterodine ER 4 mg o.d. (*n* = 507)	Tolterodine 2 mg b.d. (*n* = 514) Placebo (*n* = 508)	12 weeks tx	Frequency/24 h (mean change)	–17 vs –15 vs –11%, $P \leq 0.008$ both tol grps vs plac	Funding: Pharmacia Corporation. Results for women in the 12-week RCT have been reported separately, but as other publications reported findings in total population, the M/F study reported here. ~53% had been treated for OAB previously, ~40% with 'poor efficacy.' †sig. difference between ER and placebo grp regardless of severity at baseline[371] #2 domains (incontinence impact and role limitations) specified as primary outcomes. 12% withdrew (47% owing to AE). subjective assessment
							Leakage episodes/week (mean change)†	–53 vs –46 vs –30%, $P = 0.0005$ both tol grps vs plac (median changes –71 vs –60 vs –33%, $P < 0.05$ tol ER vs tol 2 mg b.d.)	
							Volume voided/24 h (mean change)	+24 vs +21 vs +10% $P = 0.0001$ both tol grps vs plac	
							QOL (KHQ,# SF-36)	KHQ: Sig. greater improvement in 6/10 domains with tol 4 mg ER vs plac and 7/10 tol 2 mg b.d. vs plac (not general health perception, social limitation, personal relationships, [and emotions with ER]) SF-36: no sig. difference between tol and plac grps	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects (%)	dry mouth 23 vs 30 vs 8 (*P* = 0.02 tol ER vs tol 2 mg b.d.) constipation 6 vs 7 vs 4 headache 6 vs 4 vs 5	and perception of urgency reported in separate publications but inconsistent data reported for the placebo grp.[370,943]
Kreder 2002[374]	Case series EL = 3	1077 (82% women)	78% who completed 12 week RCT[367]	Tolterodine ER 4 mg o.d.	–	1 year (analysis at 15 months from beg of 12-week RCT	Efficacy (71% completers), median change from month 0	Leakage episodes/week –83% Frequency /24 h –21% Volume voided +25%	Funding: none declared. RTI = respiratory tract infection.
							Subjective improvement	75% (bladder condition), 51% (urgency)	
							Tolerability	Withdrawals 29%: withdrew consent 4.2% lost to follow-up 3.8% protocol violation 1.3% AE 10% (dry mouth 1.8%; others 0.5–0.8%: headache, abdominal pain, dizziness, UTI, dyspepsia, constipation, dry eyes, voiding disorders) AE: dry mouth 13% other < 5%; dyspepsia, constipation, upper RTI, bronchitis, UTI, cystitis, headache, back pain, influenza-like symptoms	
Khullar 2004[375]	DB RCT	854	F mean age 58 years, urge-predominant mixed	Tolterodine ER 4 mg o.d.	Placebo (*n* = 285)	8 weeks tx	Frequency/24 h (mean change)	–20 vs –12% *P* < 0.0001	Funding: Pfizer. 33% had previous

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 1++		UI: urge UI (≥ 5/week; mean 21; predominant in 75%), frequency (≥ 8/24 h; mean 10.6), urgency (mean 5/24 h), in combination with stress UI (predominant UI type in 25%) Exclusions: pure/predominant stress UI, daily urine vol. > 3 litre, contraindications to antimuscarinics, voiding difficulty, UTI, unexplained haematuria	(*n* = 569)			Leakage episodes/week (mean change)	Urge UI: –60 vs –37% *P* < 0.0001 Stress UI: –52 vs –41%, *P* = NS	antimuscarinic therapy; in 72% with unacceptable efficacy, in ~52% with unacceptable tolerability. *change in 6 point scale, no problem to many severe probs by ≥ 1 point.
							Urgency episodes/24 h (mean change)	–34 vs –16% *P* < 0.0001	
							Volume voided (mean change)	+19 vs +11% *P* < 0.0001	
							Subjective improvement*	61% vs 46% *P* < 0.001	
							QOL (KHQ)	Sig. greater improvement in 9/10 domains (not general health perception) with tol vs plac *P* ≤ 0.008	
							Adverse effects (%)	Withdrawals owing to AE 4.6 vs 5.6 ≥ 1 AE: 29 vs 34 dry mouth 20 vs 8 *P* < 0.01 other AE ≤ 4%, *P* = NS between grps	
Frohlich 2002[378] SR of Cardozo 2000[376] and Alloussi 1998[377]	SR of RCTs EL = 1+	508	Mean age ~52 years, DO Exclusions: stress UI, contraindications to antimuscarinics	Trospium 20 mg b.d. (*n* = 314)	Placebo (*n* = 203)	3 weeks	Subjective cure or marked improvement	48% vs 20%	Funding: MADAUS AG, Germany funded Cardozo 2000. GI = gastrointestinal.
							Urodynamics	Max. cystometric capacity; median tx difference +52 ml (95% CI 32 to 71) Vol. at 1st contraction: +48 (28, 68) No sig. difference in max. pressure at 1st contraction, or residual volume	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects (%)	≥ 1 AE: 36 vs 39 GI effects 22 vs 19 dry mouth 14 vs 8	
Ulshofer 2001[379]	DB RCT EL = 1–	46 (~92% women)	M/F mean age ~ 52 years, urodynamic motor urge UI, with bladder capacity < 300 ml, and primary urge to void at < 60% of capacity Exclusions: contraindications to antimuscarinic, UTI	Trospium 15 mg t.d.s. (*n* = 25)	Placebo (*n* = 21)	4 weeks	Maximum bladder capacity* (mean change)	+43% vs +8% *P* = 0.06	Funding: Dr R Pfleger Gmbh as part of clinical development programme for trospium. No information on symptoms at baseline, and no assessment of treatment effects on symptoms. [EL = 1–] *Baseline values 175 ml trospium vs 206 ml placebo.
							Adverse effects (%)	≥ 1 AE: 56 vs 52 dry mouth 48 vs 50	
Zinner 2004[380]	DB RCT EL = 1+	512 (74% women)	M/F mean age ~62 years, OAB symptoms (urgency mean 11/24 h, frequency ≥ 10/24 h; mean 12; and urge UI ≥ 1/24 h; mean ~4) Exclusions: stress UI, neurogenic bladder disorders, uninvestigated haematuria, UTI, voiding difficulty, bladder surgery within 6 months, interstitial cystitis	Trospium 20 mg b.d. (*n* = 256)	Placebo (*n* = 256)	12 weeks tx	Frequency/24 h (mean change)	–19% vs –10% *P* ≤ 0.0001 day: –18% vs –9% *P* ≤ 0.0001 night: –22% vs –15% *P* ≤ 0.05	Funding: Indevus Corporation. 54% had prior OAB medications. No further details. *Indevus Urgency Severity Scale, 4 point scale. Baseline score 1.8.
							Leakage episodes/24 h (mean change)	–59% vs –44% *P* ≤ 0.0001 Cure: 21% vs 11%	
							Urgency (mean change)	episodes/24 h: –20% vs –9% *P* ≤ 0.0001 Severity*: –12% vs –2% *P* ≤ 0.001	
							Volume voided (mean change)	+21% vs +5% *P* ≤ 0.0001	
							QOL (IIQ)	–30% vs –18%*P* ≤ 0.05	
							Adverse effects (%)	Withdrawal owing to AE: 8.8 vs 5.7 Dry mouth 21.8 vs 6.5; constipation 9.5 vs 3.8	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Rudy 2006[381]	DB RCT EL = 1+	658 (81% F)	M/F mean age 61 years, with OAB; mean frequency ~13/day, median urge UI episodes ~3/day, mean urgency severity per toilet void 1.75 50% had prior drug tx for OAB, 21% had history of PFMT exclusions: predominantly stress UI, neurogenic bladder disorders, UTI, investigated haematuria, PVR > 100 ml, bladder surgery in past 6 months, diuretic use, oestrogen therapy	Trospium 20 mg b.d. (*n* = 329)	Placebo (*n* = 329)	12 weeks tx	Frequency/24 h (change in mean values)	Day: –2.67 vs –1.76, *P* < 0.0001 Night: –0.57 vs –0.29, *P* = 0.0026	Funding: Indevus pharmaceuticals Inc. cannot calculate % change because only approximate baseline values given for whole group. severity measured on 4-point scale (Indevus urgency severity scale). QOL also assessed, will be 'reported separately'.
							Urge UI leakage episodes (change in median values)	–1.86 vs –1.29, *P* = 0.0026	
							Volume voided (change in mean values)	+36 vs +9 ml, *P* < 0.0001	
							Urgency severity (change in mean values)	Day: –0.21 vs –0.02, *P* < 0.0001 Night: –0.17 vs +0.01, *P* = 0.0005	
							Adverse effects	20% vs 5% dry mouth 11% vs 6% constipation 6% vs 5% headache 5% vs 2% UTI 4% vs 4% nasopharyngitis 2 vs 0.3% cough 2% vs 4% diarrhoea discontinuations owing to AE: 7% vs 5%	
Milani 1993[382]	DB RCT cross-over EL = 1–	50 randomised, 41 analysed	F mean age 51 years (19–78), sensory or motor urgency (baseline scores*:incontinence 1.7 flavoxate and 1.4 oxy, frequency 1.3 both grps, urgency 1.6 both grps, nocturia 0.7 and 0.8) Exclusions: severely ill, over neurological	Flavoxate 400 mg t.d.s. then oxybutynin 5 mg t.d.s. (*n* = 41)	Oxybutynin 5 mg t.d.s. then flavoxate 400 mg t.d.s. (*n* = 41)	2×4 week tx periods, 1 week washout in between	Incontinence (score change*)	–1.05 flavoxate vs –0.93 oxy, *P* < 0.01 vs baseline both grps	Funding: none declared. 9 excluded from analysis owing to poor compliance (4) or unacceptable adverse effects (5). *Scoring system of 0–2 used for symptoms, where: diurnal incontinence,
							Frequency (score change)	–0.78 flavoxate vs –0.83 oxy *P* < 0.01 vs baseline both grps	
							Urgency (score change)	–0.66 flavoxate vs –0.92 oxy, *P* < 0.01 vs baseline both grps	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			diseases, acute or chronic UTI or obstructive diseases				Nocturia (score change)	–0.44 flavoxate vs –0.41 oxy, *P* < 0.01 vs baseline both grps	urgency: 0 = none, 1 = occasional, 2 = frequent. diurnal frequency: 0 = up to 6×/day, 1 = 7 to 10×/day, 2 = more than 10; nocturnal frequency: 0 = once/night, 1 = 2 to 3 x/night, 2 = more than 3. FDV: first desire to void FDP: pressure at FDV VSDV: vol. at strong desire to void VSDP: pressure at strong desire to void MCV: vol. at max. capacity MCP: pressure at max. capacity RV: residual volume.
							Subjective cure or improvement	Cure 37% flavoxate vs 55% oxy improved 45% vs 24% slight improvement/no change 16% vs 16% worsened 3% vs 5%, *P* = NS between grps	
							Urodynamics	FDV +65 vs +57% FDP –23 vs –27% VSDV +23 vs +19% VSDP –22 vs –30% MCV –25 vs –32% RV –53 vs –23% *P* < 0.05 vs baseline both grps, all endpoints; *P* = NS between grps	
							Adverse effects (%)	Any AE 27 flav vs 90 oxy, *P* < 0.01 Occurring in > 10% of any grp; stomach pain, abdominal pain (flav): nausea, stomach pain, dry mouth/eyes (oxy)	
Holmes 1989[383]	SB RCT Cross-over EL = 1+	23	F mean age 42 years (24–66), symptoms of idiopathic DO; frequency/24 h mean ~8, nocturia mean 1.3	Propantheline 15 mg t.d.s.	Oxybutynin 5 mg t.d.s.	2×4 weeks tx, 1 week washout	Frequency/3 days, mean change	Diurnal: –10 vs –18% Night: –14 vs –35% *P* = NS for both comparisons	Funding: Tillot's laboratory provided drugs. Dose could be increased by 15 mg (Propantheline) and 5 mg oxy after 1 week if required; and could reduce dose if side
							Subjective improvement	48% vs 61% *P* = NS	
							Max. cystometric capacity (mean change)	+17 vs +36%, *P* < 0.05	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects*	Dry mouth, constipation, blurred vision reported not to be sig. difference between grps	effects experienced. *Incontinence and adverse effects measured on linear analogue scale, but ranges not reported.
Madersbacher 1999[384]	DB RCT EL = 1–	366 randomised, 310 evaluated for efficacy (93% women)	M/F, mean ~48 years urgency or urge UI, max. cystometric capacity ≤ 300 ml. 27% had prior tx for urge UI Exclusions: detrusor hyperreflexia, intravesical obstruction, PVR > 15% of max. cystometric capacity, UTI, contraindications to antimuscarinics	Propiverine 15 mg t.d.s. (*n* = 149 randomised, 126 analysed)	Oxybutynin 5 mg b.d. (*n* = 145 randomised, 121 analysed) Placebo (*n* = 72 randomised, 63 analysed)	4 weeks tx	Frequency/24 h (mean change)	–18 vs –19 vs –9% *P* = NS	Funding: none declared. [EL = 1–] Efficacy analysis for 85% only. No explanation for withdrawals. No further details on prior tx for urge UI, or on response to tx in this subgroup.
							Urgency /24 h (mean change)	–33 vs –24 vs –11% *P* = NS	
							Physician's assessment of change	Improved: 83 vs 79% vs 68% (*P* ≤ 0.001 active grps vs plac) No change: 15 vs 19% vs 32%	
							Max. cystometric capacity (mean change, ml)	+40 vs +42 vs +25%, *P* = NS	
							Adverse effects (%)	≥ 1 AE: 64 vs 72 vs 42, *P* < 005 active tx vs plac dry mouth: results in graph only visual disturbance 27 vs 18 vs 14 nausea 4 vs 10 vs 8 vomiting 2 vs 1 vs 3	
Jeong 2002[385]	DB RCT EL = 1+	228 (77% women)	M/F (Asian) mean age 52 years (27–8), frequency, urgency ± urge UI (39% with; mean 2.4–2.6 episodes/24 h). Symptomatic not urodynamic diagnosis. 27% had previous tx for	Tolterodine 2 mg b.d. (*n* = 112)	Oxybutynin 5 mg b.d. (*n* = 116)	8 weeks tx	Frequency/24 h (mean change)	–21 vs –15%, *P* = NS difference in mean change –0.71 (95% CI –1.66, +0.24)	Funding: Pharmacia Corporation. Dose adjustment not permitted during the study. Results for pts previously receiving drug tx for urge UI not
							Leakage episodes/24 h (mean change)	–85 vs –58%, *P* = NS difference in mean change –0.73 (95% CI –1.6, +0.15)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			OAB, with good efficacy in 45% Exclusions: sig. stress UI, tx with drugs having antimuscarinic side effects within 2 weeks, contraindications to antimuscarinic tx, UTI, interstitial cystitis, haematuria, bladder outlet obstruction, bladder training, electrostimulation therapy, indwelling catheterisation, ISC				Subjective assessment	45% vs 46% reported 'much' benefit (73% overall reported at least some benefit)	considered separately.
							Adverse effects (%)	Pts reporting ≥ 1 AE 55 vs 82 *P* = 0.001 Withdrawals 13 vs 22; owing to AE: 10 vs 16. Dry mouth 35 vs 63 *P* = 0.001 'micturition disorder' 9 vs 14 dyspepsia 7 vs 5 abdominal pain 5 vs 5 headache 4 vs 5	
Malone-Lee 2001[386]	DB RCT EL = 1+	378 (67% women)	M/F ≥ 50 years (mean 65), frequency (98%; mean ~11.3/24 h) with urgency, and/or urge UI (54% with; mean 2.4–2.9/24 h). 32% had prior tx for OAB, with good efficacy response in 29% Exclusions: clinical sig. stress UI, outflow obstruction, UTI, unexplained haematuria, urinary catheterisation, hepatic or renal disease, concomitant antimuscarinic tx, electrostimulation therapy or bladder training, tx with tol or oxy	Tolterodine 2 mg b.d. (*n* = 190)	Oxybutynin 2.5 mg b.d. for 2 weeks, then 5 mg b.d. (*n* = 188)	10 weeks tx	Dry mouth (%)	37 vs 61, *P* < 0.0001 severe 4 vs 15	Funding: Pharmacia and Upjohn. Dose reduction undertaken in 25% of oxy grp, and requested *but not permitted) in 6% tol grp. Results for pts previously receiving drug tx for urge UI not considered separately. RTI = respiratory tract infection.
							Frequency/24 h (change in mean)	–15 vs –15% absolute difference 0 (95% CI –0.41, +0.43)	
							Leakage episodes /24 h (change in mean)	–54 vs –62% absolute difference 0.5 (95% CI –0.03, +1.03)	
							Mean vol. voided (mean change, ml)	+22 vs +23% absolute difference –0.6 (95% CI –9.2, +8.1)	
							Subjective change in symptoms	45% vs 41% improvement 42% vs 51% no change 12% vs 8% deterioration	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			within 3 months				Adverse effects (%)	Pts reporting ≥ 1 AE; 69 vs 81, *P* = 0.01 Withdrawals 15 vs 22; owing to AE: 12 vs 15. AE reported by ≥ 5% in any grp: dyspepsia 9 vs 12 headache 11 vs 10 constipation 8 vs 6 dizziness 8 vs 5 abdominal pain 6 vs 6 upper RTI 5 vs 6 diarrhoea 5 vs 5 abnormal visual accommodation 5 vs 5 nausea 4 vs 5 UTI 4 vs 5 dysuria 2 vs 5	
Appell 2001[394]	Case series EL = 3	854 (76% women)	91% from 4×12 week placebo-controlled RCTs of tolterodine including Abrams 1998[349] and Drutz 1999[350] mean age 60 (19–89)	Tolterodine 2 mg b.d.	–	Up to 1 year	Withdrawals	30%: adverse events 9%, lack of efficacy 6%, lost to follow-up 6%, withdrew consent 4%	Funding: Pharmacia Corp. 13% reduced dose to 1 mg b.d. RTI = respiratory tract infection.
							Efficacy (in 70% who completed 9 months tx) vs RCT baseline	Frequency /24 h: median change –22%, mean –22% Leakage episodes: median change –76%, mean –57% Vol. voided, median change +22%, mean +25% Subjective improvement 65%	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects (%)	% reporting ≥ 1 AE: 76% dry mouth 28, (19 mild, 7 moderate, 2 severe); UTI 12, headache 7, abdominal pain 6, upper RTI 5	
Giannitsas 2004[387]	RCT Cross-over EL = 1–	128 randomised. 107 completed and analysed	F, (Hong Kong Chinese), 'urodynamic OAB'. Baseline frequency/24 h mean 8.5. 36% had urge UI. 29% had previous tx for OAB Exclusions: UTI, neurologic disease, bladder outlet obstruction, prior pelvic surgery, severe stress UI, narrow angle glaucoma, indwelling catheterisation, ISC	Tolterodine 2 mg b.d.	Oxybutynin 5 mg t.d.s.	2×6 weeks tx, 3–4 weeks washout	Frequency/24 h (mean change) Vol. voided /24 h (mean change) Cystometric capacity (mean change) Adverse effects (%)	–11 vs –9% +21 vs +22% +15 vs +16% Dry mouth 16 vs 41	Funding: none declared. Main objective of study was to assess whether urodynamic grade can predict response to tx. Not a blinded study. [EL = 1–] efficacy analysis for completers only. No information on 21 pts excluded from analysis. No significant differences detected between groups in efficacy outcomes.
Leung 2002[388]	RCT EL = 1+	106	F, median age 49.5, 'urodynamic OAB', frequency, urgency or urge UI Exclusions: stress UI, clinically sig. voiding difficulty, UTI, indwelling catheterisation or ISC, uninvestigated haematuria or bladder cancer, taking tx for OAB (incl. antimuscarinics), contraindications to antimuscarinics	Tolterodine 2 mg b.d. (*n* not stated)	Oxybutynin 5 mg b.d. (*n* not stated)	10 weeks tx	Xerostomia Questionnaire Voiding diary (frequency, urgency, UI)	Scores not reported. Significant changes from baseline reported but no sig., difference between groups. No numerical data; *P* values reported for between-group differences (= NS)	Funding: Pharmacia Ltd. Not a blinded study. *adapted from the McMaster University Head and Neck Radiotherapy Questionnaire; measures the effect of dry mouth on sensation of oral dryness, oral discomfort and ability to speak, chew, swallow, and wear dentures. Each domain is assessed on a 100 mm VAS.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Appell 2001[389] Sand 2004[390] (separate report of data in women, by age grp)	DB RCT EL = 1+	378 (83% women) 88% had baseline and 12-week diary data and include in efficacy analysis	M/F mean age 58 years, urge UI (only or predominantly, with ≥ 7 and ≤ 50 episodes/week; mean 28; frequency ≥ 10/24 h; mean 13. 60% naïve to antimuscarinics Exclusions: other causes of UI; had a baby or pelvic, vaginal or bladder surgery within 6 months; PVR > 150 ml; contraindications to antimuscarinics	Tolterodine 2 mg b.d. (*n* = 193 randomised, 172 analysed)	Oxybutynin ER 10 mg o.d. (*n* = 185 randomised, 160 analysed)	12 weeks tx	Leakage episodes/week (mean change)	Urge UI: –68 vs –76%, *P* = 0.03 Total: –66 vs –75%, *P* = 0.02	Funding: ALZA corporation. Primary efficacy analysis done for completers only, statistics for analysis done for all pts also quoted, which showed consistent effects.
							Frequency /week (mean change)	–22 vs –27%, *P* = 0.02	
							Adverse effects (%)	Withdrawals 11 vs 14; owing to AE: 8 vs 8, *P* = NS Dry mouth 33% vs 28%, *P* = NS No sig. difference in other AE reported; constipation, impaired urination/retention, blurred vision, dizziness, somnolence, asthenia, insomnia, nervousness, headache, dyspepsia, nausea, vomiting	
Diokno 2003[391] Associated publications: Armstrong 2005[392] (dry mouth)	DB RCT EL = 1+	790	F mean age 60 years (18–85), OAB, urge UI 21–60 episodes/week, frequency ≥ 10/24 h. 47% had prior antimuscarinic tx Exclusions: other causes of UI, PVR > 150 ml, at risk of urinary retention, existing medical	Tolterodine ER 4 mg o.d. (*n* = 399)	Oxybutynin ER 10 mg o.d. (*n* = 391)	12 weeks tx	Leakage episodes/week (mean change)	Urge UI: –70 vs –72%, *P* = NS Total: –69 vs –73%, *P* = NS	Funding: ALZA corporation, and Ortho-McNeil Pharmaceutical.
							% 'dry'	17% vs 23% *P* = 0.03	
							Frequency /week (mean change)	–25 vs –28%, *P* = 0.003 (median –26.2 vs –28.8, *P* = 0.05)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Chu 2005[393] (CNS side effects)			conditions that might increase risk of antimuscarinic effects				Adverse effects (%)	Withdrawals 11 vs 134; owing to AE: 5 vs 5 Dry mouth 22% vs 30%, *P* = 0.02: mild 17% vs 21% moderate 4% vs 6% severe 0.5 vs 1.5% No sig. difference in AE reported in ≥ 5% of either grp; constipation 7.8 vs 6.4, diarrhoea 6.3 vs 7.9, headache 6.0 vs 5.6, UTI 3.3 vs 5.1 Any CNS effect 8.3% vs 9%	
Halaska 2003[396]	RCT EL = 1+	357 (86% women) [only 77% evaluated by urodynamics]	M/F mean age 54 years (19–89), urge syndrome (frequency mean 11–12/24 h; urgency mean 10–11/24 h; nocturia); or urge UI (mean 1.5–2/24 h) Exclusions: stress UI, contraindications to antimuscarinics, other causes of UI, voiding difficulty	Trospium 20 mg b.d. (*n* = 267)	Oxybutynin 5 mg b.d. (*n* = 90)	1 year	Physician-reported cure	29% vs 17%	Funding: none declared. 25% withdrew (25% trospium 27% oxy) no results reported for changes in leakage episodes or nocturia. between-grp comparisons not reported for frequency or urgency GI = gastrointestinal effects.
							Frequency/24 h (mean change)	–31 vs –34%	
							Urgency/24 h (mean change)	–34 vs –33%	
							Maximum cystometric bladder capacity, mean change (*n* = 276)	+56 vs +58%, difference –6 ml (90% CI –33.0, +23.0)	
							Adverse effects (%)	≥ 1 AE: 68 vs 77 dry mouth 33 vs 50 *P* < 0.01 GI effects 39 vs 51 *P* = 0.02	
Chapple 2005[397]	DB RCT EL = 1+	1200 randomised; (87% F) 1177 (98%) took at least one dose of	M/F mean age 56 years with OAB symptoms ≥ 3 months, (mixed UI allowed if urge UI dominant) and being treated as	Solifenacin 5 mg o.d. for 4 weeks, could increase to 10 mg for weeks 5–12 (*n* = 593 analysed for	Tolterodine ER 4 mg o.d. could be increased (dummy) after 4 weeks (*n* = 607 analysed for safety, 599 for	12 weeks	Frequency/24 h, difference in mean change	0.21 (95% CI –0.48 to 0.10) (non-inferiority primary anlaysis), *P* = 0.004 for non-inferiority)	Funding: Yamanouchi Pharmaceutical Co. 17 countries, 117 sites 2-week single blind placebo run-in.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		tx and had one post-tx assessment ; and analysed for efficacy 1049 (87%) formed per protocol population	outpatients. ≥ 8 voids/24 h (mean ~12), ≥ 1 leakage episode/24 h (mean 2–3) or urgency (≥ 3 episodes during 3 day period; (mean ~6 per 24 h) Exclusions: stress UI, mixed UI if stress UI dominant; neurogenic cause of abnormal detrusor activity	safety, 578 for efficacy)	efficacy)		Urgency /24 h, mean change	–47 vs –41%, *P* = 0.035	Sample size calculation based on frequency in per protocol population; 80% power to detect non-inferiority between drugs in change in frequency/24 h. Dose increased in 48% solifenacin and 51% tolterodine (dummy increase) groups, controlled by pt request. Prior treatment not described. *proportion of pts with UI at baseline not stated. **on scale of 0 to 6; categories not explained; baseline values ~4.4. Mild AE = causes discomfort but no disruption to normal daily activity; moderate = discomfort sufficient to reduce/affect normal daily activity, severe = resulted in inability to work or perform daily activity.
							Leakage /24 h, mean change*	In urge UI: –61 vs –39%, *P* = 0.001 –58 vs –44%, *P* = 0.006	
							Nocturia/24 h, mean change	–35 vs –33%, *P* = NS	
							Cure of UI*	59% vs 49%, *P* = 0.006 50% reduction: 74% vs 67%, *P* = 0.02	
							Patients' erception of bladder condition	–34 vs –30%, *P* = 0.006**	
							Voided vol./void, mean change, ml	+26 vs +21%, *P* = 0.01	
							Pad usage /24 h	–53 vs –41%, *P* = 0.0023	
							Adverse effects	Dry mouth 30% vs 24% (17.5 vs 14.8 mild, 10.8 vs 7.7 moderate, 1.7 vs 1.5 severe) Constipation 6.4 vs 2.5% (3.2 vs 1.3 mild, 2.7 vs 1.0 moderate, 0.5 vs 0.2 severe) Blurred vision 0.7 vs 1.7% 0.7 vs 0.7 mild, 0 vs 1.0 moderate, 0 severe	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Discontinuation rates	Overall 5.9 vs 7.3% 1.2 vs 2.0% owing to insufficient response 3.5 vs 3.0% owing to AE	
Davila 2001[398]	DB RCT EL = 1+	76 (92% women)	M/F mean age ~63 years, DO, urge or mixed UI with predominant urge symptoms; ≥ 3 leakage episodes/day, and > 30% increase after 2 week washout from ≥ 6 weeks oral oxybutynin Exclusions: overflow incontinence owing to underactive or noncontractile detrusor or outlet obstruction, impaired bladder compliance, medical condition or drugs that could cause or contribute to UI	Transdermal oxybutynin* 2.6 mg – 5.2 mg (*n* = 38)	Oral oxybutynin 5 mg b.d. – 7.5 mg t.d.s. (*n* = 38)	6 weeks tx	Leakage episodes/ 24 h (mean change)	–67 vs –64%, *P* = NS	Funding: Watson Laboratories. *system applied twice weekly to the abdomen; mg refers to dose released over 24 h. 71% started on 2.6 mg transdermal oxy, 74% on 10 mg oral. Dose increased to max. in 68% vs 32%. Mean doses taken not stated. VFC = vol. at first contraction.
							Subjective cure (mean change)	21% vs 26%, *P* = NS	
							Urodynamics (mean change, *n* = 63)	VFC: +17 vs +40% Max. cystometric capacity: +15 vs +22% *P* = NS between grps	
							Adverse effects (%)	Dry mouth 39 vs 82, *P* < 0.01 constipation 21 vs 50 somnolence 18 vs 37 dizziness 16 vs 26 blurred vision 18 vs 24 impaired urination 24 vs 24. Allergic contact dermatitis to 1 pt in transdermal oxy grp	
Barkin 2004[399]	DB RCT EL = 1–	125 randomised, 94 (75%) incl. in primary analysis*, 90% of whom women)	M/F mean age ~59 years (26–83), urge UI (≥ 7 episodes/week) and frequency (≥ 8/day) Exclusions: PVR > 100 ml, uninvestigated voiding difficulty, daily fluid intake > 3 litre, bladder	Oxybutynin ER 15.2 mg/day (SD 4.4) (*n* = 65 randomised, 53 analysed)	Oxybutynin 14 mg/day (SD 5.3), in 3 divided doses (*n* = 60 randomised, 41 analysed)	6 weeks tx#	Leakage episodes/week (change in mean)	–57 vs –73% *P* = NS	Funding: Purdue Pharma. *[EL = 1–] Primary analyses done on pts who completed ≥ 2 weeks of tx and did not have major protocol violations. ITT analysis done for major
							Frequency/day (change in mean)	–16 vs –22% *P* = NS	
							Urgency/day (change in mean)	–30 vs –41% *P* = NS	
							Vol. voided (change in mean, ml)	+14 vs +18% *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			outlet obstruction, indwelling catheter or bladder training within 2 weeks, primary diagnosis of stress UI, contraindications to drug				QOL (change in mean)	IIQ: –0.7 vs –0.7 (27% vs 30%) *P* = NS UDI: –0.6 vs –0.7 (23% vs 28%) *P* = NS	outcomes, but data not reported. Adverse effects reported for all pts. #2 weeks dose titration, starting with 15 mg/day, changed by 5 mg each week if needed; then 4 weeks maintenance. 20% vs 37% withdrew, *P* = 0.047 mainly owing to adverse effects (32 of 35). Purdue Urgency Questionnaire (unvalidated) developed and used to assess urgency. Differences in tolerability also assessed after 1 week; significantly more pts in ER group rated their medication tolerable but % not given.
							Adverse effects (%; all pts)	*P* = NS between grps for all adverse effects dry mouth 68 vs 72 others occurring in > 10% of either grp: dry throat, diarrhoea headache, UTI, dizziness, dyspepsia, rhinitis, abdominal pain, asthenia, constipation, taste perversion, cough, dysphagia, dry eyes, nausea	
Anderson 1999[400]	DB RCT EL = 1–	105* (92% women); 93 completed	M/F mean age ~60 years (34–76), urge or mixed UI with primary urge component (≥ 6 urge UI episodes/week; mean 23–27), previously responded to oxybutynin tx Exclusions: known genitourinary causes of UI, PVR > 100 ml, at risk	Oxybutynin ER 5–30 mg/day (*n* = 53 randomised, 46 analysed)	Oxybutynin 5–20 mg/day in 3 divided doses (*n* = 52 randomised, 47 analysed)	Up to 6 weeks	Leakage episodes/week (change in mean)	Urge: –84 vs –88%, *P* = NS Total UI: –82 vs –88%, *P* = NS	Funding: none declared. Doses of both oxy preps titrated upwards from 5 mg/day, based on efficacy and tolerability, dose adjustment in 5 mg increments every 4–7 days. Actual doses taken not reported. *[EL = 1–] efficacy
							Cure	Urge UI: 52% vs 51%, *P* = NS Total: 41% vs 40%, *P* = NS	
							Voided vol. (change in mean)	+32 vs +20% *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			of retention from anticholinergic drug tx				Adverse effects	Dry mouth 68% vs 87% *P* = 0.04 (moderate to severe dry mouth 25% vs 46%, *P* = 0.03) No other sig. differences in AE reported: somnolence, blurred vision, constipation, dizziness, impaired urination, nervousness, nausea	analyses only done for completers. Adverse effects reported for all pts. Two pts withdrew owing to anticholinergic side effects. No further details. Severity of dry mouth did not therefore appear to affect withdrawal rate.
Birns 2000[401]	DB RCT EL = 1+	130 (68% women), 128 analysedITT	M/F mean age 56 years (18–76), voiding problems stabilised on standard oxybutynin. Urodynamic diagnosis: 77% DO (urge UI, unstable bladder, frequency), 8% UI (unspecified), 4% mixed UI, 1.5% stress UI, 5% neuropathic bladder Exclusions: contraindications to anticholinergics, symptomatic UTI, clinically sig. bladder outlet obstruction, or symptoms of only nocturnal enuresis	Oxybutynin ER 10 mg o.d. (*n* = 63; 62 analysed)	Oxybutynin 5 mg b.d. (*n* = 67; 66 analysed)	4 weeks tx*	Daytime continence	53% vs 58% (95% CI for difference –22% to +13%)	Funding: Leiras Oy, and Pharmacia and Upjohn. *following 2-week run-in period with standard oxy.
							Night-time continence, day and night frequency, day and night leakage episodes	No numerical data. No sig. differences found in any outcome	
							Adverse effects (%)	Any: 55 vs 67 No sig. difference between grps in AE: dry mouth 23% vs 17% dizziness 2% vs 9% vision abnormality 7% vs 5% coughing 3% vs 5% headache 0% vs 5%	
Versi 2000[402]	DB RCT EL = 1+	226 (89% women)	M/F mean age 59 years, 7–45 urge UI episodes/week, previously responded to	Oxybutynin ER 5–20 mg/day* (*n* = 111)	Oxybutynin 5–20 mg/day*, dosing frequency not stated (*n* = 115)	Up to 5 weeks tx (actual duration not	Leakage episodes/week (mean change)	Urge UI: –83 vs –76%, *P* = NS Total: –81 vs –75%, *P* = NS	Funding: ALZA Corporation. *dose increased by 5 mg every week based on

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			anticholinergic meds or specifically to oxybutynin before enrolment Exclusions: clinically sig. medical problems, PVR > 100 ml, contraindications to oxybutynin			stated)	Adverse effects (%)	Dry mouth 48 vs 59, *P* = NS (cumulative rates by dose#, *P* = 0.003 between grps): 5 mg: 19 vs 36; 10 mg: 40 vs 61; 15 mg: 57 vs 74; 20 mg: 80 vs 83	efficacy and tolerability, plus 1 week at optimal dose. Results are vs 2-week baseline run-in. #first report of dry mouth at a give dose.

Antimuscarinics – health economics

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Hughes 2004[405] UK Funding: Janssen Pharmaceutical	A hypothetical cohort with urge incontinence associated with OAB Empirical models of drug effects and persistence used to derive clinical effectiveness estimates. This was combined with cost data to derive an estimate of cost effectiveness	3 pharmaceutical treatments for OAB: oxybutynin ER (Oxy-ER), immediate-release oxybutynin (Oxy-IR), tolterodine immediate-release (Tol-IR), tolterodine extended-release (Tol-ER) (IR) tolterodine	Total annual cost (base case): Oxy-IR £40, Oxy-ER £79, Tol-IR £74, Tol-ER £63 Total annual cost (discontinuers adopt baseline values): Oxy-IR £42, Oxy-ER £82, Tol-IR £78, Tol-ER £68 Total annual cost (discontinuers adopt placebo values): Oxy-IR £37, Oxy-ER £77, Tol-IR £73, Tol-ER £63 Total annual cost (full persistence): Oxy-IR £129, Oxy-ER £241, Tol-IR £383, Tol-ER £362 Annual number of incontinent-free weeks (base case): Oxy-IR: 7.5, Oxy-ER: 11.1, Tol-IR: 9.6, Tol-ER 10.9 Annual number of incontinent-free weeks (discontinuers adopt baseline values): Oxy-IR: 2.5, Oxy-ER: 3.0, Tol-IR: 1.3, Tol-ER 1.4 Annual number of incontinent-free weeks (discontinuers adopt placebo values): Oxy-IR: 14.3, Oxy-ER: 14.3, Tol-IR: 13.4, Tol-ER 13.8 Annual number of incontinent-free weeks (full persistence): Oxy-IR: 22.1, Oxy-ER: 20.1, Tol-IR: 14.0, Tol-ER 19.4	Incremental cost per incontinent-free week (Base case): Oxy-IR: £5.25[a], Oxy-ER: £84.82[b], Tol-IR: Dominated, Tol-ER: £7.14[c] Incremental cost per incontinent-free week (Discontinuers adopting baseline values): Oxy-IR: £16.59[a], Oxy-ER: £87.43[c], Tol-IR: Dominated, Tol-ER: Dominated Incremental cost per incontinent-free week (Discontinuers adopting placebo values): Oxy-IR: £2.58[a], Oxy-ER: £1375.50[c], Tol-IR: Dominated, Tol-ER: Dominated Incremental cost per incontinent-free week (Full persistence): Oxy-IR: £5.81[a], Oxy-ER: Dominated, Tol-IR: Dominated, Tol-ER: Dominated [a] versus no treatment [b] versus Tol-ER [c] versus Oxy-IR	Model Direct medical costs – dugs, appliances, containment products, staff costs and direct overheads, surgical procedures. NHS perspective, 1998 prices inflated to 2001 values. Time horizon one year. Model results were robust to parameter uncertainty but were affected by assumptions made about early discontinuation.	Cost effectiveness analysis

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Kobelt 1998[410] Sweden Funding: Pharmacia and Upjohn	Hypothetical patient cohort with overactive bladder A Markov model was used to estimate the cost, utility and months of cure over one-year QALYs were calculated by a regression analysis of the correlation between urinary symptoms and EQ-5D scores Costs were based on drug costs and pad usage	Tolterodine; no treatment	Average Total costs per patient over one year: tolterodine SEK8,595, no treatment SEK3,286 Average Total QALYs per patient per year: tolterodine 0.6977, no treatment 0.6728 Average cured months per patient per year: tolterodine 3.6709, no treatment 0.816	Incremental cost per QALY of tolterodine vs no treatment: SEK213,000 (USD 28,000) Incremental cost per cured month of tolterodine vs no treatment: SEK1,860 (USD215)	Model Swedish context. Exchange rate: USD1 = SEK7.6. The authors report that the ICER of SEK213,000 per QALY is within the range usually considered cost effective. Markov model utilizes 5 severity states. Model assumed no further treatment effect after 3 months.	Cost–utility analysis and cost effectiveness analysis

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
O'Brien 2001[409] Canada Funding: Pharmacia Corporation	Hypothetical patient cohort with urge incontinence A Markov model was used to estimate the effects of two treatment strategies on cost, utility, and time in "normal" health state over one-year Discontinuation rates were obtained from Quebec prescription claims data Utility estimates were obtained from a previous Swedish study	generic oxybutynin with no further treatment in patients who discontinue initial therapy; generic oxybutynin with switch to tolterodine in patients who discontinue initial therapy	Total average costs to health care payer per patient over one year: oxybutynin to no therapy CAD82, oxybutynin to tolterodine CAD294 Total average costs to patient over one year:: oxybutynin to no therapy CAD285, oxybutynin to tolterodine CAD236 Total costs per patient over one year: oxybutynin to no therapy CAD367, oxybutynin to tolterodine CAD530 Average Total QALYs per patient over one year: oxybutynin to no therapy 0.67, oxybutynin to tolterodine 0.69 Average months in normal health state over one year: oxybutynin to no therapy 0.50, oxybutynin to tolterodine 1.15	Incremental cost per QALY of tolterodine vs no further therapy: CAD9,982 Incremental cost per additional month in a normal health state of tolterodine vs no further therapy: CAD251	Model Canadian context. Patient and health care payer perspective. One-way sensitivity analysis produced did not produce large variations from base rates.	Cost–utility analysis and cost effectiveness analysis

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Guest 2004[406] Austria, France and UK Funding: Sanofi-Synthelabo	Hypothetical patient cohort of patients with OAB > = 18 years of age, and urge or mixed incontinence with a primary-urge component A decision analytic model to estimate costs and incontinence outcomes of three treatment strategies over a six-month period Data was obtained from a systematic literature review and information about resource utilization were derived from interviews with clinicians	Controlled-release oxybutynin; immediate-release oxybutynin; tolterodine	Total average costs per patient over 6 months (UK): Controlled-release oxybutynin Euro1078.05, immediate-release oxybutynin Euro1097.30, tolterodine Euro1359.20 Total average costs per patient over 6 months (France): Controlled-release oxybutynin Euro872.91, immediate-release oxybutynin Euro834.25, tolterodine Euro861.90 Total average costs per patient over 6 months (Austria): Controlled-release oxybutynin Euro912.84, immediate-release oxybutynin Euro986.64, tolterodine Euro1108.71 Average percentage reduction in frequency of incontinence at 6 months (UK): CR oxybutynin 72.3, IR oxybutynin 62.3, tolterodine 56.3 Average percentage reduction in frequency of incontinence at 6 months (France): CR oxybutynin 72.2, IR oxybutynin 54.7, tolterodine 48.4 Average percentage reduction in frequency of incontinence at 6 months (Austria): CR oxybutynin 76.4, IR oxybutynin 62.1, tolterodine 63.8 Average change in daily no. of incontinence episodes per patient at 6 months (UK): CR oxybutynin 3.6 to 1.0, IR oxybutynin 3.6 to 1.4, tolterodine 3.6 to 1.6 Average change in daily no. of incontinence episodes per patient at 6 months (France): CR oxybutynin 3.6 to 1.0, IR oxybutynin 3.6 to 1.6, tolterodine 3.6 to 1.9 Average change in daily no. of incontinence episodes per patient at 6 months (Austria): CR oxybutynin 3.6 to 0.9, IR oxybutynin 3.6 to 1.4, tolterodine 3.6 to 1.3 Average percentage reduction in micturition frequency at 6 months (UK): CR Oxybutynin 24.1, IR Oxybutynin 17.4, tolterodine 20.1	Incremental cost effectiveness in reducing the frequency of incontinence (UK): CR oxybutynin dominates other treatments, IR oxybutynin dominates tolterodine Incremental cost effectiveness in reducing the frequency of incontinence (France): CR oxybutynin vs IR oxybutynin; Euro64 per additional reduction in the no. of daily incontinence episodes, CR oxybutynin vs tolterodine; Euro12 per additional reduction in the no. of daily incontinence episodes, IR oxybutynin dominates tolterodine Incremental cost effectiveness in reducing the frequency of incontinence (Austria): CR oxybutynin dominates other treatments, IR oxybutynin vs tolterodine; Euro1,219 Incremental cost effectiveness in reducing the frequency of micturition (UK): CR oxybutynin dominates other treatments, IR oxybutynin vs tolterodine; Euro1,455 per additional reduction in no. of daily micturitions Incremental cost effectiveness in reducing the frequency of micturition (France): CR oxybutynin vs IR oxybutynin; Euro39 per additional reduction in the no. of daily micturitions, CR oxybutynin vs tolterodine; Euro14 per additional reduction in the no. of daily micturitions, , IR oxybutynin vs tolterodine; Euro138 per additional	Model Conducted from perspective of payers (Sick Funds in Austria, Social Security in France and NHS) and patients, 2000/01 prices (Euros). Costs to patients and societal costs arising from lost productivity were also estimated.	Cost effectiveness analysis

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Getsios 2004[407] Canada Funding: This work was supported in part by a grant from Janssen-Ortho Canada	Hypothetical patient cohort: baseline characteristics; 83.3% female, 59.1 years mean age, 45% had 7–21 incontinent episodes per week, 34% had 22–42 incontinent episodes per week, 21% > 42 episodes per week A Markov model was used to estimate the costs and outcomes resulting from each treatment over one-year	2 pharmaceutical treatments for overactive bladder: extended-release (ER) oxybutynin; immediate-release (IR) tolterodine	Total costs per patient at one year: Tolterodine IR CAD688, Oxybutynin ER CAD656 Completely continent at week 52: Tolterodine IR 17.2%, Oxybutynin ER 20.4% No or minimal incontinence at week 52: Tolterodine IR 48.7%, oxybutynin ER 54.3% Days per year with no incontinent episodes: Tolterodine IR 146.0, oxybutynin ER 162.5 Total annual incontinent episodes: Tolterodine IR 679.8, oxybutynin ER 584.6 Patients receiving drug at week 52: Tolterodine IR 81.5%, oxybutynin ER 79.1%	Oxybutynin ER dominates Tolterodine IR	Model Direct costs only – drugs, doctor visits, pads and laundry. Canadian context; health care payer perspective; 2002 costs. Time horizon one year. 5 severity states. Transition probabilities into different states was calculated from the OBJECT clinical trial. Clinical data comparing oxybutynin ER and tolterodine IR only available for 3 months and it was assumed that there would be no change in severity among patients who were compliant with treatment. Treatment persistence rates over 3 months were based on OBJECT study, a common dropout rate was assumed for all patients after this. Sensitivity analysis showed that net savings would be eliminated if oxybutynin cost CAD0.11 more than tolterodine.	Cost effectiveness analysis

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Getsios et al., 2004 UK[404] Funding: This work was in part supported by a grant from Janssen Pharmaceutica	Hypothetical patient cohort: baseline characteristics; 83.3% female, 59.1 years mean age, 45% had 7–21 incontinent episodes per week, 34% had 22–42 incontinent episodes per week, 21% > 42 episodes per week A Markov model was used to estimate the costs and outcomes resulting from each treatment	2 pharmaceutical treatments for overactive bladder: extended-release (ER) oxybutynin, immediate-release (IR) tolterodine	Total costs per patient at one year: Tolterodine IR £418, Oxybutynin ER £332 Completely continent at week 52: Tolterodine IR 17.2%, Oxybutynin ER 20.4% No or minimal incontinence at week 52: Tolterodine IR 48.7%, oxybutynin ER 54.3% Days per year with no incontinent episodes: Tolterodine IR 146.0, oxybutynin ER 162.5 Total annual incontinent episodes: Tolterodine IR 679.8, oxybutynin ER 584.6 QALYs: Tolterodine IR 0.686, oxybutynin ER 0.690 Patients receiving drug at week 52: Tolterodine IR 81.5%, oxybutynin ER 79.1%	Oxybutynin ER dominates Tolterodine IR	Model Direct costs only – drugs, doctor visits, pads and laundry. UK context, perspective of a comprehensive healthcare payer; 2002 costs. Time horizon one year. 5 severity states. Transition probabilities into different states was calculated from the OBJECT clinical trial. Clinical data comparing oxybutynin ER and tolterodine IR only available for 3 months and it was assumed that there would be no change in severity among patients who remained compliant after this date. Health utilities derived from study by Kobelt *et al*., 1998. Treatment persistence rates over 3 months were based on OBJECT study, a common dropout rate was assumed for all patients after this. Sensitivity analysis suggested that the results were quite stable to different assumptions. Increasing discontinuation rates reduced the cost effectiveness of oxybutynin ER relative to tolterodine IR. The dominance of oxybutynin ER was also sensitive to the costs of treatment. Only examined a fixed dose for each drug. Data to estimate the effect of lower compliance were not available.	Cost–utility and cost effectiveness analysis

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Arikian 2000[408] US Funding: This research was supported by a grant from the Alza Corporation	Hypothetical patient cohort of patients with OAB A decision analytic model to determine the costs, weekly incontinence episodes and expected number of continent days of three treatment strategies over a six-month period Data was derived from a review of RCT data combined with expert opinion Drug costs were based on the January 1999 wholesaler acquisition cost and average daily dosage was based on clinical opinion	3 pharmaceutical treatments for overactive bladder: once-daily contolled-release oxybutynin, twice daily tolterodine, immediate-release oxybutynin	Treatment success*: oxybutynin controlled-release 52.30%; immediate-release oxybutynin 46.15%; tolterodine 31.89% Continent days: oxybutynin controlled-release 75; immediate-release oxybutynin 65; tolterodine 44 Surgery (second-line treatment) Cost: oxybutynin controlled-release USD 1,403; immediate-release oxybutynin USD 1,395; tolterodine USD 1,650 Surgery (third-line treatment) Cost: oxybutynin controlled-release USD 894; immediate-release oxybutynin USD 819; tolterodine USD 918 *Treatment success defined as patients with zero incontinence episodes per week at the end of six months	Surgery (second-line treatment) Cost per success: oxybutynin controlled-release USD 2,682; immediate-release oxybutynin USD 3,022; tolterodine USD 5,177 Cost per continent day: oxybutynin controlled-release USD 18.70; immediate-release oxybutynin USD 21.60; tolterodine USD 37.20 Surgery (third-line treatment) Cost per success: oxybutynin controlled-release USD 1,708; immediate-release oxybutynin USD 1,774; tolterodine USD 2,882 Cost per continent day: oxybutynin controlled-release USD 11.90; immediate-release oxybutynin USD 12.60; tolterodine USD 20.70	Model US context. Authors report that sensitivity analysis shows that results are robust to model assumptions. Baseline results suggest that tolterodine is dominated.	Cost effectiveness analysis

Desmopressin

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Lose 2003[413] Lose 2004[414] (up to 1 year tx with desmopressin [all patients])	DB RCT EL = 1+ (long-term study EL = 3)	144 randomised. 117 enrolled in long-term tx study; 87 [74%] completed 10–12 month follow-up	F mean age 57 years (SD 13.4) with nocturia (mean voids 2.98 [SD 0.91]), mean nocturnal volume 798 ml (SD 296), nocturia index score > 1*; returned to ≥ 78% of baseline nocturnal diuresis value after the 1-week washout following dose titration Exclusions: shift work, pregnancy, vaginitis, urethritis, clinically significant abnormal blood or urine values, hyponatraemia, diabetes insipidus, MS, polydipsia, overt lower urinary tract dysfunction, tx with diuretics, tricyclic antidepressants, indometacin, carbamazepine, chlorpropamide	Desmopressin, optimal dose# orally (*n* = 72)	Placebo (*n* = 72)	3 weeks tx, 10–12 month follow-up	Responders (≥ 50% reduction in mean no. nocturnal voids)	46% vs 7%, OR 13.4 (95% CI 4.6 to 39.2), *P* < 0.0001 *At 12 months* (*n* = 67): 67%; mean number voids 1.2 after tx end (*n* = 85); and 1.3 at 12 months (*n* = 79)	Funding: Ferring Pharmaceuticals. *defined as mean nocturnal volume divided by largest voided volume. Randomisation occurred after #dose titration of up to 3 weeks (then a 1 week washout period): 0.1 mg orally at bedtime for 1 week, maintained if 0 nocturia. If ≥ 1 nocturia episode, dose increased to 0.2 mg for 1 week and if required to 0.4 mg for 1 week. 14%, 39%, 47% took 0.1 mg, 0.2 mg, 0.4 mg respectively.[414] During longer-term study, all women could continue with their optimal dose of desmopressin and were advised to void just before going to bed, not to drink more than sufficient to satisfy thirst from 1 h before bed until 8 h after drug dose, also advised to avoid drinking liquids with a diuretic effect at night (e.g. caffeine, alcohol). 75% completed 1 year of tx. Withdrawals owing to AE (10%), lack of efficacy (7%), on pt request (4%), other reasons (5%).
							Vol. Nocturnal voids (mean change, ml)	–46 vs –17%, *P* < 0.0001	
							Duration of sleep until first nocturnal void (mean change, mins)	+78% (to 272 min) vs +20%, *P* < 0.0001 *At 10–12 months* duration 307–310 min	
							Nocturnal diuresis (mean change, ml/min)	–44 vs –6%, *P* < 0.0001	
							Ratio of nocturnal/24 h urine vol.	–30 vs +2%, *P* < 0.0001	
							Ratio of daytime/24 h urine vol.	–36 vs +9%, *P* < 0.0001	
							QOL (BFLUTS); % reporting nocturia as bothersome	75% vs 84% after tx (97% vs 98% at baseline) *At 10–12 months* 30–31%	
							Adverse effects (*n* = 224; total screened)	*Dose titration:* headache 22%, nausea 8%, hyponatraemia 6%,	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
								abdominal pain, frequency, dry mouth (each 4%), dizziness, fatigue, peripheral oedema (each 3%). *Double-blind period*: headache 10% vs 7%; serious adverse events: 2 deaths (unrelated to tx), 2 serious hyponatraemia, 1 angina and SVT) *At 10–12 months (data for F only)*: most frequent AE related to tx: hyponatraemia 12% (none required tx, none < 125 mmol/l); headache 7%, frequency, peripheral oedema, UTI (each 3%), nausea, dizziness (each 2%)	
Asplund 1999[415]	DB RCT cross-over EL = 1+	17 (5 women)	M/F 60–74 years (mean 68), ≥ 2 nocturnal voids and nocturnal urinary output ≥ 0.9 ml/min, completed and responded to an initial dose-response study*[944] Exclusions: desmopressin tx within 2 weeks, heart disease, hypertension,	Desmopressin (optimal dose from dose-titration study)*, (*n* = 17)	Placebo (*n* = 17)	2×2 week tx periods	Nocturnal diuresis (ml/min)	1.0 (0.4) vs 1.6 (0.8) difference between grps: –0.59 (95% CI –0.33, –0.85), *P* < 0.0001	Funding: none declared; some authors from Ferring pharmaceuticals. *Dose titration[944]: 0.1 mg orally at bedtime for 1 week, increased to 0.2 mg for 1 week and 0.4 mg for 1 week; dose increased if none of the following: nocturnal diuresis < 0.5 ml/min, unable to void in the morning, adverse events. Optimal dose for 17 patients include in this study:
							24 h diuresis	No sig. change (1.3 at baseline, 1.3 vs 1.4 after tx)	
							Nocturia (mean [SD])	1.1 (0.7) vs 1.7 (0.8), *P* < 0.0001 difference between grps: –0.59 (95% CI –0.32, –0.85), *P* < 0.0001	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			liver disease, Crohn's disease, renal or neurological problems, primary polydipsia, diabetes insipidus, UTI, tx known to affect water or electrolyte metabolism, smokers				Adverse effects	1 hyponatraemia, resolved at end of tx	0.1 mg (*n* = 4), 0.2 mg (10), 0.4 mg (3). No fluid restriction; pts permitted to drink as much as needed to avoid thirst.
Hilton 1982[416]	DB RCT cross-over EL = 1+	25	F mean age 56 years (41–76), nocturia (mean 3.17 episodes) who had failed to respond to treatment with antispasmodic agents and evening fluid restriction. 13 had urge UI, 6 stress UI, 23 urgency, 18 daytime frequency. Urodynamic diagnosis: 18 DO (14 idiopathic, 3 MS, 1 interstitial cystitis); 1 DO + urethral sphincter incompetence, 2 voiding difficulty, 2 sensory urgency, 2 urodynamically normal (uterovaginal prolapse) Exclusion: ischaemic heart disease, congestive heart failure, hypertension	Desmopressin 20 µg (*n* = 25)	Placebo (*n* = 25)	4 weeks tx (2×2 weeks)	Nocturnal frequency	–39 vs –18% (*P* < 0.01 des vs baseline and plac)	Funding: Ferring pharmaceuticals supplied materials. Drugs given as a single intranasal dose at bedtime. 11 took desmopressin followed by placebo, 14 took placebo then desmopressin.
							Nocturnal urine output	–39 vs –11%, (*P* ≤ 0.02 des vs baseline and plac)	
							Diurnal frequency	+11 vs +10%, *P* = NS des vs baseline and plac	
							Diurnal urine output	+11 vs –10%, *P* = NS des vs baseline and plac	
							Other urinary symptoms	Urge UI (*n*); 11 vs 12 Stress UI (*n*); 6 vs 6 Urgency: 19 vs 20	
							Adverse effects	2 transient headache, 2 nausea, 2 earache during each tx phase. 1 hypertensive pt developed BP 190/110 mmHg and ankle oedema with desmopressin tx	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Robinson 2004[417]	DB RCT 'cross-over' EL = 1+	64 randomised, 57 analysed	F mean age 53 years (25–78), daytime UI (23% stress, 50% mixed, 20% urge), daily fluid intake < 2.5 litre Exclusions: tx with diuretics, tricyclic antidepressants, indometacin, carbamazepine, chlorpropamide; or abnormally low serum sodium	Desmopressin 40 µg intranasally (7 doses) and placebo (3 doses)*	*	To end of 10 doses (actual duration not stated)	Mean (SD) no. of periods with no leakage (≤ 5 g increase in pad weight) for the first 4 h after voiding (*n* = 58 desmo, 55 plac)	61.7 (35.4), 95% CI 52.4 to 71.0 vs 47.9 (40.2), 95% CI 37.0 to 58.7	Funding: Ferring Pharmaceuticals. *F randomised to one of 4 tx sequences, in which the placebo doses were taken as the 1–3, 3–5, 6–8, or 8–10 doses. Results not given for each sequence, and do not know over what time period women used the tx for. Results from the 4 tx sequences pooled for desmopressin vs placebo. Each dose of desmopressin or placebo was taken when required, but at least 4 h before bedtime, not on > 2 consecutive days, and not > once in 24 h. The confidence intervals for each outcome for desmopressin and placebo groups overlapped.
							Mean (SD) vol. leaked /UI episode in 1st 4 h (ml; *n* = 45 desmo, 39 placebo)	22.2 (18.9), 95% CI 16.5 to 27.9 vs 26.1 (25.1), 95% CI 17.9 to 34.2	
							Mean (SD) vol. voided in 1st 4 h (ml; *n* = 59 desmo, 58 plac)	237 (121), 95% CI 206 to 269 vs 317 (194), 95% CI 266 to 368	
							Mean (SD) no. of periods with no leakage over 24 h (*n* = 57 desmo, 50 plac)	32.7 (38.1), 95% CI 22.6 to 42.9 vs 25.3 (37.7), 95% CI 14.6 to 36.0	
							Mean (SD) vol. leaked /UI episode over 24 h (ml; *n* = 51 desmo, 48 plac)	24.3 (18.6), 95% CI 19.1 to 29.6 vs 25.7 (18.5), 95% CI 20.3 to 31.1	
							Mean (SD) vol. voided over 24 h (ml; *n* = 58 desmo, 57 plac)	1180 (582), 95% CI 1027 to 1333 vs 1375 (625), 95% CI 1209 to 1541	
							Mean (SD) time to first UI episode or void from dose taken	2.3 (1.0) h vs 2.1 (1.0)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects	% reporting any; 42% desmo vs 25% plac most common with desmopressin; headache 36%, nausea 10%	

Diuretics

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Pedersen 1988[418]	DB RCT cross-over EL = 1–	33; 28 completed (13 women)	M/F median age 66.5 years, ≥ 2 nocturia episodes (median 17.5/week) Exclusions: urinary retention, UTI, hypo- or hyper-kalaemia, creatinine > 120 µmol/l	Bumetanide 1 mg	Placebo	2×2 weeks tx	Nocturia episodes/week	10 vs 13.8; difference –3.8 (IQR –1.5, 5.5), *P* < 0.05	Funding: none declared. [EL = 1–] 5 pts excluded from analysis owing to protocol violations (2), adverse effects (3; indisposition, headache, stranguria). Doses taken 4–6 h before bedtime.

Duloxetine

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Norton 2002[420]	DB RCT EL = 1+	553	F 18–65 years (mean 50), predominant stress UI for ≥ 3 months, (positive cough stress test and positive stress pad test), ≥ 4 episodes/week (mean 1.6 to 1.9/day), diurnal frequency ≤ 7/day, nocturnal frequency ≤ 2/day, absence of predominant symptoms of urge UI or enuresis. 8% had prior continence surgery and 19% performed PFMT Exclusions: unable to tolerate bladder infusion filling to 400 ml, or first sensation of bladder filling < 100 ml, or no	Duloxetine 80 mg/day (*n* = 140)	Duloxetine 40 mg /day (*n* = 137) Duloxetine 20 mg /day (*n* = 138) Placebo (*n* = 138)	12 weeks tx	Leakage episodes, (median change)	–64 vs –59 vs –54 vs –41% *P* ≤ 0.002 for duloxetine 80 mg or 40 mg vs placebo	Funding: Eli Lilly and Company. Duloxetine 80 mg and 40 mg groups; daily dose taken in two divided doses.
							Frequency/day (mean change)	–1.4 vs –1.2 vs –1.0 vs –0.6 *P* ≤ 0.003 for duloxetine 80 mg or 40 mg vs placebo	
							Voiding interval (mean change, mins)	+24 vs +19 vs +16 vs +7 *P* ≤ 0.004 for all duloxetine grps vs placebo	
							I-QOL (mean change in score)	+9.3 vs +7.8 vs +5.3 vs +5.8, *P* = 0.03 duloxetine 80 mg vs placebo	
							Patients Global Impression of Improvement (PGI-I)	44 vs 37 vs 31% vs 27% reported their condition was very much/much better, *P* = 0.005 duloxetine 80 mg vs placebo	
							Stress pad test (median change in weight)	–29 vs –43 vs –11 vs –30%, *P* = NS between grps	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			sensation at any time during the filling				Adverse effects	At least 1 AE: 73 vs 69 vs 62% vs 61% Nausea 13 vs 9 vs 9% vs 2%, *P* < 0.05 duloxetine grps vs placebo. Other events occurring in ≥ 5% in any grp (no sig. differences between grps): headache, diarrhoea, constipation, dry mouth, dizziness, insomnia, sinusitis, fatigue, nasopharyngitis, upper resp tract infection	
							Discontinuation owing to AE	15 vs 12 vs 9% vs 5%, *P* = 0.04 duloxetine grps vs placebo	
Millard 2004[421]	DB RCT EL = 1+	458	F 27–79 years (mean ~ 53), predominant stress UI for ≥ 3 months, (positive cough stress test and positive stress pad test), ≥ 7 episodes/week (mean ~18), diurnal frequency < 9/day, nocturnal frequency < 3/night, absence of predominant urge UI symptoms. 18% had prior continence	Duloxetine 80 mg/day (*n* = 227)	Placebo (*n* = 231)	12 weeks tx	Leakage episodes, (median change)	–53.6 vs –40.0% *P* = 0.05 responders:# 59.5 vs 43.2%, *P* < 0.001	Funding: Eli Lilly and Company, and Boehringer Ingelheim. Duloxetine 80 mg taken in two divided doses. #proportions with ≥ 50% reduction in leakage episodes. More placebo-treated pts completed the study, 92% vs 75%, *P* < 0.001. Higher discontinuation rate related to side effects. Results also available for monthly visits. Not reproduced
							Voiding interval (mean change, mins)	+20.4 vs +8.5, *P* < 0.001	
							I-QOL (mean change in score)	+10.3 (SD 16) vs +6.4 (SD 17), *P* = 0.007	
							PGI-I	74% vs 64%, *P* = 0.028 reported their condition was very much/much/little better	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			surgery.* 5.7% duloxetine vs 12.1% placebo performed PFMT (P = 0.017) Exclusions: unable to tolerate bladder infusion filling to 400 ml, or first sensation of bladder filling < 100 ml, or no sensation at any time during the filling				Adverse effects	Any 76% vs 59% nausea 25% vs 4% dry mouth 12% vs 2% constipation 13% vs 2% fatigue 10% vs 4% insomnia 14% vs 3% dizziness 11% vs 3% increased sweating 6% vs 1% vomiting 6% vs 2% somnolence 8% vs 0% anorexia 7% vs 0% (all $P \leq 0.016$ duloxetine vs placebo) Mean change in heart rate (bpm); +2.8 vs –0.07, $P < 0.001$	here. *previous continence surgery includes injections. bpm = beats per minute.
							Discontinuation owing to AE	17.2 vs 1.7%, $P < 0.001$	
Dmochowski 2003[422]	DB RCT EL = 1+	683	F 22–84 years (mean ~ 53), predominant stress UI for ≥ 3 months, (positive cough stress test and positive stress pad test), ≥ 7 episodes/week (mean ~18, diurnal frequency < 8/day, nocturnal frequency < 3/night, absence of predominant urge UI	Duloxetine 80 mg /day (n = 344)	Placebo (n = 339)	12 weeks tx	Leakage episodes, (median change)	–50% vs –27.5% $P < 0.001$ responders:#: 51.4% vs 33.5%, $P < 0.001$	Funding: Eli Lilly and Co. Duloxetine 80 mg taken in two divided doses. #proportions with ≥ 50% reduction in leakage episodes. More placebo-treated pts completed the study, 87% vs 69%, $P < 0.001$. Higher discontinuation rate related to side effects. *Previous continence surgery
							Voiding interval (mean change, mins)	+20 vs +1.7, $P < 0.001$	
							I-QOL (mean change in score)	+11.1 (SD 14.8) vs +6.8 (SD 13.8), $P < 0.001$	
							PGI-I	62% vs 40%, $P < 0.001$ reported improvement	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			symptoms. 13% had prior continence surgery.* 16.9% duloxetine vs 18% placebo performed PFMT Exclusions: unable to tolerate bladder infusion filling to 400 ml, or first sensation of bladder filling < 100 ml, or no sensation at any time during the filling, women taking antidepressants				Adverse effects	Any 74% vs 50% nausea 23% vs 2% dry mouth 12% vs 1% constipation 10% vs 2% fatigue 15% vs 4% insomnia 14% vs 2% somnolence 9 vs 0.3% dizziness 8% vs 2%; (all $P \leq 0.002$ between grps) Headache 7% vs 4% diarrhoea 6% vs 3%, $P = 0.04$.	includes injections.
							Discontinuation owing to AE	24% vs 4%, $P < 0.001$ (mainly nausea 6.4% vs 0, $P < 0.001$)	
van Kerrebroeck 2004[423]	DB RCT EL = 1+	494	F 24–83 years (mean 52–54), predominant stress UI for ≥ 3 months, (positive cough stress test and positive stress pad test), ≥ 7 episodes/week (mean ~17), diurnal frequency < 8/day, nocturnal frequency ≤ 2/day, absence of predominant urge UI symptoms. 8% had prior continence surgery and 19%	Duloxetine 80 mg /day ($n = 247$)	Placebo ($n = 247$)	12 weeks tx	Leakage episodes, (median change)	–50% (95% CI –57.1, –42.9) vs –29.3% (95% CI –36.8, –20.0), $P = 0.002$ responders#: 51.9% vs 33.5%, $P < 0.001$	Funding: Eli Lilly and Boehringer Ingelheim. Duloxetine 80 mg taken in two divided doses. #proportions with ≥ 50% reduction in leakage episodes. More placebo-treated pts completed the study, 92% vs 73%, $P < 0.001$. Higher discontinuation rate related to side effects. Results also available for monthly visits. Not reproduced here. bpm = beats per minute.
							Voiding interval (mean change, mins)	+15 vs +3.8, $P < 0.001$	
							I-QOL (mean change in score)	+5.5 vs +4.1 95% CI for tx difference –0.5, +4.1, P = NS	
							PGI-I	56.2 vs 48.2%, P = NS reported their condition was very much/much/little better	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			performed PFMT Exclusions: unable to tolerate bladder infusion filling to 400 ml, or first sensation of bladder filling < 100 ml				Adverse effects	Nausea 28% vs 7% dry mouth 19% vs 2% constipation 14% vs 4% fatigue 14% vs 5% insomnia 13% vs 1% dizziness 12% vs 3% increased sweating 9% vs 2% vomiting 7% vs 2% somnolence 4% vs 0% tremor 4% vs 0% (all $P \leq 0.024$ duloxetine vs placebo) Mean change in heart rate (bpm); < 3 for duloxetine ('sig. greater with duloxetine'); placebo results not given	
							Discontinuation owing to AE	22% vs 5%, $P < 0.001$	
Cardozo 2004[425]	DB RCT EL = 1–	109 randomised, 92 included in analysis	F aged 33–75 years (mean ~53), predominant symptom of stress UI with urodynamic evidence, leakage episodes ≥ 14/ week (mean ~21–24), continence surgery already scheduled. 16% had prior continence surgery	Duloxetine 80 mg/day for 4 weeks, then 120 mg/day for 4 weeks (n = 55 randomised, 46 analysed)	Placebo (n = 54 randomised, 52 analysed)	8 weeks tx	Leakage episodes, (median change)	–59.8 vs –26.9% $P < 0.001$ Responders[#]: 63 vs 13.5%, $P < 0.001$; RR 4.68 (95% CI 2.27 to 9.66)	Funding: Eli Lilly and Boehringer Ingelheim. Duloxetine total daily dose taken in two divided doses. [#]proportions with ≥ 50% reduction in leakage episodes. [EL = 1–] owing to drop out rate; only completers analysed. *women asked: based on your current symptoms of stress UI, would you consider a surgical intervention? (strongly interested, somewhat interested, unsure, somewhat not interested, strongly not interested).
							I-QOL (mean change in score)	+10.6 (SD 19.1) vs +2.4 (SD 9.4), $P = 0.003$ (95% CI for tx difference 3.0 to 14.2) % change 20 vs 4.5	
							PGI-I	Very much or much better 33.3 vs 7.7% Little better or no change 60.8 vs 80.8% Little or very much worse 5.9 vs 11.5% $P = 0.003$ duloxetine vs placebo	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Willingness to consider surgery* (% changing from unsure or interested in surgery to NOT interested)	20.4% vs 0, *P* = 0.001 (results for 94, because 1 duloxetine and 6 placebo pts excluded from analysis owing to stating they were not interested in surgery at baseline)	
							Adverse effects	Any AE 93% vs 72%, *P* = 0.006 Nausea 46% vs 13% dry mouth 22% vs 0% constipation 27% vs 6%, (all *P* ≤ 0.004 duloxetine vs placebo) Headache 27% vs 9% fatigue 18% vs 11% insomnia 13% vs 6% dizziness 16% vs 4% vomiting 13% vs 2%, somnolence 13% vs 2% (all *P* = NS)	
							Discontinuation owing to AE	33% vs 6%, *P* < 0.001	
Kinchen 2005[424]	DB RCT EL = 1+	451	F mean age ~53 years (SD 13), with symptoms of stress UI (≥ 1 leakage episode/week; median ~7). 16% had pure stress UI, 69% stress-predominant UI, 9% urge-predominant UI, 6% 'balanced' UI. About 50% had genital prolapse on training, 10% prior continence	Duloxetine 40 mg b.d. (*n* = 224)	Placebo (*n* = 227)	9 months (3 month analysis also done because of high drop-out rate at 9 months)	I-QOL (mean score increase)	At 3 months: ITT analysis 13.0 vs 10.4, *P* = NS completers 13.5 vs 10.8, *P* = NS At 9 months: ITT 13.8 vs 12.1, *P* = NS completers 15.6 vs 15.7, *P* = NS	Funding: none declared. All authors Eli Lilly-based. Urodynamic testing was not required prior to study entry. Pts were permitted to take other treatments and/or change dose of study medication during the study But cross-over not allowed. Use of other interventions at any time was: oestrogens 45% vs 49%, antimuscarinics 11% vs 14%,
							PGI-I at 9 months	ITT: 48% vs 42%, *P* = NS Completers: 70% vs 51% *P* < 0.05	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			surgery, 5% prior antimuscarinic drug use 35% undertaking PFMT at baseline Exclusions: active UTI, participated in previous duloxetine trials, other medical conditions (arrhythmias, uncontrolled hypertension, liver disease, seizure disorders, unstable cardiac conditions)				Adverse effects (all AE sig. different between groups)	88% vs 70% reported ≥ 1 Very common with duloxetine: 31% vs 6% nausea 20% vs 5% fatigue 15% vs 6% insomnia 13% vs 4% dizziness 13% vs 6% headache 10% vs 2% somnolence 12% vs 2% dry mouth Common with duloxetine: 9% vs 2% constipation 9% vs 4% diarrhoea 9% vs 4% vomiting 7 vs 0.4% increased sweating 5% vs 1% appetite decreased 4% vs 1% anxiety 5 vs 0.4% tremor 3.6 vs 0.4% reduced libido 2% vs 0% nightmare 0% vs 3% fungal infection	pseudoephedrine or phenylpropanolamine 11% vs 13%. Another outcome 'integrated percent of possible improvement' also reported but no numerical data given. Drop-out rates at 3 months: 14.7 vs 11.5%; at 6 months 24.1 vs 18.5%, at 9 months 27.7% vs 22%. Proportion still taking study drug: 62.9 vs 81.9% at 3 months, 49.6 vs 71.8% at 6 months, 37.9 vs 53.7% at 9 months.
							Discontinuation owing to adverse effects (at 9 months)	8.9 vs 2.2%, $P < 0.05$ (discontinuations overall at 9 months: 62.1 vs 46.3%)	

Duloxetine – health economics

Study	Population Study method	Intervention details	Costs Outcomes	Results	Additional comments	Study type
Das Gupta 2006[426]8}8}41 UK Funding: Eli-Lilly and Company Ltd. And Boehringer Ingelheim	A hypothetical patient population A Markov model was used to estimate the cost and QALYs over a time horizon of 2 years Disutility from SUI symptoms estimated from two previous studies Cost data taken from standard UK sources	Conservative treatment of stress UI: duloxetine vs standard treatment (PFMT followed by surgery); and duloxetine in combination with PFMT vs standard treatment In both cases duloxetine was assesses as a first line and second line treatment	Costs: duloxetine vs standard treatment (first line); standard treatment GBP620.20, duloxetine GBP717 duloxetine vs standard treatment (second line); standard treatment GBP620.20, duloxetine GBP717 duloxetine + PFMT vs standard treatment (first line); standard treatment GBP618, duloxetine GBP910 duloxetine vs standard treatment (second line); standard treatment GBP618, duloxetine GBP501 QALY gain: duloxetine vs standard treatment (first line); standard treatment 0.0434, duloxetine 0.0544 duloxetine vs standard treatment (second line); standard treatment 0.0436, duloxetine 0.0518 duloxetine + PFMT vs standard treatment (first line); standard treatment 0.0409, duloxetine 0.0909 duloxetine vs standard treatment (second line); standard treatment 0.0399, duloxetine 0.0599	ICER: duloxetine vs standard treatment (first line); GBP8,730 per QALY ICER: duloxetine + PFMT vs standard treatment (first line); GBP5,854 per QALY ICER: duloxetine vs standard treatment (second line); duloxetine dominates ICER: duloxetine + PFMT vs standard treatment (second line); duloxetine dominates	Model UK context. Cost data 2004/05. Costs and benefits discounted at 3.5%. Baseline analysis based on two year timeframe Markov model used 3 months cycles. Waiting times for outpatient attendance, urodynamics, formal PFMT and surgery are included in the model. Sensitivity analysis suggested that the second line use of duloxetine alone or in combination with PFMT was cost effective (using a £30,000 per QALY willingness to pay threshold) at 5 years; first line use of duloxetine alone would not be considered cost effective at 5 years with an ICER of GBP49,658.	Cost–utility analysis

Oestrogens

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Dessole 2004[431]	RCT EL = 1+	88	Postmenopausal women, (mean ~7 years since	Estriol 'ovule' intravaginally (1 mg/day for 2 weeks, then 2 mg	Placebo intravaginally (*n* = 44)	6 months tx	Subjective improvement of stress UI	68% vs 16%, *P* < 0.01	Funding: none declared. Not a blinded

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			menopause), mean age ~57 years, stress UI, vaginal atrophy, recurrent UTI Exclusions: uterovaginal prolapse, cystocele, rectocele, (grade II or III), severe systemic disease, thromboembolic disease, biliary lithiasis, previous breast or uterine cancer, abnormal uterine bleeding, BMI ≥ 25 kg/m^2	once /week), *n* = 44			UPP (mean changes)	MUP (cmH_2O): +22% vs –6%, *P* < 0.05 MUCP (cmH_2O): +26% vs –3%, *P* < 0.05 Pressure transmission ratio (%): +23% vs 0, *P* < 0.05	study.
							Urodynamics	No significant difference between groups in volume at 1st sensation, bladder capacity or compliance, or max. bladder pressure. Sig. greater increase in UPP in estriol grp vs placebo	
							Adverse events	2 from each grp withdrew owing to localised adverse reactions; vaginal irritation, burning, itching. No systemic AE reported	
Fantl 1996[432]	DB RCT EL = 1+	83	F, hypoestrogenic, aged ≥ 45 years (mean 67), UI at least once/week. 45% stress UI, 26% DO, 29% stress UI + DO Exclusions: institutionalisation, permanent catheterisation, cognitive impairment, functional disability, neuropathic or uncontrolled metabolic conditions, chronic UTI, reversible causes of UI	Conjugated equine oestrogen 0.625 mg /30 days + medroxyprogerterone for 10 days each cycle (*n* = 44)	Placebo (*n* = 39)	3 months tx	Leakage episodes/week (mean change)	–3 vs –3%, *P* = NS	Funding: National Institute on Aging, National Institutes of Health, Wyeth-Ayerst, Upjohn. Sig. differences between grps at baseline in vaginal parity (3.1 vs 2.4), and use of diuretics (32% vs 26%), *P* < 0.05.
							Fluid loss (standardised pad test; mean change, g)	–20 vs –13% *P* = NS	
							Frequency/week (mean change)	Diurnal: –4 vs –6%, *P* = NS Nocturnal: –11% vs 0%, *P* = NS	
							QOL	IIQ: –25 vs –23 (–20 vs –19%), *P* = NS UDI: –12 vs –20 (–10.5 vs –16.5%), *P* = NS	
							Perception of improvement (5 pt ordinal scale)	Much or somewhat better 54% vs 45%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Jackson 1999[433]	DB RCT EL = 1+	67	Postmenopausal F (at least 1 year) mean age 63 years, genuine stress UI (mean 1 leakage episode/day and 1/night), not taken HRT in last 12 months Exclusions: breast, endometrial or liver cancer; endometrium > 4 mm thick	Estradiol valerate 2 mg/day (*n* = 33)	Placebo (*n* = 34)	6 months tx	BFLUTS	No sig. difference between grps in % reporting symptoms	Funding: MRC. Unit at which study based funded by educational grant from Pfizer. Progestogen not given in addition to estradiol, in order to maintain blinding of treatment. Norethisterone 5 mg for 12 days/month given if breakthrough bleeding occurred with estradiol. *baseline values 10 vs 3 g.
							SF-36	No sig. difference between grps in changes in scores	
							1 h pad test (mean change, g)	+3 vs +6 g (30% vs 200%)* *P* = NS	
							Frequency–volume chart parameters (change in median values/24 h)	Frequency: +1 vs –7% Nocturia: –10 vs +10% Mean voided vol.: +12 vs –1% Leaks/day: +0.4 (40%) vs 0 (*P* = NS for all comparisons)	
							Urodynamics (change in median values)	1st desire to void: +2% vs +9% Functional capacity: +11% vs +7% MUCP increased in both grp, *P* = NS between grps	
							Urodynamic cure	14% both grps	
Wilson 1987[434]	DB RCT EL = 1+	36 randomised, 34 analysed	Postmenopausal F mean age 57 years (47–72), genuine stress UI, and stable detrusor function, no HRT in past 3 months	Piperazine estrone sulphate, 3 mg at night (*n* = 16)	Placebo (*n* = 18)	3 months	Subjective assessment	Much improved 7 vs 5, improved 5 vs 5, no better 4 vs 8; *P* = NS	Funding: none declared.
							Frequency/24 h (mean change)	–16 vs –3%, *P* = NS	
							Urilos nappy test (change in mean, ml/2 h) (*n* = 22)	+1 ml (20%) vs –2 ml (40%)	
							MUCP (change in mean, cmH_2O)	–4 (7%) vs –3 (6%), *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse events	2 in oestrogen grp withdrew (1 palpitations and trembling, 1 posterior subendocardial infarct). 'other minor symptoms e.g. leg pain, breast discomfort, chest pain, nausea, were uncommon'	
Cardozo 1993[435]	DB RCT EL = 1–	64 randomised, 56 completed and analysed	Postmenopausal F, ambulant, mean age ~59 years, sensory or motor urge UI* (21 had stress UI, 48 urge UI) Exclusions: symptoms present for 3 months before the menopause, voiding difficulty, pelvic anatomical defect requiring surgery, neurological disease, recent oestrogen use, contraindications to oestrogen use	Estriol 3 mg/day (*n* = 34 randomised, 31 analysed)	Placebo (*n* = 30 randomised, 25 analysed)	3 months tx	Leakage episodes/day (change in mean)	Diurnal: –21 vs –59% Night: –81 vs –70%	Funding: none declared. *sensory urge UI: 1st desire to void at < 150 ml and cystometric capacity < 400 ml in the absence of detrusor activity); motor urge UI: uninhibited detrusor contractions > 15 cmH_2O. No between-group statistical comparisons reported. [EL = 1–] only completers analysed.
							Cure of UI	Stress UI: 6/11 vs 6/10 Urge UI: 11/25 vs 7/23	
							Frequency (change in mean/day)	Diurnal: –16 vs –32% (*P* < 0.05 vs baseline for both grps) Nocturia: –25 vs –46% (*P* < 0.05 vs baseline for plac grp)	
							Urgency	Change on severity scale of 0–3: –1.1 vs –1.1 Cure: 7/29 vs 9/25 (*P* < 0.05 vs baseline for both grps)	
							1st desire to void (change in mean)	Bladder volume at: +28 vs +24% Detrusor pressure at:: 0 vs +29%	
							Cystometric capacity (change in mean)	Bladder volume: +2 vs +13% Detrusor pressure: –19 vs +52%	
							Adverse effects	None	
Lose 2000[436]	RCT EL = 1+	251	Postmenopausal F (> 2 years), mean age 66 years, at least	Estradiol-releasing ring, 7.5 mg/24 h (*n* = 134)	Estriol pessaries 0.5 mg (1/day for 3 weeks, then every	6 months tx	Urgency	Responder rate 51% vs 56% Cure 27% vs 33%	Funding: none declared. Second author

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			1 bothersome lower urinary tract symptom. 23% had cystocele. 70% had urgency, 59% frequency, 52% urge UI, 50% stress UI, 50% nocturia, 19% dysuria Exclusions: oestrogen-dependent neoplasia, or breast, ovarian or endometrial cancer, undiagnosed vaginal bleeding, liver disease, porphyria, uterovaginal prolapse grade II or III, sex hormone tx in last 6 months		other day), *n* = 117		Frequency	Responder rate 61% vs 58% Cure 34% vs 44%	medical director of Pharmacia and Upjohn.
							Urge UI	Responder rate 58% vs 58% Cure 33% vs 34%	No sig. difference identified between grps in any outcome.
							Stress UI	Responder rate 53% vs 59% Cure 34% vs 41%	
							Nocturia	Responder rate 51% vs 54% Cure 31% vs 35%	Responder rate not defined; assumed to be ≥ 50% reduction in symptoms.
							Improvement of symptoms (VAS)	+21.1 mm vs +23.2 mm	
							Adverse effects	'most', including vaginal discomfort/discharge and breast pain were mild and transient 3.7 vs 2.6% withdrew owing to an adverse event	Not a blinded study.
Ouslander 2001[437]	RCT EL = 1–	32 randomised, 21 completed tx	F nursing home residents aged ≥ 65 years (mean 88), UI at least daily	Oestrogen 0.625 mg + medroxyprogesterone acetate 2.5 mg (*n* = 15 randomised, 9 completed)	Placebo (*n* = 17 randomised, 12 completed)	6 months tx	Wet rate (% checks wet during 3 days prompted voiding); change in mean	–10 vs –11%, *P* = NS	Funding: National Institute on Aging. Materials supplied by Wyeth-Ayerest. F also received prompted voiding when wet checks (primary outcome) were carried out
							Appropriate toileting rate (continent voids/total), change in mean	+20 vs +23%, *P* = NS	
							Incontinent volume (change in mean)	–1 vs –20%, *P* = NS	
							Bladder capacity (change in mean, ml)	–5 vs +4%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Adverse effects	Active tx grp: 2 vaginal spotting; ~10% breast tenderness	(3 days for 8 h). [EL = 1–] owing to high drop out rate. Not a blinded study
Rufford 2003[438]	DB RCT EL = 1+	40	F with 'urge syndrome' (29 urge UI, 17 stress UI), age not stated, postmenopausal (> 1 year) or estradiol < 150 pmol/l if had hysterectomy. 2 had colposuspension Exclusions: any medication for urge syndrome, diabetes mellitus or insipidus, diuretics, HRT within 3 months or hormone implant /IM hormone injection within 1 year, endometrial thickness > 4 mm in women with intact uterus, UTI, haematuria, pelvic masses or urogenital prolapse	17-beta estradiol subcutaneous implant (*n* = 20)	Placebo implant (*n* = 20)	6 months tx	Self-reported cure	35% vs 30% urge UI 20% vs 15% stress UI 15% vs 10% urgency	Funding: Organon. At final visit all women with intact uterus given norethisterone 5 mg/day for 2 weeks, repeated until no further vaginal bleeding. Number of women recruited did not reach the target set in the power calculation. No significant difference identified between groups for any outcome. *first sensation, maximum capacity, pressure rise on filling, volume pressure > 15 c mH_2O.
							Leakage episodes (median, IQR)	0 (0, 1.8) vs 0 (0, 0.5)	
							Frequency/24 h (median, IQR)	8.6 (6.5, 11.4) vs 8.0 (7.0, 9.8)	
							Volume voided (median ml, IQR)	177 (143, 209) vs 161 (107, 200)	
							Urodynamics* (at 3 months)	No between-group analysis	
							Adverse effects (*n*)	Estradiol; 9/12 women with intact uterus had irregular bleeding (5 requiring hysterectomy); 1 angina Other; UTI (8 vs 11), breast tenderness (4 vs 1)	
Simunic 2003[439]	DB RCT EL = 1+	1612	Postmenopausal F (> 1 year) with urogenital symptoms	17-beta estradiol intravaginal tablet (*n* = 828; 371 with	Placebo (*n* = 784; 315 with frequency/nocturia,	1 year tx	Frequency/nocturia prevalence (mean change)	–38% (*P* = 0.001 vs baseline) vs –10.1%	Funding: none declared. Treatment given

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			(28% had UI, 43% frequency/nocturia) Exclusions: oestrogen tx within 6 months, systemic disease or infection, suspected or proven malignant disease, unexplained uterine bleeding, hysterectomy or surgery for stress UI, acute urogynaecological infection	frequency/nocturia, 245 UI)	206 UI)		UI prevalence (mean change)	–17.8% (*P* = 0.002 vs baseline) vs –10.2%	daily for 2 weeks then twice a month for 12 months. Tx interrupted for 1 month every 4 months.
							Cystometry	Max. cystometric capacity, bladder volume at 1st or strong sensation to void sig. increased in estradiol grp (*P* ≤ 0.05 from baseline); no sig. change in plac grp	
							Adverse effects	Increased vaginal discharge 2.7 vs 0.4% vaginal bleeding 0.6% vs 0% erythema 0.8 vs 0.1% itching 0.5 vs 0.1% UTI 0.4 vs 0.1% labial oedema 0.3 vs 0.1% 'other' 2.4% vs 0%	
Walter 1978[440]	DB RCT EL = 1–	29	Postmenopausal F mean age 56 years (46–69), UI (21 frequency, urgency and urge UI, 29 stress UI), no detrusor hyperreflexia	Estradiol 2 mg + estriol 1 mg orally for 20 days, then 8 day break/cycle (*n* = 15)	Placebo (*n* = 14)	4 months tx	Change in frequency, urgency, urge UI	Cure 7/11 vs 1/10	Funding: none declared. [EL = 1–] No baseline data reported Aim of study was to evaluate effects of oestrogen on symptoms related to vaginal atrophy and urge UI /MUCP *baseline values not given
							MUCP (29 pts with stress UI)	Mean change (cmH_2O): +4.6 vs +0.17, *P* = NS*	
							Adverse effects	'no subjective adverse effects'	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Samsioe 1985[441]	DB RCT, cross-over EL = 1–	34	Postmenopausal F aged 77–78 years, (32% stress UI, 41% urge UI, 26% mixed)	Estriol 3 mg orally (*n* = 34)	Placebo (*n* = 34)	Unclear whether 3 or 6 months tx	Incontinence	Urge UI: two thirds reported symptoms alleviated Mixed UI: 6/8 reported symptoms 'ameliorated'	Funding: AB Leo supplied tablets. [EL = 1–] Duration of tx unclear (3 months or 2×3 months). Main aim of study was to evaluate effects of oestrogen on symptoms related to vaginal atrophy.
Molander 1990[442]	DB RCT EL = 1+	35	F with urogenital oestrogen deficiency syndrome including urinary frequency and dysuria	Estriol 3 mg/day for 4 weeks then 2 mg/day for 6 weeks (*n* = 18)	Placebo (*n* = 17)	10 weeks tx	Severity of urinary frequency on 4 point scale	No change from 2.5 in estriol grp; change from 2.4 to 2.3 in placebo grp	Funding: none declared. Main aim of study was to assess effects of tx on vaginal bacterial flora, cytology, and urogenital symptoms.
Eriksen 1992[443]	DB RCT EL = 1+	164 randomised, 154 completed and	F mean age 58 years (45–70) with atrophic vaginitis; 53% in estradiol grp and 41% placebo grp had	17-beta estradiol intravaginal tablet, 25 µg (*n* = 81 randomised, 75 analysed)	Placebo (*n* = 83 randomised, 79 analysed)	3 months tx	Improvement in urological symptoms (frequency, dysuria, urge or stress UI)	63% vs 32% $P < 0.001$	Funding: none declared. Daily dose given for 2 weeks then

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		analysed	urological symptoms Exclusions: history of cancer or thromboembolism, unexplained vaginal bleeding				Adverse effects	Estradiol (7 reports); local effects (alopecia, slight pain, rash, smell); aggravation of psoriasis, dizziness, GI pain Placebo (11 reports): local effects (itching, burning, eczema, discharge); palpitations, sweats, leg itching, weight gain (2), leg cramp, pain	2×/week. 10 withdrew: 6 estradiol, 4 placebo. Main aim of study was to evaluate effects of oestrogen on symptoms related to vaginal atrophy.
Grady 2001[444] (Analysis of data from HERS study[#])[445]	DB RCT EL = 1++	1,525 (55% of the HERS study population)	Postmenopausal F < 80 years with established coronary heart disease, not had a hysterectomy; included in the HERS study who had at least 1 episode incontinence weekly (23% stress UI, 51% mixed, 26% urge). 78% had ≥ 2 UI episodes/week, 23% had ≥ 7 episodes/week; mean 5.6 (SD 9.1)	Conjugated oestrogen 0.625 mg with medroxyprogesterone acetate 2.5 mg (*n* = 768)	Placebo (*n* = 757)	Mean duration of tx 4.1 years	% markedly improved or improved*	20.9% vs 26%, *P* = 0.001	Funding: Wyeth-Ayerst. [#]aim of HERS study was to determine whether oestrogen + progesterone alters the risk of coronary events in postmenopausal women with established coronary heart disease. *markedly improved: reduction of ≥ 5 UI episodes/week; improved: reduction of 2–4 UI
							% worsened or markedly worsened	38.8% vs 27%, *P* = 0.001 (OR for worsening by > 1 category 1.51 [95% CI 1.26 to 1.82])	
							Leakage episodes /week (change in mean)	+0.7 vs –0.1, *P* < 0.001	
							Frequency	'essentially unchanged'; no numerical data	
			Total HERS study population[445,945]	(*n* = 1380)	(*n* = 1383)	Mean duration of tx 4.1 years	Adverse effects	Confirmed venous thromboembolism: 6.3 vs 2.2 per 1000 woman/years (RH 2.89, 95% CI 1.50 to 5.58), *P* = 0.002	
								Gallbladder disease, 6 vs 4.4% (RH 1.38, 95% CI 1.00 to 1.92), *P* = 0.05	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
								No significant differences between grps in the risk of breast or endometrial or other cancer, or fracture	episodes/week; unchanged: no greater than change of 1 UI episode/week; worsened: increase of 2–4 UI episodes/week; markedly worsened: increase of ≥ 5 UI episodes/week. Compliance: ≥ 80% of study medication taken by 82% vs 88% at 1 year, and 69% vs 74% at 4 years. 6% vs 4% took tx for UI during the study, and 1.3 vs 0.9% had continence surgery.
Steinauer 2005[450]	As Grady[444]	1208	F from the HERS study who did not report UI at baseline (any episodes of stress or urge UI in the last week)	Conjugated oestrogen 0.625 mg with medroxyprogesterone acetate (*n* = 597)	Placebo (*n* = 611)	As Grady[444]	% pts reporting weekly UI episode at least once (Odds Ratio, 95% CI)	Any type of UI: 64% vs 49%, *P* ≤ 0.01 (OR 1.6, 95% CI 1.3 to 1.9) Urge UI: 48% vs 36%, *P* < 0.001 (OR 1.5 to 95% CI 1.2 to 1.8) Stress UI: 54% vs 38%, *P* < 0.001 (OR 1.7, 95% CI 1.5 to 2.1)	Funding: Wyeth-Ayerst. Women in placebo grp were on average 1 year older than HRT grp.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Hendrix 2005[446] (Analysis of data from the Women's Health Initiative [WHI] study#)[447,448]	DB RCT EL = 1++	23,296 who had baseline and 1 year UI data (85% of WHI study population)	Postmenopausal F aged 50–79 years. Across tx grps, 34.1–36.9% had no UI; 24–26.7% stress UI, 21.9–24.2% urge UI, 15–17.9% mixed UI, 0.2–0.5% UI only at night. Of those with UI, leakage episodes < 1/month 30.9%, ≥ 1/month but < 1/week 26.4%, ≥ 1/week but < 1 day 27.9%, daily 14.7% Exclusions: breast cancer, other invasive cancer in last 10 years, venous thromboembolism, hypertriglyceridaemia, severe menopausal symptoms at end of 3 month HRT washout period prior to start of study	Conjugated equine oestrogen (CEE) 0.625 mg + medroxyprogesterone acetate (MPA) 2.5 mg (*n* = 7247)	Placebo (*n* = 7056)	1 year tx and follow-up	Incident UI	Any: 11.5 vs 7.9%, RR 1.39 (95% CI 1.27 to 1.52) Stress UI: 5.9 vs 3.1%, RR 1.87 (95% CI 1.61 to 2.18) Mixed UI: 1.3 vs 0.1%, RR 1.49 (95% CI 1.10 to 2.01) Urge UI: 4.2 vs 3.9%, RR 1.15 (95% CI 0.99 to 1.34)	Funding: National Heart Lung and Blood Institute. Wyeth-Ayerst Research provided study medication. #aim of WHI study was to assess effects of HRT on coronary heart disease, and other risks and benefits. Those with an intact uterus randomised to CEE + MPA or placebo; those who had hysterectomy randomised to CEE or placebo. Both studies were stopped early; CEE+MPA vs placebo at a mean of 5.6 years owing to more harm than benefit, and CEE vs placebo study at mean 7.1 years owing to increased risk of stroke and no benefit for CHD.
							Worsening of prevalent UI RR (95% CI)	Quantity of leakage: 1.20 (1.06, 1.36) Leakage episodes 1.38 (1.28, 1.49) Limitations in daily activities related to UI 1.18 (1.06, 1.32) Bother factor 1.22 (1.13, 1.32)	
				Conjugated equine oestrogen (CEE) 0.625 mg (*n* = 4476)	Placebo (*n* = 4517)	1 year tx and follow-up	Incident UI	Any: 12.4 vs 8.1%, RR 1.53 (95% CI 1.37 to 1.71) Stress UI: 5.9 vs 2.9%, RR 2.15 (95% CI 1.77 to 2.62) Mixed UI: 1.7 vs 1.1%, RR 1.79 (95% CI 1.26 to 2.53) Urge UI: 4.7 vs 4.0%, RR 1.32 (95% CI 1.10 to 1.58)	
							Worsening of prevalent UI RR (95% CI)	Quantity of leakage: 1.59 (1.39, 1.82) Leakage episodes 1.47 (1.35, 1.61) Limitations in daily activities related to UI 1.29 (1.15, 1.45) Bother factor 1.50 (1.37, 1.65)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			Total population[447,448]	CEE + MPA (*n* = 8506)	Placebo (*n* = 8102)	Mean 5.2 years follow-up	Adverse effects (annualised %, i.e. events per 10,000 person years [hazard ratio, 95% CI])	CHD 0.37 vs 0.30 (HR 1.29, 95% CI 1.02 to 1.63) Stroke 0.29 vs 0.21 (HR 1.41, 95% CI 1.07 to 1.85) Venous thromboembolism 0.34 vs 0.16 (HR 2.11, 95% CI 1.58 to 2.82) Invasive breast cancer 0.38 vs 0.30 (HR 1.26, 95% CI 1.0 to 1.59)	Compliance at 1 year: ≥ 80% of study medication taken by 74% vs 81% in CEE+MPA vs placebo arm, and by 77.4 vs 81.4% in CEE vs placebo arm. % who stopped taking medication: 9.7 vs 6.6%, and 8.4% vs 8%. 3 year data published for 8.6% of the 23,296; not reproduced here. CHD = coronary heart disease.
				CEE (*n* = 5310)	Placebo (*n* = 5429)	Mean 6.8 years follow-up	Adverse effects	CHD 0.49 vs 0.54 (HR 0.91, 95% CI 0.75 to 1.12) Stroke 0.44 vs 0.32 (HR 1.39, 95% CI 1.10 to 1.77) Venous thromboembolism 0.28 vs 0.21 (HR 1.33, 95% CI 0.99 to 1.79) Invasive breast cancer 0.26 vs 0.33 (HR 0.77, 95% CI 0.59 to 1.01)	
Goldstein 2005[449]	RCT EL = 1+	619	F enrolled in a placebo-controlled study evaluating raloxifene and oestrogen for osteoporosis prevention in postmenopausal women F had prior hysterectomy, mean age 53 years. Prevalence of UI at baseline: 4% CEE grp, 3% raloxifene 60 mg, 3% raloxifene 150 mg, 6% placebo	Conjugated equine oestrogen 0.625 mg o.d. (*n* = 158)	Raloxifene 60 mg o.d. (*n* = 152) Raloxifene 150 mg o.d. (*n* = 157) Placebo (*n* = 152)	3 years	New or worsening UI	7 vs 0.7 vs 0.6 vs 1.3%, *P* < 0.02 for CEE grp vs others	Funding: Eli Lilly and Co. 60% of pts still taking study medication at 3 years. No difference between grps in reasons for discontinuing tx.
							% patients with improvement in existing UI (% of 4 vs 3 vs 3% vs 6%)	50 vs 100 vs 100% vs 89%	

Non-therapeutic interventions

Absorbent products

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Holtedahl 1998[454]	RCT EL = 1+	90 randomised, 87 analysed	F mean age ~60 years (50–74), ≥ 2 leakage episodes/month, objectively shown Exclusions: pacemaker, dementia, psychological medical problems	Immediate conservative tx* (*n* = 42)	Delayed conservative tx – pads and pants provided (*n* = 45)	6 months tx	Severity of UI (change on 1–8 ordinal scale)	6 months: –2.0 vs –0.1, *P* < 0.001	Funding: Norwegian Medical Association Fund, Odd Berg Medical Research Fund, Medicon A/S, Organon A/S, Coloplast A/S, SABA Molnlycke A/S, LIC Hygiene A/S. *consisted of pads and pants, estriol (depending on oestrogen status), PFMT (6 training sessions), bladder training (for urge or mixed UI), electrical stimulation (urge UI ~2 months, stress/mixed, overnight stimulation 4–6 months). Delayed grp: pads and pants for 6 months, then as immediate grp (results at 12 months, when both groups had conservative tx not reproduced in this table) #scale: 1 = slight, 2 = moderate, 3 = disturbing, 4 = incapacitating leakage.
							Impact of UI (change on 1–4, ordinal scale#)	6 months: –0.8 (95% CI –0.5, –1.1) vs 0 (95% CI –0.2 to 0.2), *P* < 0.001	
							Leakage episodes/day (*n* analysed = 63)	6 months: 0.3 vs 1.8, *P* < 0.001	
							Frequency/24 h	6 months: 6.5 vs 7.4, *P* = NS	
							% cured, improved, unchanged, worse	6 months: 22%, 39%, 28%, 11% vs 0, 9%, 61%, 30%	

Products to prevent leakage

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Sirls 2002[480] (ongoing study at time of this published	Case series EL = 3	150	F mean age 54 years (27–78), 52% stress UI, 48% mixed UI, 3 or more leakage episodes/week, urine loss 2 g or more on pad	FemSoft	–	Mean 15 months	Leakage episodes*	0.56/day with device vs 1.32/day without device	Funding: Rochester Medical Corporation. 51% withdrew in 1st year, reasons: 13 loss to follow-up, 15 unable to insert, 4 chose

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
report)			test Exclusions: urge UI, bladder capacity < 200 ml, PVR > 100 ml, neurogenic bladder, recurrent UTI, lower urinary tract malignancy or prior pelvic radiation, significant cystocele, other treatment for stress UI				Cure on pad test ('standardised' test; believed to be 1 h test)	93% vs 14%	surgery, 8 study demands, 8 adverse effects, 4 unrelated health reasons, 3 personal, 1 cure, 2 non-compliance, 3 unable to retain. *all comparisons with or without device, not vs baseline.
							Adverse effects	47% symptomatic UTI 10% insertion trauma 5% haematuria 3% spotting 5% cystoscopic bladder/urethral irritation or trauma 1.3% (*n* = 2) device migration (1 into bladder)	
Thyssen 1996[456] 1 year follow-up reported by Thyssen 1997[457]	Case series EL = 3	26 to 1 month 19 to 1 year	F mean age 49 years, stress UI. 5 had hysterectomy, 4 anterior vaginal repair. 5 receiving oestrogen therapy	Continence Guard	–	1 month; and 1 year of those who were improved/cured (*n* = 19)	Subjective assessment (of 22 completers)	At 1 month: 9 cure, 10 improved, 3 unchanged At 1 year: 13 cure, 5 improved, 1 unchanged	Funding: none declared. Device used during the day. 4 discontinued use in 1 month study; 2 owing to discomfort, 2 difficulties in placing the device. At 1 year, 11 used device every day, 8 used it 2–5×/week. 15 reported not feeling the device after a few days. All 19 women were followed up from month 1 to 1 year.
							24 h pad test	At 1 month: reduced leakage in all (information read from graph) At 1 year: reduced leakage in 18/19	
							Uroflowmetry and ultrasound	At 1 month and 1 year: No sig. change in peak flow rate, voided vol., PVR urine	
							Adverse effects	At 1 month: 'No significant'	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
								irritation or erosion on gynaecological examination. 1 (4%) 'slight voiding difficulties' with device in place 1 (4%) difficulties during defaecation 4 (15%) lost device when straining at stool. At 1 year: 2 (11%) 'slight voiding difficulties' with device in place 9 (47%) expulsion when straining at stool	
Thyssen 1999[458]	Case series EL = 3	38	F mean age 57 years, uninhibited bladder contractions on sitting cystometry, motor urge UI (37% mixed). 21 receiving oestrogen therapy; prior tx received: PFMT (15), electrical stimulation (13), drug tx (30), colposuspension (6), hysterectomy (9), anterior vaginal repair (3)	Continence Guard		1 month	Subjective assessment (of 30 completers) 24 h pad test Uroflowmetry and ultrasound Adverse effects	2 cure 15 improved 13 unchanged Mean change in leakage – 32%, *P* = 0.001 No sig. change in peak flow rate, corrected peak flow, PVR urine No sign of irritation on pelvic examination. 11% uncomplicated UTI	Funding: none declared. Device used during the day. 8 discontinued use; 4 local discomfort; 1 difficulties in placing the device; 1 device expulsion; 1 unsatisfactory effects.
Nilsson 2000[459]	Case series EL = 3	25	F mean age 56 years, urodynamic stress UI; failed tx with PFMT, in whom surgery not recommended (19 had prior continence surgery)	Continence Guard	–	3 weeks	Subjective assessment (19 completers) 24 h pad test Adverse effects	17 cure or improvement 16 cure No vaginal irritation on gynae examination No AE reported	Funding: none declared. Device used during the day. 6 discontinued use; 2 device did not stay in place, 1 discomfort; 1 difficulties in placing the device; 1 no symptom relief; 1 admitted to hospital for other reasons.
Thyssen 2001[462]	Cross-over RCT	94; 62 completed	F mean age 51 years, stress UI, no major uterovaginal prolapse.	Conveen continence guard	Controlle continence tampon	2×5 weeks	Subjective improvement	Cure: 36% vs 48%, *P* = NS Improvement 40% vs 36% no change 24% vs 16%	Funding: none declared. [EL = 1–] Only completers

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 1–		51% had received PFMT, 10% continence surgery, 31% hysterectomy				24 h pad test (mean change, g)	–53 vs –75%, *P* = 0.03	analysed. Ease of use also reported, and preferred device; 26% vs 63%.
							Uroflowmetry	no sig. change in peak flow, voided volume, residual urine	
							Adverse effects	minor voiding difficulties 14% vs 23% vaginal irritation 34% vs 26% device expulsion 8% vs 10%	
Mouritsen 2001[461]	Case series EL = 3	15	Women mean age 53 years, stress UI (mixed in 6/15), leakage > 8 g/24 h on home pad test	Conveen continence guard (1 of 2 models offered)	–	Not stated	Adverse effects	none	Funding: Coloplast A/S. Device used during the day.

Complementary therapies

Acupuncture – RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Zheng 1992[485]	RCT EL = 1–	60	F mean age 56 years (22–75), stress UI	Acupuncture, 30 sessions, every other day (*n* = 34)	Placebo (not described) (*n* = 26)	60 days tx; 10 pts from acupuncture grp followed up to 1 year	% reporting Improvement	88% vs 23%, *P* < 0.01 10 of 36 followed up to 1 year; 8 'still effective', 2 relapsed.	Funding: none declared. Acupoints used: Ren 6, Ren 4, St 28, UB23, UB29, UB35, UB39 if symptoms identified as owing to insufficiency of Kidney-Qi and dysfunction of urinary bladder; plus Sp6, Lu7, K3 if Insufficiency owing to Kidney-Yin and deficiency of ling and kidney-Qi. For deficiency of Kidney-Yin and decline of kidney-Yang, acupoints were: Moxibustion to Guanyuan and Qihai, and Du4. It is unclear from the report how many women were stimulated by which acupoints. Improvement: 'clinical' improvement and improvements in 1 or more of 5 urodynamic parameters.
							Urodynamic parameters	urethral max. pressure: +13 (cmH_2O) vs no change, *P* < 0.01 No sig. differences between grps in changes in urethral length	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Ellis 1990[483] Ellis 1993[484]	SB RCT EL = 1–	20	Elderly M/F* (aged 65–96 years), with problem of night urinary frequency on long-stay hospital wards *Two publications of this study identified; one stated 15 /20 were women, the other stated that 17 were women Exclusions: 200rethra200*n*200 within 1 month, UTI	Acupuncture (acupoints Sp 6, St36; needles left in situ for 20 min)	Placebo (mock TENS) for 20 min	2 weeks treatment	Nocturnal frequency (median change for h 9 pm to 7 am)*	–2 (95% CI –1.0, –3.0) vs 'no significant change'	Funding: none stated. *2 hospitals measured this in different ways: 1 monitoring device introduced into one-way incontinence pads, connected to a visual alarm checked hourly; other hospital toileted pts in usual way. 1 pt from each grp withdrew.
Emmons 2005[486]	SB RCT EL = 1–	85 randomised, 74 (87%) completed all aspects of study and analysed*	F median age 51 years (22–82) with symptoms of OAB and urge UI (> 8 voids per 24 h, urgency, and urge UI at least twice in a 3 day period) 18% had prior continence surgery Exclusions: if taking drug tx for OAB, or acupuncture for any condition; haematuria or UTI	Acupuncture (*n* = 44 randomised, 38 completed and analysed)	Placebo acupuncture (*n* = 41 randomised, 36 completed and analysed)	Tx given weekly for 4 weeks Assessment at 6–8 weeks	Leakage episodes/ 3 days, mean change	–59 vs –40%, *P* = NS	Funding: in part by Oregon Health Science Foundation. Physician who performed acupuncture not blind to randomisation code; assessment was blinded. [EL = 1–] only completers analysed. *3 withdrew owing to difficulty scheduling appointments; others had incomplete assessment data. Acupuncture: needles placed bilaterally at SP6 (inner legs), BL39 (outer knee fold), BL28 (low back), CV4 (low abdomen) and rotated clockwise until patient reported a sensation of warmth and tightening. The needles retained for 20 min without further stimulation. Placebo; same method as active tx grp but tx designed for relaxation; sites were GB31 (outer thigh), ST36 (outer legs), BL12 (upper back), and mid-line CV12 (epigastrium).
							Frequency/ 3 days, mean change	–14 vs –4%, *P* = 0.03	
							Urgency/ 3 days, mean change	–30 vs –3%, *P* = 0.016	
							Functional bladder capacity, mean change	+12 vs –2%, *P* = 0.01	
							UDI (mean score change)	–57 vs –32%, *P* = 0.05	
							IIQ (mean score change)	–52 vs –23%, *P* = 0.004	
							Adverse effects	23% bleeding or bruising from acupuncture 25% minor discomfort on needle displacement (none had discomfort beyond the time of tx)	

Acupuncture – case series

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Chang 1988[487] Chang 1993[488] follow-up study	Case series EL = 3	Investigate urodynamic effects of acupuncture	52 (21 in follow-up)	F mean age 35 years (17–52) with frequency, urgency and dysuria	Symptomatic cure or improvement[487]	*Sp6:* improvement in 22 of 26, cure in 17 of 22, no response in 4 (at mean follow-up 8 months, range 2–14). Relapse was seen in 6 women after 6–8 months *St-36:* improvement in 6	Funding: none declared. Acupoints used: Sp-6 in half the patients, St-36 in the other half; needles rotated until patients felt numbness around the point (single session). *undertaken 30 min after acupuncture.
					Urodynamics* [487]	*Sp6:* sig. increase in maximum cystometric capacity, and a sig. decrease in peak urinary flow rate *St-36:* No sig. changes	
					Long-term follow-up of 21 treated at Sp6 (mean 66.2 months, range 60–72)[488]	Acupunture repeated in all owing to recurrence of symptoms; mean no txs 4.8 (range 2–8) No significant changes in any urodynamic measurements at 1 or 3 years' follow-up Unstable detrusor (present in 8 at baseline) was evident in 7 at 1 year, and 8 at 2 years	
Philp 1988[489]	Case series EL = 3	Investigate the possible role of 201rethra201*n*201*n* in the treatment of DO	20 (17 F)	F with lower urinary tract symptoms associated with a diagnosis of bladder instability	Symptomatic improvement	10 of 13 patients with diurnal symptoms ('sig. improvement'); 0 of 3 with sensory urgency; of 3 with enuresis, 2 were unchanged, 1 dry at night, 1 completely dry	Funding: none declared. Acupuncture given at urinary bladder points 23 and 28 plus Du4, or points Ren 4 and 6 plus spleen 6 for 30 min once a week for 10–12 weeks.
					Urodynamic assessment (*n* = 16)	no consistent changes; instability was no longer evident in 1 patient who experienced no symptomatic improvement	
					Side effects	None	
Bergstrom 2000[491]	Case series EL = 3	Investigate whether acupuncture could: reduce subjective inconvenience of urgency, reduce leakage episodes, reduce nocturnal frequency; increased self-perceived QOL; maintain effects 3 months after tx	15	F mean age 76 years (66–82) who had urge (5) or mixed (11) incontinence who were not satisfactorily treated with PFMT, bladder training or drug treatment Exclusions: pts with other conditions or receiving	Urgency, leakage episodes, 48 h pad test results (at tx end)	all showed significant improvement after 6 weeks acupuncture (incomplete numerical data).	Funding: Dept RandD, South Stockholm Medical Area. Acupoints BL31–33, BL23, SP6, K13, L11 (3 sacral, 1 lumbar, 1 paravertebral, 1 lower legs, 1 near elbow) used. Needles left in situ for 25 min; 8–12 acupuncture sessions given over 6 weeks.
					Global impression (at 3 months)	8 reported they were much improved	

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		completed		other treatments that could influence urge to void	Side effects	none	

Hypnosis

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Freeman 1982[492] Freeman 1987[493]	Case series EL = 3	To investigate whether hypnosis is a useful treatment for UI caused by DO; and whether psychological factors are important in the aetiology of DO	50	F (age 17–74, mean age 44 years) with incontinence owing to proven bladder instability, who underwent 12 sessions of hypnotherapy over 1 month (and later continued at home using an audiocassette). Hypnotherapy involved symptom removal by direct suggestion and 'ego strengthening'	Self-reported improvement[492]	29 cured, 14 improved, 7 unchanged*	Funding: none declared. *7 patients relapsed between 2 months and 1 year; further treatment was given to 6, 5 of whom became symptom free.[492] Methods, definitions of cystometry conform to ICS recommendations.
					Cystometry at 3 months (n = 44)[492]	cure of instability in 22, improvement in 16, and no change in 6	
					Follow-up at 2 years (n = 30)[493]	Of 18 and 10 who were subjectively or objectively cured at 3 months, 9 and 3 remained cured	
Smith 1999[494]	Case series EL = 3	Part of a larger study to pilot brief individualised hypnotherapy for the unstable bladder	4 (3 women)	M/F with unstable bladder (DO); all pts had received tx by a continence nurse practitioner in the MRC Continence Care Study	Self-reported improvement	2 of the 3 women reported remission of symptoms at 6 months	Funding: none declared. Hypnotherapy involved 3×1 h sessions, including anxiety control methods, ego-strengthening, training in self-hypnosis, age progression, explanation of stable bladder function and 'hand-on-abdomen technique'.

Herbal medicines

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
Steels 2002[496]	Case series EL = 3	Investigate efficacy of a tablet preparation containing *Crataeva nurvala,* a herb used in traditional Hindu science of medicine, and equisetum (Horsetail) to treat urge and/or	8	F, symptoms of urge UI and/or stress UI 'on a regular basis'. One aged 20 years, others 54–65 years Exclusions: hysterectomy or prolapse repair within	UDI	Significant positive change to perceptions of frequency, leakage related to urgency or activity, and difficulty emptying the bladder	Funding: BioLogic Health Solutions.

Study	Study type and EL	Aim of study	No. of patients	Patient characteristics	Outcomes	Results	Additional comments
		stress UI for 12 weeks 2 tablets taken b.d. (≡ 12 g Crataeva and 6 g Equisetum/day)		12 months; serious health conditions; medications for UI in past month	IIQ	All parameters except physical recreation and household chores improved significantly	

Preventive use of conservative therapies

Behavioural therapy

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Diokno 2004[499] Associated reference Sampselle 2005[500]	RCT EL = 1–	480 randomised, 359 (75%) completed and analysed	Women 55–80 years (mean ~66), continent (no more than 1–5 days UI in past 12 months, and negative paper towel stress test), no tx for UI; MMSE score ≥ 24; able to contract PFM Exclusions: neurological disease, difficulties with activities of daily living, uterine prolapse beyond introitus	Behavioural modification program (*n* = 238; 164 completed)	No tx (*n* = 242; 195 completed)	12 months follow-up	Continence status*	Cure (0 episodes) 37% vs 28%, *P* = NS, OR 2.03 (95% CI 1.04 to 3.98, *P* = 0.04) Same/better: 56% vs 41%, *P* = 0.01 OR 1.97 (95% CI 1.15 to 3.38, *P* = 0.01)	Funding: none declared. Behavioural modification program: 2 h classroom presentation on education on anatomy and nervous control of lower urinary tract, healthy habits and self-care, voiding frequency, bladder capacity, bladder training and PFMT. Audiotape of PFMT provided, daily PFMT encouraged. Bladder training used if voiding interval < 3.5 h. Nurse follow-up 2–4 weeks after initial instruction. *at baseline 31% reported zero UI episodes, 69% reported 1–5 days of UI episodes over past year. PFM strength (pressure and displacement) assessed using digital test.
							Frequency/day, mean change	–1.2 vs +0.1, *P* < 0.0001	
							Intervoid interval, mean change	+33 vs +2 min, *P* < 0.0001	
							PFM pressure	Improved 33% vs 16%, *P* = 0.0008 no change 60% vs 70% decreased 7% vs 14%	
							PFM displacement	Improved 39% vs 8%, *P* < 0.0001 no change 52% vs 64% decreased 9% vs 28%	

Physical therapies during pregnancy

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Reilly 2002[501]	RCT EI = 1+	268 randomised, 230 analysed	Primigravidae with increased bladder neck mobility (> 5 mm on linear movement following standardised 204rethra204), approx 20 weeks gestation. Age 17–47 years Exclusions: pre-pregnancy UI, neurological disorder	PFMT (*n* = 139; 120 analysed)	Control (*n* = 129; 110 analysed)	Tx from 20 weeks to delivery; follow-up (all results) at 3 months post-partum	Stress UI	19.2 vs 32.7% RR 0.59 (95% CI 0.37 to 0.92)	Funding: none declared. PFMT: Met physio every month; 3×8 contractions 2×/day, increased to 3×12 from week 34 gestation; also instructed to contract PFM when coughing or sneezing. Those unable to follow protocol owing to inability to contract PFM had individualised programmes until able to follow study regimen. Control: routine antenatal care, likely to have received verbal advice on pelvic floor exercises. 51% reported doing PFM exercises. No significant difference between mode of delivery between grps. In total 101 (38%) withdrew from study before completion, mainly owing to time and travel to hospital, and dislike of perineometry or ultrasound.
							Positive 1 h pad test (*n* = 148)	9.5 vs 10.8% RR 0.87 (95% CI 0.35 to 2.23)	
							Bladder neck mobility (*n* = 166), difference in means, mm	–0.08 (95% CI –0.22 to 0.07)	
							PFM strength (perineometry); difference in means, cmH_2O	1.0 (95% CI –1.3 to 3.4)	
							QOL	No differences between grps in KHQ On SF-36, sig. higher score in PFMT grp in general health domain	
Sampselle 1998[502]	RCT EI = 1-	72 randomised, 46 completed study	Primigravid F ≥ 18 years (mean 27), at 20 weeks gestation. No history of genitourinary pathology. Not stated whether any had UI at baseline	PFMT (*n* = 34 randomised , *n* analysed unclear)	Control (*n* = 38 randomised, *n* analysed unclear)	Follow-up at 12 months post-partum	UI score on gentle /hard coughing, sneezing, and laughing (4 point scale; 0 no leakage, 1 dampness, 2 wetness, 3 soaking)	No numerical data per tx grp. No significant difference reported between grps. Mean scores ranged from 0.3 (SD 0.5) to 0.7 (SD 0.6) across all time points evaluated.	Funding: National Institutes of Health. All women paid $150 for participation. PFMT: tailored to individual's ability. Correct contraction checked. Recommended 30 contractions/day at max. or near maximum intensity. Control: routine care, no systematic PFMT programme. 20% reported exercising PFM. The 46 women with complete data had vaginal (*n* = 37) or caesarean delivery (*n* = 9). Between-grp comparison not reported.
							PFM strength (*n* = 16; women who had vaginal delivery and complete speculum data)	No numerical data per tx grp. No significant difference reported between grps. Mean scores ranged from 6.6 (SD 3.0) to 13.0 (SD 7.6) newtons across all time points evaluated.	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Morkved 2003[503]	RCT EI = 1++	301	Nulliparous F ≥ 18 years, at 18 weeks gestation, singleton pregnancy. 32% reported UI Exclusions: pregnancy complications, high risk for preterm labour, pain during PFM contractions, ongoing UTI	PFMT (n = 148)	Control (n = 153)	12 weeks tx (to 36 weeks pregnancy) follow-up 3 months post-partum	Self-reported UI (≥ 1 episode/week)	32% vs 38% (end of tx); RR 0.67 (95% CI 0.50 to 0.89), P = 0.007 20% vs 32% (3 months post-partum); RR 0.61 (95% CI 0.40 to 0.90), P = 0.018	Funding: The Norwegian Fund for Postgraduate Training in Physiotherapy; and Norwegian Women's Public Health Association. Women in both grps given individual instruction in pelvic floor anatomy and PFM contraction; and ability to contract PFM checked by vaginal palpation before randomisation. PFMT: 60 mins group (10–15) training with physio once/week; lying, sitting, standing, kneeling positions; breathing exercises and relaxation of abdominal, back and thigh muscles taught. Home PFMT encouraged: 8–12 contractions 2×/day. Control: 'usual' information from midwife or GP. 81% of PFMT grp followed training protocol. 30% PFMT vs 28% control reported PFM exercising at baseline. No significant difference between groups in the proportion of vaginal, forceps, vacuum, or caesarean deliveries.
							Leakage episodes per tx grp over 3 days	17% vs 31%, P = 0.014 (end of tx) 14% vs 24%, P = 0.049 (3 months post-partum)	
							PFM strength (vaginal squeeze pressure); mean, cmH_2O	39.9 vs 34.4, P = 0.008 (end of tx) 29.5 vs 25.6, P = 0.048 (3 months post-partum)	
							Adverse effects	None	
Hughes 2001[504]	RCT EI = 1+	1169	Nulliparous F mean age 28 years, 25% reported UI at baseline; 20 weeks gestation Exclusions: insulin dependent diabetes, neurological abnormality, previously investigated or treated urinary symptoms	Control (n = 586)	PFMT (n = 583)	Duration of intervention unclear, tx started between weeks 22 and 25 of gestation, and follow-up to 6 months post-partum*	Stress UI (prevalence and odds ratio)	Ante-natal (36 weeks): 66% vs 61%, OR 0.78 (0.59, 1.04) Post-natal: 38% vs 36%, OR 0.90 (95% CI 0.64 to 1.28)	Funding: none declared. BFLUTS questionnaire completed weeks 26 and 36 weeks gestation; and 3 and 6 months post-natally. Response rates to questionnaire: 84% at 26 weeks gestation, 76% at 36 weeks gestation, unclear at 3 months post-partum, and 68% at 6 months post-partum. Response rates to questionnaires tended to be higher in the control group. PFMT: physio-led class (max. n = 6)
							Urge UI	Ante-natal (36 weeks): 46% vs 45%, OR 0.93 (0.71, 1.23) Postnatal: 27% vs 30%, OR 1.04 (95% CI 0.72 to 1.52)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							'spontaneous incontinence'	Ante-natal (36 weeks): 25% vs 22%, OR 0.87 (0.63, 1.21) Post-natal: 8% vs 10%, OR 1.33 (95% CI 0.77 to 2.30)	between weeks 22 and 25 gestation. Also individual tx, with use of perineometer. Written instructions for home daily exercise, ante- and post-natal. Control: no formal instruction in PFMT. Vaginal palpation of PFM contraction (both grps). No sig. difference in mode of delivery of in severity of any perineal tears between groups. *all postnatal results correct for symptom antenatally.
							Leakage episodes ('occasions')	Ante-natal (36 weeks): 65% vs 64%, OR 0.97 (0.73, 1.29) Post-natal: 36% vs 37%, OR 1.00 (95% CI 0.72 to 1.41)	
							'amount of leakage ≥ drop'	Ante-natal (36 weeks): 69% vs 66%, OR 0.85 (0.63, 1.14) Post-natal: 40% vs 39%, OR 0.94 (95% CI 0.67 to 1.31)	
							Incontinence affects physical activity	Ante-natal (36 weeks): 24% vs 20%, OR 0.83 (0.56, 1.16) Post-natal 7% vs 8%, OR 1.20 (95% CI 0.66 to 2.18)	

Physical therapies after pregnancy

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Chiarelli 2002[506] Chiarelli 2004 (1 year follow-up)[510]	RCT EL = 1+	720 randomised, 676 (94%) followed up at 3 months, 569 (79%) at 12 months	F who had a forceps or ventouse delivery or had babies of ≥ 4 kg birthweight, recruited within 48 h of delivery. Number of pregnancies: 1	PFMT (*n* = 370 randomised, 348 followed up)	Usual care (*n* = 350 randomised, 328 followed up)	8 weeks intervention; telephone interview at 3 months post-partum	Prevalence of UI	31 vs 38.4% (difference 7.4%, 95% CI 0.22% to 14.5%, *P* = 0.044) adjusted OR 0.65 (95% CI 0.46 to 0.91, *P* = 0.01)	Funding: Medical Benefits Fund, Physiotherapy Foundation, and University of Newcastle Research Management Committee. PFMT grp: instruction from physio whilst in hospital and

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			(57%), 2 (29%), 3 (15%), ≥ 4 (6%) 17% reported UI before this pregnancy. Women with disability such that they would not be able to contract PFM were excluded				Adherence to PFM exercises (3×/week or more)	84% vs 58%, *P* = 0.001	at 8 weeks. PFMT: up to 5 contractions 3×/day, held for 3–6 s; individually tailored to functional ability of PFM. Also taught 'good bladder habits', advice not to drink caffeine, and to drink plenty of fluids; all contained in booklet designed for the study. Usual care: routine post-partum care; no visit from physio; supplied with information about general postpartum care and PFM exercises and invited to join routine physio post-natal class when in hospital.
				n = 294	*n* = 275	12 months post-partum	Prevalence of UI	34.4 vs 36.4% adjusted OR 0.94 (95% CI 0.64 to 1.37, *P* = NS)	
							Adherence to PFMT	daily 14% vs 11% several times/week 26% vs 21% ≤ weekly: 55% vs 38% none: 5% vs 30%	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Sleep 1987[507]	RCT EL = 1–	1800 randomised, results reported for 1609	F within 24 h of vaginal delivery. 32% of the intensive grp vs 29% standard reported UI during pregnancy. 49% primiparous	Intensive PFMT (*n* = 816)	Standard PFMT (*n* = 793)	4 weeks exercise diary in the intensive grp. Questionnaire follow-up at 3 months post-partum	Prevalence of UI	22% vs 22% < once/week: 13% vs 14% 1–2×/week: 7% vs 6% ≥ 3×/week: 1% vs 1% episodes not recorded: 1% both grps	Funding: Oxford Regional Health Authority. Both grps given initial instruction in PFMT during ante-natal care, reinforced by physios post-natally to grps of 2–4 women. In standard care grp, women given leaflet to take home, and reinforcement from community midwife. 'Intensive' grp individually instructed by midwife, given a diary detailing PFMT to be done every week, telephone reminder every week,; women checked PFM contraction by palpation at week 4. In both grps women were advised to repeat exercises daily as often as they could remember. 58% intensive vs 42% reported PFMT during the 3 months post-partum. [EL = 1–] No explanation of missing data for women not followed-up, or of potential differences between groups in number who performed PFMT during pregnancy (57% intensive vs 46% standard grp).
Meyer 2001[509]	RCT EL = 1–	107	Nulliparous F mean age 29 years (SD 4), enrolled from 2 months post-partum Exclusions:	PFMT, with biofeedback and electrical stimulation (*n* = 51)	Control (*n* = 56)	6 weeks intervention, follow-up at 10 months post-partum	Prevalence of stress UI at 10 months post-partum	12% vs 14%, *P* = NS	Funding: Swiss National Fund for Scientific Research. PFMT: 12 sessions of PFMT followed by 20 min biofeedback and 15 min electrical stimulation (vaginal

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			pregnancy complications, those beginning labour, history of urinary infections				PFMT strength, MUCP, pressure transmission values	No sig. differences between groups	electrode, biphasic stimulation, impulse width 200–400 μs, frequency 50 Hz, intensity 15–50 mA, 6/12 contraction/rest; using Compact-Elite 2.7 device). Control grp: no training. [EL = 1–] Treatment allocation in an 'alternating manner', not truly random. 31% PFMT vs 16% control had stress UI at baseline; implication of this on findings at 10 months not explored.
Morkved 1997[508] Morkved 2000[511] (1 year post-partum follow-up)	Cohort [EL = 2+]	198	F enrolled 8 weeks post-natally. ~41% had UI at baseline. Mean no. of deliveries 1.8 (range 1–5)	PFMT (*n* = 99)	Usual care (*n* = 99)	8 weeks intervention, follow up after further 8 weeks (= week 16 postpartum)	Stress UI prevalence at week 16 post-partum	Self-reported 14% vs 28%, *P* = 0.01 Shown on pad test 3% vs 13%, *P* = 0.009	Funding: Foundation for Education and Research in Physical Therapy and the Norwegian Board of Health. Women in the 2 grps matched for age, parity, type of delivery. PFMT: individual instruction in PFM anatomy and contraction. Grp (*n* = 5–10) training with physio for
							Pad test (g), week 16 post-partum	0.09 (SD 0.6) vs 1.3 (SD 4.5), *P* < 0.01	
							Leakage index (1–5, never-always)	No sig. difference between grps	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Social activity index (0–10, impossible-no problem in participation)	No sig. difference between grps	45 min 1×/week for 8 weeks. Home practice 8–12 contractions 2×/day. Usual care: provided with written post-partum instructions that included recommendation to exercise PFM daily. More women in the usual care grp undertook PFMT during pregnancy than in the PFMT grp (57% vs 35%) and (83% vs 65%), $P \geq 0.003$. During the active intervention period, 65% vs 99% undertook PFMT, $P << 0.00$.
		162 followed up to 1 year post-partum		PFMT (n = 81)	Usual care (n = 81)	1 year post-partum	PFM strength (mean change from week 16 to 1 year, cmH_2O)	+4.4 (95% CI 3.2 to 5.6) vs +1.7 (95% CI 0.8 to 2.7), $P < 0.001$	16% vs 31% of this grp reported stress UI at week 16. 53% vs 30% had continued to exercise PFM at least 3×/week after week 16 post-partum.
							Stress UI	Self-reported 17% vs 38%, $P = 0.003$ Shown on pad test 6% vs 17%, $P < 0.03$	
							Social activity index (0–10, impossible-no problem in participation)	No sig. difference between grps	

Surgical management

Procedures for overactive bladder

Sacral nerve stimulation – RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Weil 2000[514]	RCT EL = 1–	44 (91% F)	M/F median age 43 years (20–66) refractory urge UI, muscular and sensory responsiveness shown on peripheral nerve evaluation (as ≥ 50% improvement in at least 1 of 3 primary outcomes during PNE) Duration of urge UI median age 9 years (range 2–34) 45% had prior lower urinary tract or pelvic surgery 36% prior medication (most commonly antimuscarinics or antispasmodics): 50% had used ≥ 1 drug. Other unsuccessful txs: biofeedback, various external electrical stimulation, ISC, psychological counselling, denervation Exclusions: stress UI	Sacral nerve stimulation in S3 foramen* (*n* = 20)	Continued prior conservative management** (*n* = 23)	6 months tx	Leakage episodes/24 h	difference in means at 6 months: 88%, *P* < 0.0005 implant vs control	Funding: none declared. 123 pts had percutaneous sacral nerve test stimulation, hence 36% received implant. *PISCES Quad lead fixed to sacral periosteum bone, implantable pulse generator (ITREL II, Medtronic), implanted in lower abdominal pocket connected to lead by an extension. 1 in active tx grp withdrew after randomisation. **'oral medication' or pelvic floor exercises. #0 = dry, 1 few drops, 2 = 1–2 tablespoons, 3 complete wetting. Tx failures if (1) < 50% improvement vs baseline in 1 of 3 outcomes (leakage episodes, severity, pad usage); or (2) underwent removal of device. QOL measures also reported, but scale used not stated. Significant improvement in 2 of 10 domains (mean physical functioning, and standardised physical component of scale). [EL = 1–] No clear info on what control grp took, unclear whether all pts randomised analysed.
							Leakage severity#	difference in means: 24%, *P* < 0.047 vs control	
							Pad usage /24 h	difference in means: 90%, *P* < 0.0005 vs control % dry (no pads used): 56% vs 4%	
						Follow-up of all pts (after control grp crossed over to active tx, *n* = 43), median 18 months (6–36)	Treatment failure	9 (21%); 8 deterioration in outcomes, 1 device removal acturial failure rate at 36 months 32.4% (95% CI 17 to 56)	
							Adverse events (% reporting)	29% pain at implant site 17% lead migration 17% leg pain 5% leg stimulation 5% bowel function disturbance 2% urinary retention 2% vaginal cramps 2% anal pain 2% skin irritation at implant site	
							Surgical procedures to resolve adverse effects	8 revisions to correct lead migration 8 to ameliorate pain at implant site (3 in 1 pt in whom device removed)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Hassouna 2000[516] Siegel 2000[517] (up to 2 year follow-up)	RCT EL = 1–	51 (90% F)	M/F mean age 39 years (SD 12), refractory urinary urgency-frequency, all had failed prior treatment (94% prior drug tx); other procedures included hydrodistention and other surgical interventions Frequency 16/day; voided vol. 1693 ml/day Exclusions: neurological conditions, stress UI, primary pelvic pain	Sacral nerve stimulation group (*n* = 25)	Control group (*n* = 26)	6 months tx and follow-up	Frequency/day	9.3 ± 5.1 vs 15.7 ± 7.6, *P* < 0.0001 ≥ 50% reduction in 56% vs 4%	Funding: none declared; all authors declared financial interest and/or other relationship with Medtronic. InterStim* system. 51 pts underwent test stimulation; the 50% with > 50% improvement offered implant. [EL = 1–] Only bladder diary data given per randomised groups. Assumed all pts randomised followed-up to 6 months.
							Urodynamics	Mean voided vol. +92% vs –0.8%, *P* < 0.0001 Bladder vol. at 1st sensation of fullness +50% vs –12%, *P* = 0.01	
							SF36	Sig. improvement in active vs control grp in physical function, role physical, bodily pain, general health, vitality, social function, mental health	
				Sacral nerve stimulation (after 6 months controlled trial; where control grp offered implant)		Up to 2 year follow-up (*n* = 56 at 6 months, 46 at 12 months, 21 at 2 years)	Frequency (≥ 50% reduction, or within 4–7/day)	46% at 6 months 54% at 12 months 43% at 2 years	
							Volume voided (≥ 50% increase)	53% at 6 months 57% at 12 months 62% at 2 years	
							Adverse effects/ complications	See Schmidt 1999[515]	
Schmidt 1999[515] Siegel 2000[517]	RCT EL = 1–	98 randomised, 76 had data at 6 months (Female proportion not stated)	M/F urinary urge incontinence refractory to standard medical therapy, 100 ml capacity with normal upper urinary tract Of 155 who underwent PNE, 81% women; overall mean age 47 (20–79); prior tx: 99% drugs, 36% non-surgical, 57% surgical.	Sacral nerve stimulation (*n* = 34)	Control group (standard medical therapy for 6 months and then were offered implantation) (*n* = 42)	6 months tx and follow-up	Urge UI	Leakage episodes/day: 2.6 ± 5.1 vs 11.3 ± 5.9, *P* < 0.0001 Severity: 0.8 ± 0.9 vs 2.0 ± 0.6, *P* < 0.0001 Pad usage/day: 1.1 ± 2.0 vs 6.3 ± 3.6, *P* < 0.0001	Funding: Medtronic 16 centres. 155 pts underwent test stimulation; the 63% with > 50% improvement offered implant. [EL = 1–] Only completers analysed; no explanation for other pts. Only leakage data given per randomised pt grps; all other baseline data for 155 PNE pts
							QOL (SF-36, change in scores)	Physical health status mean score 46 vs 36, *P* = 0.0008 No sig. difference in mental health component	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			In randomised pts, baseline leakage episodes ~9, severity ranking (scale 1–3) 1.9, daily pad usage ~5–6 Exclusions: neurological conditions, stress UI, primary pelvic pain				Cystometry	Vol. at 1st sensation of fullness 222 vs 79 ml, *P* = 0.017 % with stable detrusor function 56% vs 16%, *P* = 0.014	only. *data from pts enrolled across 3 Sacral Nerve Stimulation Group trials (for urge UI, urgency-frequency, an retention).[516]
				Sacral nerve stimulation (after 6 months controlled trial; where control grp offered implant)		Up to 18 months (*n* = 58 at 6 months, 38 at 12 months, 21 at 18 months) 41 at 3 years[517]	Continence (% dry: % with ≥ 50% reduction in leakage episodes)	47%: 28% at 6 months 45%: 34% at 12 months 52%: 24% at 18 months 46%: 13% at 3 years	
							Pad usage (% none: % with ≥ 50% reduction in usage)	57%: 26% at 6 months 55%: 21% at 12 months 57%: 19% at 18 months	
							Adverse effects/ complications (*n* = 157)*	33% AE requiring surgical revisions (probability 29% at 6 months, 12% in 2nd 6 months) 16% pain at stimulator site 19% pain at implant site 9% lead migration 5% infection /skin irritation requiring device removal	

Sacral nerve stimulation – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Spinelli 2001[518]	Case series (Italian National Register) EL = 3	196 (93 in retro- and 103 in pro-spective)*	M/F Retrospective register*: 81% F mean age 51 years (17–79). Diagnosis 47% DO, 22% retention, 9% detrusor hyperreflexia, 5% urgency-frequency, 17% others	Sacral nerve stimulation	Retrospective register: mean 41 months (28–73, median 40) *n* = 61 (66%)	Leakage episodes	39% cured (dry) 23% < 1 episode/day 23% 1–3 episodes/day 15% > 3/day	Funding: none declared. *Italian register set up in Feb 1997 to collect national results on sacral neuromodulation; collected retrospective data up to 1998, then prospective subsequently Devices; Itrel II or IntermStim
						Frequency	42% frequency of < 8/day 42% 8–12/day 18% > 12/day	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			(pelvic pain, urethral instability, interstitial cystitis) Prospective register*: mean age 50 years (17–79). Diagnosis: 41% DO, 34% retention, 15% detrusor hyperreflexia, 5% urgency-frequency, 6% others			Complications	7% lead displacement 4% device removal (1 infection, 3 tx failure) 1% lead breakage	implanted after positive response to PNE.
					Prospective register: 12 months Results for DO grp (n = 42)	Leakage episodes	80% reduction from baseline 5.4/day (P < 0.001) 59% cured at 12 months	
						Frequency (% with < 8 voids/day)	75% at 3 months 84% at 6 months 64–71% 'between 6 and 9 months No results for 12 months	
						QOL (IQOL) (n = 41 with DO), change in mean scores	+125% at 3 months +143% at 6 months +110% at 12 months +123% at 18 months P < 0.001 vs baseline	
						Complications	10% surgical revision (4% lead fracture, 4% device removal, 2% lead repositioning) 4% pain at implant/connector site 2% haematoma/wound problem	
Everaert 2000[519]	Case series EL = 3	53 (85% women)	M/F mean age 43 years with 'tx-resistant' symptoms of urgency, urge UI, dysuria, urinary retention, and/or perineal pain Prior tx included colposuspension /sling in 8, hysterectomy in 9 72% had symptoms of dysuria and/or retention, 42% urgency and/or urge UI, 36% perineal pain UD diagnosis: hypo-/a-contractile detrusor in 23, dysfunctional voiding 13, DO 10, detrusor hyperreflexia 4	Sacral nerve stimulation in S3 foramen*	Min 12 months (mean 24 SD 8; range 13–49)	Objective response#	70% (n = 37; 27 cured, 10 improved)	Funding: none declared. *implanted with a quadripolar electrode (Medtronic Interstim, model 3886 in 6 pts, 3080 in 47), and a subcut pulse generator in the abdominal site. Initially 49 pts implanted with unilateral leads, 4 with bilateral). #≥ 50% reduction in leakage or frequency, (≥ 50% reduction in pain in pts with perineal pain, normalisation of PVR or reduction to < 50 ml in pts with dysuria/retention). device-related pain treated successfully by physio in 8/18 pts.
						Pt satisfaction	68%	
						Adverse effects	34% device-related pain 17% other causes of pain 11% current-related problems 8% disturbing toe flexion 6% diarrhoea 6% technical problems with device 4% lead migration(model 3886) 2% infection 2% operation-related problems 8% 'other'	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Grunewald 1999[520]	Case series EL = 3	43 (88% F) Results reported separately for pts with UI	M/F mean age 49 years (23–76) 42% idiopathic motor urge UI, 49% urinary retention owing to severe detrusor sphincter dyssenergia, 7% sensory urge UI, 2% (*n* = 1) mixed UI, refractory to conservative treatment	Sacral nerve stimulation in S3 or S4 foramen* ('usually' S3)	Mean 43.6 months (2–77)	Symptomatic clinical improvement of ≥ 50%	13/18 (72%) motor urge UI (7/13 cured) 18/21 (86%) urinary retention 2/3 (67%) sensory urge UI 0 mixed UI	Funding: none declared. 154 pts had percutaneous sacral nerve test stimulation, hence 28% received implant. *quad lead Medtronic device, connected to ITREL II Medtronic pulse generator, implanted subcut at the lower abdominal wall.
						Urodynamic parameters (motor urge UI grp)	Sig. increase at 6 months in mean voided vol., from 208 to 292 ml, (40%) *P* < 0.05	
						Adverse effects	30% complications requiring 'surgical revisions' (9% infections, 5% lead migrations, 7% pain at site of implant, 2% lead fracture, electrode insulating defect and skin erosion)	
Aboseif 2002[521]	Case series EL = 3	64 (54 women)	M/F mean age 47 years (22–76) with various forms of voiding dysfunction, refractory to other tx including behavioural therapy, PFMT with biofeedback, drug tx with 'various agents' 69% had frequency, urgency, or urge UI, 31% chronic retention requiring intermittent catheterisation – results reported separately for each grp	Sacral nerve stimulation in S3 foramen*	Mean 24 months (6–36)	Bladder diary (in population with UI/OAB *n* = 44), mean change/day	Leakage episodes –4.4 (69%), *P* < 0.05 vs baseline Frequency –9.3 (52%), *P* < 0.05 vs baseline Mean vol. voided +4 oz (91%)	Funding: none declared. 2 authors proctors for Medtronic Inc. 160 underwent PNE, those with > 50% objective cure (bladder diary) in voiding symptoms given permanent implant (40%). *Medtronic Interstim Sacral Nerve Implant. Device activated 1 week after implantation. Mean hospital stay 24 h.
						Satisfaction (in population with UI/OAB *n* = 44),	77% reported ' > 50% improvement in QOL'	
						Complications (all pts, *n* = 64)	Incidence 19% (*n* = 12): 'most common' seroma formation at pulse generator site 2 (3%) superficial wound infections 1 (2%) deep infection (req device removal) 3% lead migration (op repeated) 3% device malfunction (op repeated)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Amundsen 2002[527]	Case series EL = 3	12	F# with 'severe LUTS' (all had urge UI; 7/12 had DO) who had failed behavioural and drug tx Mean age of 25 undergoing test stimulation 69 years (55–78)	Sacral nerve stimulation in S3 foramen*	Mean 7.8 months (1–16)	Bladder diary (mean change vs baseline)	Leakage episodes/day: –5 (71%), *P* = NS Frequency/day: –4 (36%), *P* = NS Pad usage: –5 (71%), *P* = NS	Funding: none declared. 25 pts had percutaneous sacral nerve test stimulation, 48% had ≥ 50% improvement during the test phase. #inferred from baseline examination described (urogynaecological) – population referred to as 'patients' throughout. *Interstim device (Medtronic), implanted under GA.
						IIQ (mean change vs baseline)	–188 (75%), *P* = 0.03	
						Adverse effects	2 (17%) mild discomfort at device site, resolved at 3 months 5 (42%) reqd reprogramming (which improved symptoms)	
Bosch 2000[522] [Earlier publications of same population identified[946,947]	Case series EL = 3	45 (39 women)	M/F mean age 45 (16–65) years, urge UI owing to DO refractory to drug tx and bladder retraining. Bladder capacity 150 to 500 ml 5 (11%) F had neurogenic bladder Mean 1.3 prior continence operations. 56% F had undergone hysterectomy, and 62% colposuspension Exclusions: stress UI, untreated UTI	Sacral nerve stimulation in S3 foramen*	Mean 47 months (6–96) (100% at 1 year, 78% at 2 years, 69% 3, 58% 4, 51% 5)	Subjective cure†/ improvement	40% cure 20% partially successful (50–90% reduction in pad use and/or leakage) 40% tx failure	Funding: Fund for Developments in Medicine (Health Insurance Council of the Netherlands). 85 pts had percutaneous sacral nerve test stimulation, 54% had ≥ 50% improvement during the test phase. † > 90% improvement in pad use and/or leakage episodes. *quad lead Medtronic device, connected to pulse generator implanted subcut. Initial stimulation parameters pulse width 210 μs, freq 10 pulses/s, mean amplitude 2.6 (SD 0.2) Volts. Pt retained external magnet to switch generator on/off.
						Bladder diary (change from baseline to 6 months and 5 years)	Leakage episodes/24 h (median change): –5.8 (82%) and –6.4 (90%), *P* = 0.0001 Frequency/24 h (median change): –4.9 (37%) and –4.2 (32%), *P* = 0.0001 Mean voided vol. (mean change): +47 ml (36%), *P* = 0.0001, and +21 ml (16%), *P* = NS Pads used/24 h (median change): –4.2 (78%), and –4.1 (76%), *P* = 0.0001	
						Filling cystometry (standing) at 6 months, median change from baseline	Sig. change in: bladder capacity +28%, *P* = 0.03 Detrusor pressure at max. unstable contraction –55% (cmH_2O), *P* = 0.001	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Adverse effects	19 re-operations in 17 (38%) pts; 9 owing to electrode dislocation, 3 suboptimal positioning during initial procedure; 2 extension cable exchanges owing to fracture; 1 early device failure 2 pain at generator site, resolved after repositioning	
Cappellano 2001[523]	Case series EL = 3	113 (73% women)	M/F mean age 51 years (17–79), urge UI (56%), urgency/frequency (4%), voiding disturbance (36%), pelvic pain (4%), resistant to conservative treatment. Baseline leakage episodes 5.8 ± 4.2 per day 14% had neurogenic bladder	Sacral neuromodulation implant (no further details)	18 months (results for non–neurogenic bladder grp)	I-QOL (mean change in score from baseline)	+41.9 (122%) at 3 months +49.2 (143%) at 6 months, +40.5 (118%) at 9 months +38.3 (111%) at 12 months +49.4 (144%) at 18 months $P \leq 0.01$ for all changes	Funding: none declared. All pts had shown response in prior percutaneous sacral nerve test stimulation. I-QOL: 22 item domain specific; score 0–100 poor QOL to no impact.
						Leakage episodes (mean change from baseline)	–90% at 3 months –81% at 6 months, $P < 0.01$ –86% at 9 months –84% at 12 months, $P < 0.01$ –79% at 18 months	
Janknegt 2001[524]	Case series EL = 3	96 (89% women)	M/F aged 22–78 years, urge UI refractory to 'standard medical technologies' (no details of previous treatments). Mean 11 ± 6.5 leakage episodes/day, severity* 2 ± 0.6	Sacral neuromodulation implant in S3 or S4 foramen	Mean 30.8 months (12–60)	Leakage episodes/day (mean change)	–6.7 (61%), $P < 0.0001$	Funding: none declared. All pts underwent test stimulation those with ≥ 50% reduction in UI symptoms during test given implant (InterStim), quad leads. *severity on scale of 1–3; 1 mild/drops of urine, 2 moderate/several tablespoons, 3 heavy/soaked pad/outer clothing. Adverse effects/complications – not considered.
						Cure (dry) or improvement	26% cured 36% had ≥ 50% reduction in leakage episodes	
						Frequency /day (mean change)	–4.0 (30%), $P < 0.0001$	
						Severity* (mean change in score)	–0.3 (15%), $P < 0.0001$	
						Pad usage (n = 90), mean change	–4.2/day, $P < 0.0001$	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Volume voided (*n* = 85), mean change	Sig. increase in mean and max. voided vol.; no sig. change in total voided vol./day	
						Device removal	11% (9 for lack of efficacy, 1 chronic leg pain, 1 bowel dysfunction)	
Scheepens 2002[525]	Case series EL = 3	15 (13 F) 8 had retention (1 both UI and retention)	M/F mean age 53 years (44–66), urge UI or retention (no further details) Mean no leakage episodes/day 9, frequency 13, pad usage 5	Sacral neuromodulation implant in S3 foramen	Mean 4.9 years (median 5.2, range 2.5–7.5) *n* = 12	Bladder diary variables in UI pts (*n* unclear), mean change from baseline	Leakage/day –64%, *P* = NS Frequency/day –39% *P* = 0.05 Pad usage/day –80% *P* = 0.003 Max. voided vol. +267% *P* = 0.013	Funding: none declared. All pts underwent test stimulation (mean 2.1 per pt); 2 stage technique used for pts who failed initial PNE test but had good response in the acute phase of testing or the first 2–3 days of the subchronic phase.
						Adverse effects (*n* = 15)	7% each: abdominal pain, adverse bowel function 13% each: flank pain, pain at IPG 20% each: no effect, leg pain, perineal pain	
Shaker 1998[526]	Case series EL = 3	18 (16 F) 7 had retention	M/F mean age 42 years (22–67) refractory to all conservative treatments. Leakage episodes/24 h 6.49	Sacral neuromodulation implant in S3 foramen	18 months (*n* = 7)	Bladder diary variables (mean change from baseline)	Leakage episodes –80% Frequency –43% Volume voided +8%	Funding: none declared. All pts underwent test stimulation those with ≥ 50% reduction in UI symptoms during test given implant. Other than 18 month follow-up, 1 month results also reported.
						Complications (*n* = 18)	2 (11%) superficial wound dehiscence 11% cable erosion needing repositioning 11% pain at implant site with back pain	
Hedlund 2004[528]	Case series EL = 3	14 (12 F)	M/F mean age 47 years (33–73) with severe symptoms of OAB an urge UI 21% (of the 53 who underwent PNE had prior continence surgery)	Sacral neuromodulation implant in S3 foramen	Mean 18 months (9–32)	Subjective cure	8 of 11 (73%) 5 (45%) had > 50% improvement	Funding: none declared. 36% responded to PNE (19 of 53; implant given to 14). Medtronic quadripolar lead model 3080, pulse generator Medtronic Interstim Model 3031, pulse width 210 µs, freq 20 Hz, pulse rate 14, amplitude 0.5–3.5 V.
						Complications	1 had device removed 2 lead repositioning 1 seroma 2 occasional faecal incontinence	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Weil 1998[529]	Case series EL = 3	36 (27 F)	M/F median age 45 years (23–67). 66% urge UI, 17% urgency-frequency, 17% retention. 44% overall had perineal, hypogastric, or scrotal pain with their voiding complaints. 86% failed prior drug tx, 44% had prior lower urinary tract surgery	Sacral neuromodulation implant in S3 foramen	Mean 38 months (12–60)	'Success'	47% good (> 90% improvement) 8% partial (> 50% and < 90%) 11% no effect 33% device removed	Funding: none declared. 100 pts screened; therefore 36% had response to PNE. Urodynamic findings at 6 months reported for urge UI groups only – data not reproduced here. Medtronic electrode 3886 or 3080 used, and implant 7421 or 7422.
						Mean change in daily symptoms at 6 months	–36% frequency –76% leakage episodes –27% urgency +44% voided volume	
						Complications	66% had re-operation, 38% for lead problems 12% pain at implant site	
Latini 2006[513]	Case series EL = 3	41 (36 F)	M/F mean age 54 years (SD 16) with urge UI refractory to conservative therapy (ie, pharmacologic, behavioural, biofeedback therapy) The patients included those who received permanent one-staged or two-staged InterStim implants Exclusions: bladder outlet obstruction, neurologic disease, positive urine cytology or culture, prior bladder surgery	Sacral nerve stimulation	Median 12 months (IQR 12–27) for single-stage and 4.5 months (IQR 1.5–12) for staged implants*	Leakage episodes in pts with urge UI (mean change /day)	–74% (from 8.8 to 2.3 per day, $P = 0.0001$)	Funding: none declared. Retrospective evaluation of cases. Device = Surgical implantation of the InterStim was performed in patients who experienced a greater than 50% reduction in urge incontinence symptoms, (= 90% pts). *'test stimulation' consisted of percutaneous stimulation unless pt obese, in which case 2-stage permanent implant used (firstly permanent electrode implanted and connected to external stimulator; if successful in alleviating symptoms, it is then connected to a permanent stimulator implanted as a 2nd procedure). Implant undertaken 2000 to 2003; older version of electrode sutured to presacral fascia by way of an open approach used Jan 2000 to Sept 2002. More minimally invasive implantation procedure with the tined lead used Oct 02 to July 2003.
						Pad usage (mean change/day)	–83% (from 4.7 to 0.82 per day, $P < 0.0001$)	
						Adverse effects	No intra-operative complications 2 (4.9%) devices removed (1 infection, 1 owing to ongoing need for MRI) 3 reqd re-operation (7.3%); 2 displacement of implanted pulse generator, 1 malfunctioning device) 2.4% ($n = 1$) haematoma 2.4% pain at generator site 2.4% pain in pelvis 2.4% pain in gluteal incision 10% superficial incisional separation 15% superficial wound infection 4.9% cellulitis at pulse generator	

Augmentation cystoplasty

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Awad 1998[530]	Case series EL = 3	51	F mean age 44 years (18–69), idiopathic urge UI, symptom duration 3.3 (2–6.5) years. 27 (53%) also had evidence of interstitial cystitis on cystocopy Other symptoms: 88% frequency, 63% nocturia, 47% stress UI, 41% suprapubic pain Previous tx: 100% drugs, 63% bladder dilatation, 53% DMSO, 47% urethrovesical suspension, 45% sacral nerve block UD findings: 69% DO, 57% capacity < 200 ml	Augmentation ileocystoplasty, with Burch in pts with anatomical evidence of stress UI (47%)*	Mean 63.4 months (range 24–97)	Continence status	53% continent 25% occasional leaks 18% incontinent (regular pad use) Of 45 who still had patch, 33% required CISC regularly (2–3×/day) and 11% occasionally	Funding: none declared. *positive Marshall test and bladder neck hypermobility.
						Patient satisfaction	53% satisfied 39% not satisfied 8% unsure	
						Additional or further therapy	24% antimuscarinics 6% fascial sling suspension 4% patch revision 8% patch removed owing to persistent UTI and high residual vol. 4% ileal conduit	
						Adverse effects	49% recurrent UTI 20% 'frequent' mucus retention, usually relieved with CISC 8% partial bowel obstruction 12% chronic diarrhoea 2% (*n* = 1) incisional hernia 2% bladder calculus 2% augmentation necrosis with perforation and secondary peritonitis 'caused by neglect during CISC'	
Hasan 1995[531] UK study	Case series EL = 3	48 (31 [65%] F)	M/F mean age 46 years (21–87) Symptoms: 100% frequency, 98% urgency, 65% urge UI, 56% enuresis Diagnosis: 35 idiopathic DO (all failed prior conservative treatment with no benefit or intolerable side effects): 13 neurogenic DO Prior procedures: 37 bladder distention, 5	Clam enterocystoplasty (with colposuspension in 7 with idiopathic DO)	Mean 38 ± 18 months (13–78)	Symptoms	% with improved symptoms at 3 months: 92% improved frequency 90% improved nocturia 89% improved enuresis At > 12 months (*n* = 46): as 3 months results except sig. increase in nocturia (No numerical data)	Funding: none declared. Ileal segment used in 46 pts, and sigmoid colon in 2. Trial CISC performed before deciding on procedure. Visick grading (excellent to worse after op) also quoted, and Nottingham Health Profile.
						Urinary symptom scores (max. 14 points)	Change from 10 ± 3 (2–14) pre-op to 3 ± 4 (2–14) at 3 months, *P* < 0.001	
						Urodynamics (*n* = 45), at 3 months	Sig. increase in total bladder capacity and compliance 31% had DO post-op	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			sub-trigonal injection			Complications	Early (< 30 days): 15% UTI 10% emergency readmission (cause not stated) 6% chest infection 4% blood transfusion > 2 units 2% septicaemia Late (1–12 months): 8% recurrent UTI 2% each: anastomotic perforation, calculus formation, urethral stricture > 12 months: 6% incisional hernia 37% recurrent UTI (requiring frequent antibiotic tx) 15% UTI requiring long-term antibiotic tx Others (timescale not stated): 22% increased bowel frequency 17% faecal incontinence 11% diarrhoea 4% constipation 11% problems with CISC (no details)	
Mundy 1985[532] UK study	Case series EL = 3	40 (22 [55%] F)	M/F mean age 28 years (6–57). 88% had urgency/urge UI, 12% totally wet 63% no evidence of neuropathy; 20% overt neuropathy, 13% suspected neuropathy, 5% other diagnosis	Clam enterocystoplasty (with other procedure in 13 [33%]; 5 AUS, 4 unidiversion, 2 bladder neck incision, 1 colposuspension, 1 change in AUS balloon pressure)	Mean 12 months (3–39)	Continence	90% cured (of which 83% spontaneously voiding, 17% using CISC) 10% had stress UI	Funding: none declared. Some urodynamic parameters reported for 31 pts; in terms of 'normality' (not defined), presence or absence.
						Complications	18% voiding dysfunction 5% recurrent UTI 3% (*n* = 1) AUS problems 3% mucus plug retention 3% small bowel perforation 3% persistent urine leak	
Kockelbergh 1991[533] UK study	Case series EL = 3	45 (31 [69%] F)	M/F median age 45 years (19–79), duration of symptoms 8.2 years; all had urgency and frequency, and 87% had UI. 98% previously treated with a variety of	Clam enterocystoplasty	Mean follow-up 20.3 ± 12.4 months (Min 5)	Symptoms (% with pre/post-op)	93/24% urgency 89/22 urge UI 89/31 any incontinence *P* < 0.001 for all pre- to post-op changes	Funding: none declared. Clam procedure in coronal plane in 42%, and in sagittal plane in 58%.
						Subjective improvement	53% cured or much better 18% improved 27% no better or worse 2% (*n* = 1) died	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			anticholinergics drugs; 80% also had other procedures: phenol, Helmstein, transection; Diagnosis: 42 (93%) idiopathic, 7% neurogenic			Urodynamics	No sig. change in any parameter (bladder capacity, residual vol., filling/voiding pressure, flow rate)	
						Complications	4% early failures (1 small bowel obstruction, 1 peritonitis) 4% each: incisional hernia, urethral stricture 22% voiding 'strain' (77% of whom did ISC) 51% recurrent UTI 100% mucus in urine (51% required bladder washout/carbocysteine)	
Edlund 2001[535]	Case series EL = 3	30 (26 F)	M/F mean age 50 (21–71) with urge UI and OAB refractory to conservative measures	Clam enterocystoplasty (with colposuspension in 8 pts)	Mean 60 months (4–127)	Satisfaction	78% (17 of 23 who completed questionnaire)	Funding: grants from Ferring/Swedish Enuresis Academy and other research foundations. Urodynamics also reported (increase in cystometric capacity and reduction in max. detrusor pressure during filling).
						Complications	2 reoperation owing to failure (1 resection, 1 AUS) 39% used CISC 25% increased bowel frequency 17% received vit B12 substitution for low levels 58% 'sporadic' UTI 3% (*n* = 1) recurrent UTI requiring long-term antibiotic therapy	
Greenwell 2001[536]	Case series/ narrative review EL = 3	See comments column	No details of patients or indications	Entero-cystoplasty	Minimum 5 years (5–17)	Complications in own series (ranges for others in literature)*	Short-term: 0.75% bleed (0.6 to 6.7%; 3 studies) 1.5% infection (2.1 to 9%; 11 studies) 0.4% fistula (0 to 29.7%; 10 studies) 1.9% small intestine obstruction (1.5 to 8.7%; 14 studies) 1.1% PE/DVT (2.1 to 7.1%; 5 studies) 0 MI (1.1 to 2.7%; 3 studies) 0 patch necrosis (0 to 1.7%; 3 studies) 0 death (0 to 3.2%; 10 studies) Long-term: 38% CISC (14 to 100%; 20 studies) 16% metabolic disturbance (0 to 19%; 10 studies) 2% renal function deterioration (0 to 56%; 13 studies) 75% asymptomatic UTI (6 to 100%; 10 studies) 20% symptomatic UTI (2 to 43%; 16 studies) 13% stones (0 to 30%; 14 studies) 0.75% bladder perforation (0 to 9%; 11 studies) NR bowel change (0 to 64; 7 studies)	Funding: none declared. *data presented from another 23 series, ranging in size from 8 to 157, total 1083, median 34.

Urinary diversion

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Singh 1997[537] UK study	Case series EL = 3	93 (63% F)	M/F mean age 50 (8–78) years who underwent ileal conduit urinary diversion 76% had neurological disease, 24% unmanageable UI or intractable symptoms of interstitial cystitis	ileal conduit urinary diversion	Minimum 2 years (mean 5)	Complications	52% vesical infection and pyocystis; reqd hospitalisation in 48% for bladder irrigation. 5/48 had vesico-vaginal fistula None had carcinoma in residual bladder 31% stoma problems, most minor (skin reactions, infections). None reqd physician intervention 11% parastomal hernia requiring surgery 33% upper tract dilatation (44% vs 27% of pts with > 5 vs < 5 years follow-up)	Funding: none declared. Retrospective review of case notes (1 surgeon's patients).
Cox 1987[538]	Case series EL = 3	18	F mean age 54 (38–63) stress UI (3 also had bladder instability)	Ileal loop diversion	Minimum 1 year	Complications (*n*)	Complications related to dysfunctional bladder: 10 vaginal discharge 3 pyocystits [8 reqd vesicovaginal fistula 12–18 months (mean 18) after 1st procedure: all eventually underwent cystectomy] 8 underwent total of 14 revision operations on loops/stomas (3 for obstruction, 2 each: peristomal hernia, persistent excoriation, persistent leakage, stoma too long, self-inflicted stoma damage, 1 stomal stenosis 1 septicaemia 1 stomatitis (later had uterosigmoidostomy)	Funding: none declared. Retrospective review of case notes (1 surgeon's patients).

Detrusor myectomy

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Kumar 2005[540] Swami 1998[539] 1 year follow-up	Case series EL = 3	30 (20 women) (*n* = 27 in initial follow-up, gender not stated)	M/F consecutive cases; OAB symptoms refractory to anticholinergics tx; detrusor myectomy offered as alternative to enterocystoplasty 24 (18 F) idiopathic DO, 6 (2F) neurogenic DO	Detrusor myectomy	Mean 27 months (12–42) [539]	Subjective improvement	7 (26%) cured 10 (37%) improved 7 (26%) no change (12/17 with IDO cured/improved vs 5/10 with neurogenic DO)	Funding: none declared. Authors declared no conflict of interest. Improved = reduction in no. of urgency and/or urge UI episodes.
					Median 79 months (28–142)[540]	Subjective improvement	Subjective 'continued improvement' in 21 (19 IDO) No DO on UD in 14/17	
						Urodynamics	Sig. increase in bladder capacity in 24, mean +165 ml, $P < 0.001$ No sig. change in detrusor pressure or bladder contractility index	
						Complications	1 bowel perforation 10 CISC after surgery (7 owing to UTI, 2 persisting symptoms, 1 large PVR) 3 with IDO had further procedures (2 ileal conduit owing to persistent IDO, 1 colposuspension for stress UI)	

Botulinum toxin – RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Ghei 2005[548]	DB RCT EL = 1+	20 (17 F)	M/F mean age 50 (SD 12), range 18–80 years, refractory DO (3 neurogenic, 17 idiopathic). Median weekly leakage episodes 19; frequency 67.5 Exclusions: bladder/ prostate malignancy, prior bladder surgery, active UTI, major urethral access problems	Botulinum toxin type B 5000 IU diluted up to 20 ml with 0.9% saline	Placebo (20 ml 0.9% saline)	12 weeks tx (2×6 weeks tx, with no washout)	Mean voided vol. (change in median)*	+83 ml (95% CI 6.1 to 132.4) vs +4.48 ml (95% CI –4.05 to +43.43) Median difference +65 ml (95% CI +11 to +121), *P* = 0.012	Funding: none (not manufacturer). Drugs prepared by hospital pharmacy; prepared for administration by nurse, hence pt and surgeon blinded to tx. Injections into detrusor at 10 different sites by same surgeon; pts recruited April 2003 to Aug 2004. *all paired differences in changes.
							Frequency/week (change in median)*	–22.5 (95% CI –32.76 to –10.41) vs –14 (95% CI –20.29 to –5.23) Median difference –9 (95% CI –19.5 to –0.5), *P* = 0.033	
							Leakage episodes/week (change in median)*	–17 (95% CI –40 to –7.7) vs –8.5 (95% CI –16.5 to –2.0) Median difference –12 (95% CI –24 to –5), *P* = 0.001	
							KHQ	Significant improvements in 5 of 9 domains (impact on life, incontinence impact, physical/social limitations, sleep/energy disturbance, incontinence severity measures)	
							Adverse effects	10% (*n* = 2) retention (resolved after 6 weeks ISC) 10% constipation 10% dry mouth	

Botulinum toxin – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Flynn 2004[545]	Case series EL = 3	7	F median age 59 947–82), urge UI failed physical and behavioural therapy and tx with ≥ 1 antimuscarinic drug; 24 h pad weight > 100 g Exclusions: correctable or neurogenic cause for UI	Botulinum toxin type A 150 units in 0.9% saline	6 months	Leakage episodes/24 h (mean change, [95% CI])	–61% (–35, –88) at 6 weeks, *P* = 0.0013 –64% (–42, –92) at 3 months, *P* = 0.0006 –12% (+59, –83) at 6 months, *P* = NS	Funding: none declared. Botulinum inj. into 10–12 sites of posterior bladder wall (total 3 ml).
						Frequency/24 h (mean change)	No sig. change at any time point	
						QOL (UDI-6, IIQ-7), mean change in score (95% CI)	UDI-6: –53% (–26, –80) at 6 weeks, *P* = 0.003 –46% (–22, –70) at 3 months, *P* = 0.0034 –35% (–1, –70) at 6 months, *P* = 0.045 IIQ-7: –64% (–24, –100) at 6 weeks, *P* = 0.0077 –77% (–46, –100) at 3 months, *P* = 0.001 –48% (+23, –99) at 6 months, *P* = NS	
						24 h pad test (mean change, g, [95% CI])	–90% (–76, –100) at 6 weeks, *P* < 0.0001 –50% (+42, –100) at 3 months, *P* = NS +184% (+600, –100) at 6 months, *P* = NS	
						Urodynamics (6 weeks and 3 months)	No sig. change in voiding function (pressure flow studies) or mean cystometric capacity	
						Adverse effects	none	
Werner 2005[546]	Case series EL = 3	26	F mean age 66 (48–84 years), urge UI and DO, failed to respond to various antimuscarinics Exclusions: neurogenic hyperreflexia	Botulinum toxin type A 100 units in 0.9% saline, under GA or spinal anaesthesia	3 months (*n* = 20)	Frequency (mean change)	Day frequency –4.5 (38%) Nocturia –1.4 (54%)	Funding: none declared. Conducted in tertiary referral unit. 1 ml injected at 30 locations covering inner surface of bladder. Follow-up to 9 months also reported but only in 5 pts – not reproduced here. 2 pts re-injected 5–10 months after initial inj.
						Cure of leakage	80% subjective 65% objective (no detrusor contraction associated with leakage)	
						Urodynamics	Sig. increase in max. cystometric capacity; compliance, volumes at first and strong desire to void	
						KHQ	Sig. difference in all items (improvement of ≥ 1 category)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Adverse effects	2 had PVR 130–230 ml after 4 weeks, resolved with self-catheterisation for 1 week 31% UTI (during follow-up period)	
Rapp 2004[541]	Case series EL = 3	35 (29 women)	M/F mean age 66 years (41–93), with refractory symptoms of frequency, urgency, and/or urge UI, failed tx with anticholinergics (min 4 weeks without improvement). Mean duration of symptoms 3.7 years 6 had neurogenic UI Exclusions: bladder cancer, retention, surgical bladder reconstruction, history of interstitial cystitis	Botulinum toxin type A* 300 units inj. into 30 detrusor intramural sites	3 weeks	QOL (IIQ-7, UDI-6), score change vs baseline	IIQ-7: –5.5, $P = 0.0006$ UDI-6: –4.0, $P = 0.0003$	Funding: none declared. *given under IV sedation as outpatient procedure, using cystoscope.
						Subjective cure/ improvement	34% cure 26% slight improvement 40% no improvement	
						Adverse effects	7 mild haematuria, pelvic pain, dysuria (all resolved within 3 days of inj.)	
					6 months ($n = 24$, [3-week responders])	QOL (IIQ-7, UDI-6), score change vs baseline at 3 weeks and 6 months	IIQ-7: –9.8 and –5.5, ($P = 0.008$ 6 month values vs baseline) UDI-6: –6.2 and –3.4, ($P = 0.002$ 6 month values vs baseline)	
Kuo 2005[542]	Case series EL = 3	20 (7 women)	M/F mean age 62 years (35–83), idiopathic DO refractory to anticholinergics Exclusions: PVR > 150 ml	Botulinum toxin type A 200 units into 40 suburothelial (posterior and lateral bladder wall) sites*	12 months	Subjective cure/ improvement	3 months ($n = 20$): 9 cure 8 improved 3 no improvement In women: 4 cured, 2 improved 6 months ($n = 20$): 7 remained cured 8 improved 5 no improvement 12 months: 4 remained cured	Funding: none declared. *under IV GA, using cystoscope. #all pts in study given 7 days antibiotics after procedure.
						Urodynamics	Sig. increase in vol. at 1st sensation, bladder capacity, PVR, $P \leq 0.001$ Sig. reduction in detrusor pressure, $P = 0.022$ No sig. change in max. flow rate or bladder neck opening time	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Complications	Within 2 weeks: 1 haematuria 6 transient retention 10 PVR > 250 ml 7 UTI (all had PVR > 100 ml)# 'during follow-up': 15 difficulty urinating and residual urine sensation	
Rajkumar 2005[547]	Case series EL = 3	15	F mean age 44 years (20–61), with UD confirmed idiopathic DO, not responded to conservative measures. None had prior major urinary bladder surgery Exclusions: stress-predominant incontinence	Botulinum toxin A, single dose of 300 units	At 6 weeks, and every 4 weeks until baseline values reached	Frequency	No numerical data: reported to be reduced in 14 pts; symptoms returned to baseline in 13 pts with follow-up at 9 months (mean 24 weeks, range 10–52)	Funding: none declared. Drug injected intravesically into 30 sites into detrusor muscle under cystoscopic control, in 30 ml saline. The volume at first desire to void increased in 13 patients ($P < 0.006$), the max. cystometric capacity increased in 10 ($P < 0.011$) and six of the 15 had no evidence of detrusor overactivity; in the remaining eight the volume at first overactive contraction increased in six ($P < 0.0023$) and the volume at first overactivity incontinence increased in 11 ($P < 0.005$). The median modified projected isovolumetric pressure decreased significantly ($P = 0.01$), from 69 to 45.
						Leakage episodes	No numerical data	
						Urodynamics (cystometry) at 6 weeks	Max. cystometric capacity increased in 10 pts; first desire to void increased in 12 DO eliminated in 6	
						QOL (BFLUTS, KHQ)	Improved in all patients (no numerical data)	
						Adverse effects	no 'major adverse effects'	
Schulte-Baukloh 2005[543]	Case series EL = 3	44 (41 [93%] women)	F mean age 66 years (30–91) with idiopathic OAB refractory to several anticholinergics and behavioural or neuromodulating therapy	Botulinum toxin type A 200–300 units inj. into 40–50 sites all over detrusor muscle (and 4 quadrant inj. into sphincter muscle in	9 months	Frequency (mean change vs baseline)	–12% at 1 month, $P < 0.05$ –16% at 3 months, $P < 0.05$ –13% at 6 months, P = NS –9% at 9 months, P = NS	Funding: none declared. *by cystoscope, under spinal, general or local anaesthetic; diluted in 20 ml normal saline.
						Maximum voided volume (mean change vs baseline)	+14% at 1 month, $P < 0.05$ +19% at 3 months, $P < 0.05$ +25% at 6 months, P = NS –3% at 9 months, P = NS	
						Volume at strong desire to void (mean change vs baseline)	+56% at 1 month, $P < 0.05$ +37% at 3 months, $P < 0.05$ +55% at 6 months, $P P < 0.05$ –8% at 9 months, P = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
				22)*		QOL (UDI-6, SSI, SII, mean change in scores)	Scores fell at 1 month (16 to 43%), then increased back to baseline values at 9 months	
						Subjective response (no definition)	86%	
						Adverse effects	none	
Dykstra 2003[549]	Case series EL = 3	15	F mean age 57 years (48–75) with frequency (≥ 8/day), with or without UI, recruited from Urogynae clinic Exclusions: stress UI, other concomitant tx for OAB, total daily urine vol. > 3 litre, botulinum toxin inj. in past 4 months	Botulinum toxin type B 2500 units (*n* = 5), 3750 units (4), 5000 units (2), 10,000 units (2), 15,000 units (3)*	Duration of response (max. 98 days [14 weeks])	Frequency (mean change/day)	–5.3 (SE 0.5), *P* < 0.001 vs baseline no response in 1 pt	Funding: Elan Pharmaceuticals Inc supplied product. BTX injections given following instillation of 50 ml lignocaine 1%. BTX administered using 23 gauge needle into bladder wall at 10 different sites using a cystoscope, avoiding bladder trigone. BTX drawn up into 6 ml syringe and diluted with 3.5 ml saline (first 3 pts) or preservative free lignocaine (subsequent pts) to total vol. 4 ml. 3 days ciprofloxacin given as prophylaxis against infection. 1 pt did not respond to 2500 and was given 5000 units.
						Duration of response (reduction in frequency), and correlation between response duration and dose	2500 unit dose: 19, 21, 23, 25 days 3750: 22, 28, 32, 33 5000: 43 10,000: 84, 90 15,000: 80, 95, 98 *r* = 0.96, *P* < 0.001	
						Side effects	Mild % transient inj. site discomfort in 5 pts, lasted < 48 h Mild general malaise and dry mouth in 2/3 given 15,000 unit dose	

Vanilloid receptor agonists

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Kuo 2003[551]	Case series EL = 3	41 (20 women)	M/F mean age 74 years (43–82), with DO refractory to 6 months anticholinergic' tx 13 had idiopathic DO, 10 had neurogenic UI; 18 previous transurethral prostatectomy. Symptom duration 3.6 ± 4.5 years	Intravesical resiniferatoxin (10 ml of 100 Nm solution, left in bladder for 40 min)	Unclear	Change in leakage	21 (51%) improved* [5/13 with IDO] 18 (44%) no change 2 (5%) poor* duration of effect in those with improvement median 5 months (2–9)**	Funding: none declared. 100Nm solution of resiniferatoxin in 10% ethanol in 0.9% saline solution. *improvement = pts dry or 50% reduction in leakage episodes. Poor = development of exacerbated UI or retention. **10/21 with improvement received repeated instillation but unclear when. Vol. removed from bladder following instillation: median 60 ml (30–400 ml).
						Video UD (n = 21 with clinical improvement)	Sig. increase in cystometric capacity +79 ml (38%) P = 0.001 Sig. decrease in detrusor pressure – 6.2 cmH_2O (18%) P = 0.047) no sig. change in maximal flow rate or residual volume	
						Adverse effects during instillation	12 (29%) raised BP 5 (12%) bladder pain	
Palma 2004[550]	Case series EL = 3	30	F median age 56 years (24–88) with idiopathic DO for > 6 months, and no response or adverse effects from antimuscarinic drugs	Intravesical resiniferatoxin (50 Nm solution, left in bladder for 30 min, volume used not stated)	30 days	Urinary symptoms (% with)	60% urgency (vs 90% baseline, P = 0.0077) 50% urge UI (vs 83% baseline, P = 0.0044) no sig. change in frequency, nocturia, enuresis	Funding: none declared. RTX supplied by Sigma Co. 50Nm solution of resiniferatoxin in 10% ethanol in 0.9% saline solution.
						Multi-channel cystometry (change vs baseline)	40% reduction (–19 cmH_2O) in max. amplitude of involuntary contractions No sig. change in max. cystometric capacity	

Procedures for stress urinary incontinence – operations to augment sphincter closure

Intramural bulking agents – controlled trials

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Bano 2005[556] UK study	RCT EL = 1–	50 (49 followed up at 6 weeks, 48 at 6 months)	F mean age 61 years (28–80), UD stress UI 9 (18%) had prior continence surgery (3 from silicone grp: 2 pubovaginal sling, 1 colposuspension; 6 from collagen grp; 2 pubovaginal sling, 3 colposuspension, 1 colposuspension followed by sling)	Silicone injection (Macroplastique, transurethral) Mean vol. given 5 ml (2.5–7.5 *n* = 25	Collagen (porcine dermal implant injection, Permacol; 4 trans-urethrally, 21 peri-) Mean vol. given 8 ml (4.5–12) *n* = 25	Post-op	Adverse effects	Urinary retention 12% vs 8% (catheterised for 1–3 vs 7 days) *de novo* urge UI 4% vs 4%	Funding: none declared. Follow-up of participants ongoing. Collagen injections administered under cystoscopic control, using 'Macroplastique Injection System' inj. ceased when proximal urethral lumen closed or negative stress test. Inj. silicone using 'macroplastique injection system', ceased when negative cough test achieved. *ICS 1 h pad test; dry if ≤ 2 g urine loss. [EL = 1–] No details of randomisation, limited baseline data, no definition given for improvement on pad test, unclear whether ITT analysis used. No statistical analysis reported.
						6 weeks and 6 months	Objective cure/ improvement*	*At 6 weeks:* Improved: 54% vs 64% cure: 42% vs 60% unchanged 38% vs 32% worse 8% vs 4% At 6 months: Improved: 42% vs 60% cure: 38% vs 60% unchanged 29% vs 28% worse 21% vs 4% relapse 8% vs 4%	
							KHQ (% with 'improved score')	42% vs 60% at 6 weeks 29% vs 56% at 6 months	
							Change in Stamey grading	% with improvement of ≥ 1 grade: 46% vs 64% at 6 weeks 42% vs 58% at 6 months	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Maher 2005[557]	RCT EL = 1+	45	F mean age 63–65 (34–84), stress UI secondary to ISD (MUCP ≤ 20 cmH_2O), failed to respond to conservative treatments 80% had prior continence surgery (67% vaginal hysterectomy/repair, 22% abdominal hysterectomy, 9% retropubic continence surgery, 7% needle suspension, 7% 'other' Exclusions: requiring prolapse surgery, prior sling procedure	Silicone injection (Macroplastique; placed transurethral under GA) (*n* = 23)	Pubovaginal rectal sling* (*n* = 22)	6 months	Subjective outcomes	Cure (< 1 leakage episode/week): 77% vs 90%, *P* = NS Satisfaction (100 mm VAS): 60% vs 81%, *P* = NS	Funding: none declared. Uroplasty provided Macroplastique free of charge to women without health insurance. *combined abdominal-vaginal approach; 11–12 cm sling harvested from rectus sheath and positioned suburethrally at proximal urethra and secured to rectus sheath without tension. Silicone introduced using urethroscope, vials discharged using a rachet gun, administered until bladder neck closed SUDI acronym not explained. #median time since surgery 61 months (range 42–71).
							Objective cure (no leakage on UD)	9% vs 81%, *P* < 0.0001	
							QOL (SUDI, IIQ; median post-op scores [range])	SUDI: 14 (0–100) vs 11 (0–44), *P* = NS IIQ: 5 (0–85) vs 9 (0–85), *P* = NS	
							1 h pad test (median post-op scores	5 (0–57) vs 2 (0–20), *P* = NS	
							Peri-operative measures (median [range])	Theatre time (mins): 22 (10–41) vs 60 (35–105) Inpt stay (days): 1 (1–2) vs 4 (3–8) Blood loss (ml) 0 vs 200 (100–500) Duration catheterisation (days): 1 (0–7) vs 5 (2–42) Return to normal activities (days): 28 (0–35) vs 4 (0–42) *P* < 0.0001 for all comparisons	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Repeat /further surgery	In silicone grp: 5 had 2nd inj. 2 had further surgery (1 sling followed by tension-free tape; 1 transurethral collagen inj.)	
							Adverse effects (%)	*de novo* DO: 0 vs 4.5% (*n* = 1) voiding dysfunction: 4% vs 18% UTI 8.7 vs 13.6% incisional hernia 0 vs 4.5%	
						5 years (telephone follow-up), *n* = 27	Symptoms#	No sig. difference in % with frequency, nocturia, urgency, urge UI, stress UI, voiding difficulty; satisfaction with surgery 29% vs 69%, *P* = 0.057	
Corcos 2005[560]	RCT EL = 1+	133 randomised (15 refused to participate after randomisation, 2 vs 13; further 5 withdrew or lost to follow up) ITT analysis done	F aged > 30 years (mean 58) stress or mixed UI Exclusions: contraindications to surgery or collagen injections, associated conditions, or POP, neurogenic bladder, interstitial cystitis, prior pelvic radiation, prior collagen tx	Glutaraldehyde cross-linked (GAX) collagen Up to 3 injs at 1 month intervals *n* = 66	Surgery (left to surgeon's choice and experience)* *n* = 67 (54 had surgery)*	12 months	Success (dry [< 2.5 g wt gain] in 24 h pad)	ITT analysis: 52% vs 55% mean difference: –3.71% (95% CI –20.61, +13.2), *P* = NS analysis per protocol with verbal update: 53% vs 72% mean difference: –19.1% (95% CI –36.1, –2.0), *P* = 0.01	Funding: Canadian Institute for Health Research, and Bard Canada. 6 centres. collagen inj. at 3, 6, 9 o'clock positions until coaptation of the urethral mucosa obtained; injected under LA as outpatient procedure. Mean 2.9 injections per pt; mean vol. 9.7 ml. *6 transvaginal

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Satisfaction (% pts NOT satisfied)	32.8 vs 20.4% mean difference 12.4% (95% CI –5.1, +27.8), *P* = NS	endoscopic bladder neck suspension; 19 retropubic bladder neck suspension; 29 fascial pubovaginal sling placement. # straining for < 30 days post-op.
							QOL	No sig. difference between grps in changes in SF36 or IIQ scores	
							Adverse effects	% with ≥ 1 AE: 36% vs 63%, *P* = 0.003 Urogenital AE (%): urinary retention (> 48 h post intervention): 2% vs 13%, *P* = 0.001 Transient voiding difficulty# 17% vs 36%, *P* = 0.02 Urinary infection 0% vs 6%, *P* = 0.002 Transient haematuria 12% vs 12%	
Andersen 2002[558]	DB RCT EL = 1–	52 randomised, 46 followed up	F mean age 57 years (zirconium grp), 50 years collagen grp. UD stress UI owing to ISD (ALPP ≤ 90 cmH_2O). Baseline	Carbo coated zirconium beads (Durasphere), transurethral *n* = 25 no. injs not	Bovine collagen (Contigen), transurethral *n* = 21 no. injs not stated	Mean 2.6 vs 2.8 years (overall mean 2.7, range 1.5–	Mean change in Stamey grade	–1.28 (60%) vs –0.86 (39%), *P* = NS	Funding: none declared. No. of inj. sites depended on degree of closure during procedure (2, 4, 8, or 10 o'clock positions). Volume given at initial inj.
							% with improvement of ≥ 1 Stamey grade	80% vs 62%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			Stamey UI grade 2.12 vs 2.19 100% had prior tx for UI; mean ~2.2 interventions; 85% vs 92% PFMT 81% vs 91% behavioural training 23% vs 15% drug tx 31% vs 15% continence surgery Exclusions: prior urethral bulking agent therapy, uncontrolled bladder instability, drug tx affecting the evaluation of UI, grade 0 UI (Stamey)	stated		3 years)	% cured ('dry')	40 vs 14.3%, *P* = NS	4.5 ml vs 4.2 ml. Adverse effects/ complications not reported. [EL = 1–] No information on methods of randomisation, allocation concealment, or blinding. Researcher and pt, not clinical investigator and pt, blind to treatment allocation. Fewer pts followed up than randomised.
Lightner 2001[559]	DB RCT EL = 1–	355; 235 completed 12 months follow-up	F mean age 57 years (26–84). Stress UI owing to ISD, all patients had ALPP < 90 cmH_2O (mean 51). Duration UI ~10 years; all failed prior conservative or surgical treatment	Carbon-coated zirconium oxide beads (Durasphere; trans-urethral) (*n* = 178; 115 analysed)	Bovine collagen (Contigen; trans-urethral) (*n* = 177; 120 analysed)	12 months (mean 14, range 9–30) Mean 11 months (1–26) for adverse events	Change in Stamey continence grade	Improvement of ≥ 1 grade: 66.1 vs 65.8%, *P* = NS	Funding: Carbon Medical Technologies. 10 centres. Anaesthesia used at discretion of investigator. Mean no. injs: 1.69 vs 1.55, *P* = NS. Volume at initial inj. 4.83 (0.5–9.1) vs 6.23 (2–12.5), *P* < 0.001; Mean total vol. 7.55 ml (0.5–22) vs 9.58 ml (2–30), *P* < 0.001. [EL = 1–] Only completers analysed. No explanation for missing patients. Baseline characteristics reported to be comparable – limited data shown.
							1 h pad test (ICS; mean change from baseline, g)	–60 vs –64%, *P* = NS	
							Adverse effects (*n* = 355)	Urgency 24.7 vs 11.9%, *P* = 0.0001 Acute retention 16.9 vs 3.4%, *P* = 0.01 (90% vs 65% resolved by study end)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Chrouser 2004[562]	Cohort EL = 2+	86	F mean age 67 years, treated with either injectable for stress UI Mean no. injs 1.6 both grps. 47% vs 56% had pre-op urgency; 63% vs 54% hysterectomy; 21% vs 23% had prior continence or prolapse procedures	Carbo coated zirconium beads (Durasphere), transurethral (*n* = 43)	Glutaraldehyde cross-linked (GAX) collagen (trans-urethral)* (*n* = 43)	Min 18 months; median 37 months (IQR 34, 40) vs 52 45, 58)**	Continence status	Initial success (1 week): 63% vs 63% Tx effective in 35/33/21% at 12/24/36 months vs 33/19/9%	Funding: none declared. Materials injected under cystoscope guidance with intravenous sedation. *age-matched cohort randomly selected. **Owing to sig. differences in follow-up duration, survival analysis used to model time to failure.
							Time to tx failure	RR 0.78 (95% CI 0.50 to 1.20), *P* = NS	
							Satisfaction (pt perception of tx success)	37% vs 35%	
Schulz 2004[565] UK study	RCT EL = 1+	40*	F median age 59 years (35–79), genuine stress (*n* = 36) or mixed UI (4); SUI for ≥ 1 year, conservative tx for ≥ 3 months Exclusions: UTI, bladder capacity < 250 ml or PVR > 100 ml, neurogenic bladder, grade 3 cystocele uterine prolapse or rectocele, taking alpha-agonist or alpha-antagonist, previous urethral bulking agent	Hyaluronic acid /dextran copolymer (trans-urethral, under LA or GA) Up to 3 inj., within 3 months	Hyaluronic acid /dextran copolymer (peri-urethral, under LA or GA) Up to 3 inj., within 3 months	1 year*	Subjective cure (100% improvement and no leakage episodes), mean	9/20 (45%) vs 4/19 (21%) at 1 month 3/19 (16%) vs 4/18 (22%) at 3 months 3/18 (17%) vs 3/18 (17%) at 6 months 3/17 (18%) vs 1/17 (6%) at 12 months, *P* = NS all comparisons	Funding: none declared. Both inj. guided by cystoscope. Periurethral inj. at 3 and 9 o'clock positions; trans- at 3, 9, 12 o'clock positions. 'Type' of SUI: 16 vs 9 hypermobility, 4 vs 11 ISD, *P* = 0.05. Results also analysed according to hypermobility/ISD subgrps – no sig. differences in outcomes found. 15 vs 16 had LA. Mean vol. injected 3.5 vs 3.9 ml. 12 vs 10 had 2 inj., 2 vs 3 had 3 injs (mean 1.7 injs/per person per grp). *3 pts each grp lost to follow-up; 20 pts
							% subjective improvement (pts quantification), mean	68% vs 62% at 1 month 52% vs 52% at 3 months 39% vs 52% at 6 months 36% vs 37% at 12 months *P* = NS all comparisons	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Post-op urinary retention	1 vs 6 (5% vs 30%), $P < 0.05$ mean vol. injected in pts with retention: 3.4 vs 5.1 ml, $P = 0.02$	terminated study early owing to recurrent or persistent UI, at a median follow-up 5 months (1–9). Retention = if residual > 200 ml
Faerber 1998[564]	Cohort EL = 2– (Retrospective analysis of women according to method of inj.)	45	F mean age ~66 years (42–80) stress UI owing to ISD	Collagen (peri-urethral) *n* = 21	Collagen (trans-urethral) *n* = 24	Mean 8.8 months peri, 6.3 months trans	Continence*	33% vs 46% dry 67% vs 50% improved 0% vs 4% no change *P* = NS for all comparisons	Funding: none declared. Choice of delivery method determined by surgeon preference; both methods under cystoscope guidance, 3, 6, 9 o'clock for peri-urethral, and 3, 9 and occasionally 6 o'clock for trans-urethral. *based on severity.scale of 0–3; 0 dry, 1 leakage on moderate /severe exertion, 2 leakage on standing/walking, 3 total incontinence unrelated to physical activity. Improved = reduced pad use or pt report of improvement in UI grade. No. injections: mean 1.3 both grps. Vol. injected 10.1 ml (5–20) vs 4.7 ml (1.5 vs 12.5), $P < 0.01$. [EL = 2–] Only age and severity info given for both grps at baseline, unknown if different in other ways; duration of follow-up different.
							Daily pad use (mean)	1 vs 0.8 *P* = NS (baseline 3.5 vs 3.8)	
							VLPP (unclear how measured), mean cmH_2O	95 vs 90, *P* = NS (baseline 42 vs 45)	
							Adverse effects/ complications	Transient haematuria 10% vs 8% UTI 5% vs 4%	

Silicone bulking agent – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Henalla 2000[566] UK study	Case series EL = 3	40	F > 18 years, UD stress UI, PVR < 100 ml. 70% had no prior continence surgery (no details for other 30%) Exclusions: neurogenic or unstable bladder, moderate/severe prolapse, previous urethral bulking therapy, history of intra-urethral devices/haematuria	Silicone injection (Macroplastique; transurethral) 5 ml given per tx	3 months	Success at 3 months*	19 (48%) at 6 weeks 21 (53%) at 3 months	Funding: none declared. Uroplasty assisted in developing study protocol. *investigator rating of dry or markedly improved. Primary aim of study was to evaluate new implantation device for the product. 2.5 ml given at six o'clock position, 1.25 ml at each of 10 and 2 o'clock. 5 ml retreatment offered at 3 months of required (retreatment in 14/19 'failures, and 4/13 of the markedly improved grp).
						Success at 6 months (after retreatment at 3 months in *n* = 18)	Overall 29/39 (74%) with mean 1.35 implantations In retreated grp: 12/17 (71%)	
						Post-op adverse effects	89% mild/moderate pain on implantation (from pain scores) 63% 'transient haematuria and dysuria' 18% urinary retention > 48 h, 2 with persistent reqd indwelling catheterisation	
Usman 1998[567] UK study	Case series EL = 3	102	F mean age 59 years (33–83) stress UI (UD diagnosis in 86%) 30% had prior continence surgery (anterior colporrhaphy or Stamey)	Silicone injection (Macroplastique; transurethral), single injection under GA 5 ml given per tx	Mean 3.2 months (3–5)	Success (cure or marked improvement)	68% and at mean followup 17.6 (11–44) months (*n* = 84): 48%	Funding: none declared. Injn guided by cystoscope, at 6, 3, and 9 o'clock positions. Cure or marked improvement: no further tx reqd slight or no improvement: further tx reqd.
						Success in subgroups	Primary vs secondary procedure 66% vs 71%, *P* = NS (48% vs 46% at 17.6 months) Cystocele (*n* = 26), 69% success, 67% vs 75% for primary vs secondary procedure	
						Post-op adverse effects	100% haematuria and dysuria for 24–48 h 7% urinary retention for 2–7 days, 0 reqd indwelling catheter	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Gurdal 2002[568]	Case series (retrospective chart review) EL = 3	29	F mean age 57 (48–79), stress UI owing to ISD (52%) or ISD and hypermobility (48%) Stamey grade 1 (7%), 2 (28%), 3 (66%) 62% had prior continence surgery (10 bladder neck suspension, 5 anterior colporrhaphy, 2 retropubic urethropexy, 1 in situ vaginal wall sling placement) Exclusions: genital prolapse, moderate/severe cystocele, DO, bladder capacity ≤ 250 ml, neurologic disorders, bladder outlet obstruction, urge UI, detrusor hypocontractility	Silicone injection (Macroplastique), per-urethral Single injection	Mean 29 months (24–36)	Continence	At 3 months: 55% cure 24% improvement (> 50% vs baseline) 21% failure At 24 months: 45% cure 17% improvement 41% failure	Funding: none declared Injection guided by cystoscope. Mean vol. injected 3.5 ml (3–5) at 4 and 8 o'clock positions (and12 o'clock if necessary) to achieve satisfactory coaptation. No repeat injection given.
						Post-op complications (all transient)	45% haematuria 79% dysuria 72% frequency 3% temporary retention	
Sheriff 1997[569] UK study	Case series (consecutive pts) EL = 3	34	F mean age 53 years (26–77), stress UI on video-urodynamics, failed prior continence surgery. 94% had ISD. 21% also had vesical descent, 6% had neurogenic bladder	Silicone injection (Macroplastique) 5 ml dose	1–36 months	Continence	'success' (dry or rare leakage, not requiring protection): 90% at 1 month, 75% at 3 months, 48% at 2 years*	Funding: none declared. One surgeon undertook all procedures. Inj. given under LA or GA or spinal anaesthetic, at 3, 6, 8, (and12 if necessary) o'clock positions. *failed in all F with bladder descent/ neurogenic UI. 18% had re-injection after at least 3 months.
						Complications	All transient (resolved within 36 h): 12% retention 53% dysuria 68% haematuria 76% frequency	
Radley 2001[570]	Case series (Prospective) EL = 3	60	F mean age 53 years (26–81), stress UI owing to ISD (shown on video UD) 68% prior continence	Silicone injection (Macroplastique, transurethral)	Mean 19 months (6–50)	Subjective outcome (telephone q), *n* = 56	20% cured 39% improved (no definition) 41% unchanged or worse	Funding: none declared. One surgeon. Inj. under cystoscope guidance at 3

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			surgery, 40% prolapse repair, 60% prior hysterectomy	Up to 3 inj.	Mean 16 months (6–52)	Objective outcome (video UD), *n* = 41	Of 17 improved/cured after inj., 9 were cured on video UD	or more sites (2, 6, 10 o'clock positions). 2 further tx offered if initial unsuccessful (43% had 2nd, 3% a 3rd).
					Post-op	Complications	6% UTI 12% acute retention	Mean vol. at each tx 6.73 ml (3.5–10).
Tamanini 2003[571] (1 year follow-up) and 2004[572] (2 year follow-up)	Case series (consecutive cases) EL = 3	21	F mean age 47 years (33–54) with UD stress UI, Stamey grade 2, owing to ISD (VLPP < 90). 81% also had frequency, and 48% urgency Mean duration UI 12 years (2–220. 19% had prior continence surgery Exclusions: prior injection therapy, nocturnal enuresis, severe genital prolapse, neurogenic bladder	Silicone injection (Macroplastique, peri-urethral)	1 and 2 years	Subjective cure (Stamey grade 0)	Pt vs surgeon opinion: 57% vs 38% at 1 year 48% both at 2 years	Funding: Uroplasty provided the injection system. All pts treated by single surgeon on a day case basis, under LA. Inj. at 3 sites via implanter device. 8 (38%) had 2nd inj. at 3 months. Mean vol. injected 6.3 ml (SD 1.9 ml).
						Objective cure	1 h pad test (at 1 year only): 62% cure 19% improved (≥ 50% reduction) 19% failed UD (VLPP), *n* = 20: 40% cured at 1 year 50% cured at 2 years	
						KHQ	Sig. improvements in all domains at 1 and 2 years	
						Adverse effects	100% transient dysuria and pain at implant site 10% transient retention 3% (*n* = 1) loss of material though injection site	
Barranger 2000[573]	Case series EL = 3	21	F median age 68 years (46–83) stress UI owing to ISD (MUCP < 30). 6 (29%) also had bladder neck mobility. All had prior continence or prolapse surgery	Silicone injection (Macroplastique, trans-urethral)	1, 16 and 31 months	Subjective cure/ improvement	At 1 month: 2 (10%) dry 9 (42%) improved 10 (48%) failed At 16 and 31 months: 2 (10%) dry 8 (38%) improved 11 (52%) failed*	Funding: none declared. Inj. under LA, by cystoscope guidance at 3 points. Mean vol. injected not stated. 2 (10%) had 2nd injection at 3 and 5 months. *including 2 who had repeat injection.
						Stamey grading	Change of ≥ 1: Fell in 43% at 16 months, 62% at 31 months unchanged in 52%, 38% increased in 5%, 0	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						MUCP	No sig. change from baseline at 1 month (–4%)	
						Adverse effects	None during or after surgery	
Koelbl 1998[574]	Case series EL = 3	32	F mean age 64 years (39–85) stress UI owing to ISD (VLPP < 65). 88% had ≥ 1 prior continence surgery (colposuspension, anterior colporrhaphy, slings) Exclusions: genital prolapse, neurologic disorders, PVR > 50 ml, UTI, DO	Silicone injection (Macroplastique, trans-urethral)	6 and 12 months	Cure (subjective and objective [clinical stress test])	75% at 6 months 59% at 12 months	Funding: none declared. Inj. under GA, by cystoscope guidance at 3 points. Mean 3.9 ml (1.5–15 ml) used to occlude urethra. 4 (13%) had 2nd injection at 3 months.
						MUCP at rest (at 12 months)	+26% (from 25 cmH_2O), P = 0.027 vs baseline	
						Adverse effects	6% (n = 2) transient UTI Mean time to PVR < 50 ml 3.4 days (1–7) No pts had *de novo* DO	
Harriss 1996[575] UK study	Case series EL = 3	40	F median age 50 years (27–74) UD stress UI. 38% had prior continence surgery Exclusions: DO	Silicone injection (Macroplastique, peri-urethral)	3 months and 3 years	Subjective cure/ improvement	3 months: 16 (40%) dry 13 (33%) improved 11 (27%) unchanged At 3 years: 16 (40%) dry* 7 (18%) improved 17 (42%) unchanged (offered colposuspension) *includes 4 pts who had 2nd injection at 3 months, thus 4 pts deteriorated from 3 month follow-up	Funding: Bioplasty provided materials free of charge. Inj. as day case under GA. Inj. by cystoscope guidance at 4 points. 2–7 ml per inj. (actual vol. injected not stated). 4 (10%) had 2nd injection at 3 months. 25 had UD at 3 months – limited data reported. 3 of 3-months 'improved' group had DO on UD, successfully treated with anticholinergics.
						Adverse effects	'almost all had dysuria at 48 h'	

Glutaraldehyde linked collagen – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Richardson 1995[576]	Case series EL = 3	42	F mean age 64 years (28–88) stress UI owing to ISD, Stamey grade 1 (*n* = 1); grade 2 (*n* = 20), grade 3 (*n* = 21)	Glutaraldehyde cross-linked (GAX) collagen, trans- or peri-urethral*	46 months (10–66) after 1st inj.	Change in Stamey grade (mean no. injs; mean vol. injected)	40% dry (grade 0); (2.3; 15 ml) 12% 'greatly improved' (by ≥ 2 grades) (2.6; 25.7 ml) 31% improved by 1 grade (4.3; 42.8 ml) 7% unchanged (4.0; 40.2 ml) 10% worse (3.5; 28.1 ml)	Funding: none declared. Skin test to collagen 1 month before 1st inj. Inj. guided by cystoscope at 3 and 9 o'clock positions. *median no injections 2 (1–8). Adverse effects/complications not reported.
						Change in stress LPP (% increase in cmH_2O)	68.1% in cured grp 31.2% greatly improved 76.5% improved 9.3% unchanged 16.8% worse	
Cross 1998[577]	Case series EL = 3	139	F median age 72 years, with stress or mixed (40%) UI owing to ISD (abdominal LPP < 60 cmH_2O). Mean duration of UI 3.5 years, 73% grade 3 UI (Stamey); pad use 4.6/day. 63% prior incontinence procedure, 14% no previous pelvic surgery or trauma Exclusions: grade 3 or 4 prolapse abdominal LPP > 60 cmH_2O, urethral hypermobility on videourodynamics	Collagen (trans-urethral under LA) 3 injs	Mean 18 months after last inj. (range 6–36)	Improvement (% pts)	74% substantial improvement (≥ 70% reduction in daily pad usage, or grade 0 UI) 21% improved (50–70% reduction in pad usage, or min 1 grade improvement in UI) 5% failed	Funding: none declared. Skin test to collagen 1 month before 1st inj. (2% had erythema at inj. site). Collagen inj. at 4 and 8 o'clock positions. Injections given every 4–8 weeks. If tx failed after 3 injs, offered alternative tx; if initially improved, offered a 4th inj. (12% had 4th).
						Adverse effects	28% *de novo* DO (22% of substantially improved, 41% improved, 57% failed grps). 21% had continued urge UI 1 (0.7%) transient haematuria 2 (1.4%) UTI requiring tx 5 (3.6%) transient retention	
Khullar 1997[578] UK study	Case series EL = 3	28	F > 60 years (mean 76, range 62–90), UD stress UI. 43% had prior vaginal and suprapubic surgery Exclusions: DO, positive	Glutaraldehyde cross-linked (GAX) collagen (para-urethral under GA)	1 and 2 years	Subjective cure (months 1, 6, 12, 24)	1 inj.: 96, 64, 61, 36% 2 injs: 100, 54, 50, 43% 3 injs 83, 67, 67, 67% Overall: 61% at 1 year, 43% at 2 years	Funding: none declared. Skin test to collagen done 14 days prior to 1st inj. Injn guided by cystoscope at 3 and 9 o'clock positions. Reinjection if

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			skin reaction to collagen, UTI	Up to 3 inj.		Objective cure/ improvement/ failure* (overall)	Month 1: 76/5/19% Month 6: 58/6/32% Month 12: 52/14/34% Month 24: 48/9/43%	significant increase in pad test loss; 28 had 1 inj. (mean vol. 13.2, range 5–17.5 ml); 14 had 2 injs (mean vol. 11.7, range 9.4–17.5 ml), 6 had 3 injs (mean vol. 11.7, range 5–15). *cure < 1 g loss on short pad test, improvement ≥ 50% reduction. MUCP on VCU (mean change from baseline, cmH_2O at months 3, 12) also reported.
						Adverse effects	*de novo* DO: 39% after 1st inj., no additional cases on 2nd/3rd inj. 21% urinary retention, 3 (11%) developed voiding difficulties (PVR > 150 ml)	
Bent 2001[579]	Case series EL = 3	90	F mean age 61 years (35–86) with stress UI (for ≥ 12 months) and urethral hypermobility, resistant to 3 months conservative therapy Exclusions: prior tx with a periurethral bulking agent; predominant urge UI, bladder capacity < 250 ml, PVR > 50 ml, grade 3 or 4 uterine prolapse or cystocele, neurogenic bladder, fistula, skin test results positive to collagen	Glutaraldehyde cross-linked (GAX) collagen (peri- or trans-urethral) Up to 3 injs given in 6 months	12 months after last inj.	Subjective cure (Stamey grade 0)/ improvement	At 6 months: 33% dry 27% improved At 12 months, of 58 completers*: 33% dry 33% improved ITT at 12 months: 21% dry 21% improved 58% not improved or withdrawn from study	Funding: Bard Urological Division. 6 centres participated in study. 26% had 1 inj.; 51% had 2; 23% had 3 injs. Mean injected vol. 6.8 ml SD3, (range 1.5–15); mean vol. injected per pt 13.4 ml (SD 7.6 (range 2.5–37.5). *32 withdrew before study completion (14 pt choice, 14 lack of improvement, 4 lost to follow-up). All pts enrolled analysed (withdrawals considered not improved). Cure/improvement also reported by Stamey incontinence grade. QOL also assessed, but this does not appear to be using a validated questionnaire.
						Adverse effects	11% urinary retention 12% UTI 1% (*n* = 1) abscess at inj. site	
Monga 1995[580] and 1997[139] UK study (data for older age group reported separately; Stanton 1997[581] 5 year follow-	Case series EL = 3	61	F mean age 65 years (21–91), with UD stress UI declined major surgery (failed prior [82%] or too frail). Symptoms for 0.5 to 60 years Exclusions: acute cystitis, psychogenic incontinence, uncontrolled DO, history of anaphylaxis or contigen allergy	Glutaraldehyde cross-linked (GAX) collagen (peri-urethral under LA, day case procedure) Up to 3 inj.	2 and 5 years	Subjective cure/ improvement	At 1 year: 40% cure 37%improved At 2 years: 48% cure 20% improved At 5 years (*n* = 53*): 26% improved	Funding: Bard provided materials. Skin test to collagen done 1 month prior to procedure Injn guided by cystoscope at 3 and 9 o'clock positions, given until proximal urethra occluded. At 5 years, 54% had 1 inj., 25% ×2, 20% ×3. Mean injected vol. 11.5 ml (3.75–30) per session; median total vol. per pt 19 ml (4–65 ml).[582] Objective cure = no SUI on provocative
						Objective cure	54% at 1 year 48% at 2 years	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
up:Gorton 1999[582]						1 h pad test (mean change)	–72% at 2 years	cystometry and/or a negative pad test. Subjective improvement; from daily to intermittent UI; cure = dry. *known failures or had follow-up > 5 years. 8 had died, and 7 had further continence surgery.
						Bladder diary	No sig. change in frequency or nocturia at 1 or 2 years	
						UD (*n* = 54)	Sig. incr. in MUCP (stress), and pressure transmission ratio	
						Complications	18% retention (< 24 h in 15%) 26% UTI (during year 1) 3% haematuria (no abnormality on investigation) 2% (*n* = 1) flu-like symptoms 24 hs after inj.	
Stanton 1997[581] UK study (Results for older population of Monga study[580 139])	Case series EL = 3	32	F > 65 years (mean 75, range 66–90), UD stress UI. 88% had prior continence surgery, mean 1.7 operations (0–4) Exclusions as Monga 1995[580]	Glutaraldehyde cross-linked (GAX) collagen (peri-urethral under LA, day case procedure) Up to 3 inj.	2 years	Subjective cure /improvement	Cure or improved: 79% at 1 year, 69% at 2 years Cured 43%, 39% Improved 36%, 30%	Funding: Bard provided materials. Skin test to collagen done 1 month prior to procedure. 19 had 1 inj.; 9 had 2 injs; 4 had 3 injs. Mean injected vol. 11.5 ml, mean collagen injected per pt 17.6 ml. *no UI on MC cystometry, and/or negative 1 h pad test.
						Objective cure*	50% at 1 year (cystometry and pad test) 54% at 2 years (pad test only)	
						MUCP (mean change from baseline, cmH_2O at months 3, 12)	At rest –2, –2 At stress +7 ($P < 0.05$), +6	
						Adverse effects	*n* = 6 retention < 24 h, 1 reqd catheter for 8 days 2 transient haematuria 7 UTI	
Corcos 1999[583]	Case series EL = 3	40	F mean age 62 years (38–82), UD stress UI, 50% had 'significant' bladder neck mobility	Glutaraldehyde cross-linked (GAX) collagen (peri-urethral under LA [spinal in 2])	Mean 50 months (47–55)	Cure/ improvement	12 (30%) cured 16 (40%) improved 12 (30%) tx failed	Funding: none declared. Skin test to collagen done 1 month prior to procedure. Injn guided by cystoscope at 3 and 9 o'clock positions. Endpoint of tx was cure or max. 4 injs in 6 month period.
						Re-injection ('top-up') rate	4/12 in cured grp 5/16 in improved grp 0 in failed grp	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Adverse effects	0 post-op retention 3 (8%) UTI 4 (10%) *de novo* urgency	Cure = complete symptomatic improvement with negative pad test and no leak on VLPP test; improvement = pt satisfaction with no desire for further injections or treatments; VLPP and pad test results no more than 50% of baseline. Mean no. injs/pt and total vol. inj./pt: cured grp: 2.3 and 8.8 (1.5–15) improved: 1.9 and 10.1 (2.5–19) failed: 2.6 and 8.3 (4–19).
Herschorn 1997[585] and 1996[584] (same report published twice)	Case series EL = 3	187	F mean age 63 (15–94), UD stress UI secondary to hypermobility. 3% had neurogenic UI, 17% bladder instability. 63% had prior continence surgery	Collagen (peri- or trans-urethral) Up to 3 inj.	Mean 22 months (4–69)	Subjective cure/ improvement	23% cured (dry) 52% improved (decrease in Stamey grade) 25% failed Probability of staying dry (survival analysis: 71% at 1 year, 58% at 2 years, 46% at 3 years	Funding: Bard Canada, and Sunnybrook Health Science Centre. Skin test to collagen done 1 month prior to procedure. Inj. under LA or GA as outpatients, under cystoscope guidance. Mean vol. in cured/improved pts 9.65 ml (2.5–50); mean no tx's 2.5 (1–10); 3.8 ml mean vol. per tx.
						Adverse effects	1% transient retention 0.5% (*n* = 1) UTI	
Winters 2000[586]	Case series EL = 3	58	F mean age 73 (65–86), stress UI. 64% urethral hypermobility (rotation > 30° on Q-tip); 85% ISD (ALPP < 60 cmH_2O) Exclusions: prior pelvic radiation	Collagen (peri-urethral, under LA) mean 1.9 inj. (1–4)*	Mean 24 months	Continence	At 2 months: 48% cure# 31% social continence (minimal leakage, reqd ≤ 1 pad/day) 21% failure At 2 years: 27 (47%) cure or social continence #9/28 had recurrence at mean 8 months (2–16), 8 given further inj.	Funding: none declared. Skin test to collagen done 1 month prior to procedure. Inj. at 4 and 8 o'clock positions. *mean volume to achieve 'success' 14.6 ml (further inj. given after 1 month until continence achieved or further inj. deemed unlikely to provide success).
Stricker 1993[587]	Case series EL = 3	50	F, age not stated, UD stress UI, prior continence surgery (mean 1.8 prior operations)	Collagen (per or trans-urethral [71 vs 29%], under LA or GA) Up to 5 inj. or max. 30 ml	Mean 11 months (1–21)	Continence	21 (42%) cure 20 (40%) improved (desired no further tx) 7 (14%) failed 2 awaiting top-up injections	Funding: none declared. Skin test to collagen done 1 month prior to procedure Mean 1.9 inj. (> 1 in 42%). Mean vol. injected 14.4 ml.
						Complications	5 (10%) temporary retention 4 (8%) temporary urge UI	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Homma 1996[588]	Case series EL = 3	97 (78 F with stress UI)	M/F with UI (78 F with stress UI or 5 F with ISD*; all 14 men had ISD). Mean age 57 in stress UI grp, 64 in ISD grp Exclusions: active UTI, history of hypersensitivity to collagen material, obvious cystocele	Glutaraldehyde cross-linked (GAX) collagen ('most' trans-urethral under LA)	2 years# after procedure (all results for 60 F with stress UI with follow-up data at 2 years)	Leakage episodes (proportion with, of *n* = 60)	6.7% none 16.7% < once/week 26.7% < once/day 50% daily	Funding: none declared. *ISD included pts with incontinence owing to overt damage of external sphincter muscle, e.g. prostate surgery. #by mail questionnaire. Skin test to collagen done 1 month prior to procedure (positive in 2.1%). Injn under cystoscope guidance, into 3and9 o'clock positions (and 6 if reqd). Max. vol. per inj. 30 ml, and reinjection performed if reqd. No. injs and vol. injected in SUI grp: 2.2 ± 1.3; 40.1 ± 34.7 ml. Not stated whether adverse effects were transient.
						Subjective improvement	vs baseline: 72% improved 15% unchanged 13% worse. vs 1 year post-op: 37% improved 25% unchanged 37% worse 2% unknown	
						Adverse effects /complications	51% had ≥ 1 event 23% episodes of urinary retention 8% voiding difficulties 10% 'other urinary symptoms'	
Elsergany 1998[589]	Case series EL = 3	33	F mean age 64 years (19–97), stress UI. 36% failed prior surgery. 33% had DO	Collagen (trans-urethral)	Mean 18.8 months (2–33)	Subjective cure/ improvement	49% cure (dry) 33% improved (change in Stamey grade) 18% unchanged	Funding: none declared. Skin test to collagen done 1 month prior to procedure. Inj. guided by cystoscope at 5 and 7 o'clock positions. Mean total vol. per pt 4.12 ml for cured/improved cases (others not stated). Repeat inj. given if necessary after 1–3 months. Of cured/improved grp (*n* = 27), 44% had 1, 33%×2, 23%×3 inj.
						Bladder diary	Frequency –39%, *P* = 0.005 Nocturia –64%, *P* = 0.001	
						Adverse effects	6% temporary retention (catheterised for < 1 month)	
Tschopp 1999[590]	Case series EL = 3	99	F mean age 60 years (26–84), stress UI	Collagen (peri- or para-urethral under LA)	Mean 5 months (0–24)	Time to 50% considered failures*	4.7 months (95% CI 2.4 to 5.9) *failure: any 1 of: pt not satisfied; pt satisfied but surgeon considered UI to be unchanged or worse; or pt rating of success lower than at baseline	Funding: St Joseph's hospital and Home. Retrospective review. Skin test to collagen done 1 month prior to procedure. Inj. at 3 and 9 o'clock positions. Mean 2.64 ml/session.
						Adverse effects	5% transient retention	
Swami 1997[591] UK study	Case series EL = 3	111 (107 available for	F age 33–90, UD stress UI, unwilling or unfit for surgical intervention. 70% failed prior	Collagen (para-urethral) Up to 3 inj.	Mean 3.2 years (2–5.8)	Subjective cure/ improvement	25% cured (dry) 40% improved (reduced pad usage) 35% unchanged*	Funding: Bard UK. Skin test 1 month prior to procedure (positive in 3/115).

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
		analysis)	surgery Exclusions: uncontrolled DO			1 h pad test (mean change from baseline)	Sig. reduction of 81% in successful grp. No sig. change in failed grp (+48%)	Inj. under LA (90%) at 3and 9 o'clock positions. Mean vol./session 7.5 ml (2.5–12.5); mean 1.7 sessions/pt. *45% of whom underwent surgery.
						UD	No sig. change in MUCP or PTR; sig. reduction in max. flow rate	
						Adverse effects	10% transient retention (none needing long-term catheterisation) 2% UTI	
Stothers 1998[592]	Case series EL = 3	337	F, age not stated, UD stress UI	Collagen Up to 6 injs	Mean 32 months (12–65)	Complications	5% transient (< 48 h) gross haematuria 2% retention, requiring catheterisation (resolved in 48 h) 13% *de novo* urgency with urge UI, lasting 4 weeks or more (21% of whom did not respond to anticholinergics)	Funding: none declared. Skin test to collagen 2 weeks prior to procedure. Inj. given under LA as outpatient/day case.
Smith 1997[593]	Case series EL = 3	96	F mean age 67, stress UI owing to ISD (abdominal LPP < 65). 70% failed prior continence surgery.	Collagen (peri-urethral)	Median 14 months (range not stated)	Subjective cure/ improvement	38% cured (dry; mean duration of success 11.9 months) 29% socially continent (minimal leakage, max. 1 pad/day) 33% unchanged	Funding: none declared. Skin test 1 month prior to injection. Inj. under cystoscope guidance in 4 and 8 o'clock positions, under LA (GA in 2). Repeat until dry or pt satisfied; 34% had 1 inj., 23%×2, 21%×3, 21%×4. Mean no. 2.1 in successful grp, 3.2 in unchanged; mean vol. 11.9 and 16.1 ml, respectively.
						Complications	4% transient retention (< 48 h) 1% simple cystitis 1% self-limiting gross haematuria	
Ang 1997[594]	Case series EL = 3	105	F mean age 46 (26–76) years; clinical stress UI. Urodynamics done in 33% to exclude DO. 9% had prior continence surgery Exclusions: type 2 UI	Collagen (trans-urethral)	Mean 20 months (3–56)	Subjective cure/significant improvement	At 3 months: 61% cure 29.5% sig. improvement At 12 months: 46.7% cure 35.2% sig. improvement	Funding: none declared. Skin test 1 month prior to injection. Inj. under cystoscope guidance in 3, 6, 9, 12 o'clock positions. 7.6% had second injection. Mean vol. 7.4 (2–15 ml). Significant improvement = occasional leakage but able to lead normal lifestyle.
						Relapse	22%	
						Time to relapse	Mean 13.3 months (3–40)	
						Complications	5.7% transient retention 2% UTI	

Hyaluronic acid/dextranomer copolymer – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Stenberg 1999[595] and 2003[596]	Case series EL = 3	20	F genuine stress UI; mean age 67, median 74.5 years, range 38–90. Mean duration of UI 9.4 years. 2 (10%) had prior continence surgery Exclusions: neurological UI, prior pelvic radiation, urinary retention	Hyaluronic acid/dextranomer copolymer (transurethral)	3–7 months (17 min of 6 months, 3 min 3 months)[595]	Subjective cure/improvement (cure: dry, and leakage not > tenth of baseline VAS)	8 (40%) cure 40% improved 20% unchanged	Funding: none declared. Inj. under cystoscope guidance at 9 and 4 o'clock positions (and 5/6 o'clock if needed to occlude urethra). Mean vol. per inj. 5.2 ml (1.5–12 ml). Mean 1.6 inj. per pt (9 had 1, 10×2, 1×3). Repeat inj. after min 3 months. Objective cure < 8 g/24 h on 48 h pad test, or < 1 g on 1 h test; improvement = 50% reduction in 48 h pad test and/or short pad test. No adverse effects reported. *4 had died for reasons unrelated to this condition/intervention.
						Objective cure/improvement	45% cure 40% improved 15% unchanged	
					5–6 years (mean 78 months, range 73–85)[596] (*n* = 16)*	Sustained response (continued subjective cure/ improvement, together with objective evidence if possible)	9/16 (56%) 7 (44%) relapsed or did not respond initially (none of whom later cured; 2 had continence surgery). 4 initially improved relapsed after mean 33 months (15 months – 6 years).	
Van Kerrebroeck 2004[597,598]	Case series EL = 3	42	F mean age 52 years, stress UI shown on coughing/Valsalva, failed conservative treatment, and no prior invasive tx Pathophysiology of SUI not determined Exclusions: mean voided vol. < 200 ml, PVR > 100 ml, urge UI, DO, medication for SUI, recurrent UTI	Hyaluronic acid/dextranomer copolymer (transurethral)	12 months	Change in cough-induced LPP	At 3 months (*n* = 31): 42% no leakage 32% improved (increased LPP) 26% worsened (decreased LPP) At 12 months (*n* = 22) 64%, 18%, 18%	Funding: Q-med AB Inj. administered using 'Implacer', which injects product into 2, 4, 8, and 10 o'clock positions; under GA or LA. 32 received 4×1.0 ml injs, and 10 4×0.7 ml injs. 18 pts (43%) had 1 repeat inj. owing to insufficient response; mean interval between injs 49 days (24–65). no numerical data for leakage episodes (graph only) – reported to be sig. reduced from baseline *no, some very minor, some minor, minor, some severe, some very severe, many severe problems.
						Leakage (on provocation pad test [20 jumping jacks or vigorous coughs with 300 ml saline in bladder]; change in pad weight at 3 and 12 months vs baseline)	No leak: 14% at 3 months, 24% at 12 months Leakage decreased to ≤ 5 g: 31%, 17% Leakage decreased to > 5 g: 31%, 36% No change: 24%, 24% Overall sig. change in leakage vs baseline, *P* < 0.0001	
						Subjective improvement	69% improved by one category of 6-pt patient perception scale* at 3 and 12 months	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						KHQ[597]	Sig. improvement in 7 of 10 domains: incontinence impact, role/physical/social limitations, emotions, severity measures, urinary symptoms. (Not in personal relationships, sleep/energy, general health perceptions)	
						MUCP, max. cystometric capacity	No sig. change in either parameter	
						Adverse effects	Transient: 12% UTI 10% haematuria 7% urethral disorder 7% decreased urinary flow 7% temporary catheterisation for PVR > 100 ml (pts with tx-related adverse effects)	
Chapple 2005[599]	Case series EL = 3	142	F mean age 56 years (27–86) with stress UI (hypermobility and/or ISD) who had failed prior conservative tx. 21% taking oestrogen at baseline No prior surgery Exclusions: poor bladder function, DO or neurological conditions, grade III POP, fistulae, UTI, interstitial cystitis	Hyaluronic acid/dextranomer copolymer Up to 2 treatments permitted (2nd at week 8); 43% pts	1 year	Positive test on provocation test* (≥ 50% reduction from baseline)	77%	Funding: none declared. Inj.: 4×0.7 ml injections via implacer device. 89% received antibiotic prophylaxis after procedure. *bladder filled to 300 ml prior to exercise routine 24% withdrew, mainly (59%) because of lack of efficacy. **of which 70% considered serious (catheterisation required hospitalisation).
						24 h pad weight (change in median)	–89%, $P < 0.0001$	
						Leakage episodes (change in median)	–67%, $P < 0.001$	
						Frequency (change in median)	–0.4 (6%)	
						QOL (KHQ)	Sig. improvement in 6 of 9 domains	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Adverse effects ('majority transient')	20% retention** 12% UTI 12% urgency 8% dysuria 7% vaginal discomfort 6% cystitis 4% injection-site pseudocyst (resolved median 25 weeks) 4% injections-site pain 2% injection-site infection 4% fever 4% frequency	

Carbon-coated zirconium beads – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Pannek 2001[600]	Case series EL = 3	20 (13 F)	M/F mean age 63 years. F had ISD (abdominal LPP < 80), and all had prior continence surgery	Carbon-coated zirconium beads (transurethral)	Mean 10 months	Subjective improvement (*n* = 13 F)	At 6 months: 77% 'significant (dry or reduction in UI leading to use of only 1 pad within 24 h) or slight' 23% unchanged At 12 months: 33% significant improvement, 0 slight, 67% unchanged (vs baseline)	Funding: none declared. Inj. under regional anaesthesia, at 3,6,9, o'clock positions (and 12 if reqd). Mean vol. 6 ml (2–7) per tx. 2 women had repeat inj. with no improvement. *seen on 2 of 6 pts who were X-rayed when referred back to unit for further tx; in the male, beads had migrated to submucosal lining of urethra and to regional lymph nodes; in F migration to regional and distant lymph nodes.
						Adverse effects (*n* = 20)	1 (5%) skin rash and pruritus 1 week after inj. 5% transient urine retention 10% (1M, 1F) migration of beads*	
Madjar 2003[601]	Case series EL = 3	70 (46 [66%] followed-up)	F mean age 69 (46–83) with ISD (VLPP < 90) 33% had failed prior continence surgery, 63% also had urge UI, 11% also had DO	Carbon-coated zirconium beads (transurethral)	Mean 9 months (3–18)	Subjective cure/ improvement	13% cured 52% improved 35% failed	Funding: none declared. Series = single centre initial experience with the product. Inj. under cystoscope guidance under LA as outpatient. Vol. injected not stated.
						24 h pad test (*n* = 36 [78%})	50% urine loss ≤ 8 g 6% 9–20 g 44% > 20 g (no baseline data)	
						Adverse effects	No cases of urinary retention	

Polytetrafluoroethylene – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Schulman 1983[602]	Case series EL = 3	56	F mean age 59 years (30–86), stress UI. 14% had prior continence surgery	Polytetrafluoroethylene (Teflon, transurethral)	Mean 12 months (3–25)	Cure/improvement	39 (70%) cured: 29 after 1 inj., 8 after 2, 2 after 3 9 (16%) improved (no definition); 5 after 1 inj., 3 after 2, 1 after 3 8 (14%) failed; 2 after 1, 4 after 2, 1 after 3, 1 after 4	Funding: none declared. Mean 1.5 injections per pt. Mean vol. injected (unclear whether vol. per person or per injection) 9.6 ml. Non-specific details of complications.
Kiilholma 1991[607]	Case series EL = 3	22	F mean age 58 years (48–79), UD stress UI 73% had prior continence surgery (anterior colporrhaphy in 11/16)	Polytetrafluoroethylene (Teflon; under LA or GA; transurethral)	Up to 5 years	N cured or 'sufficiently continent' (not defined)	7 (32%) at 1 year 6 at 3 years 4 at 5 years	Funding: none declared. Inj. given via dedicated endoscopic injector, submucosally at 4 sites (3, 6, 9, 12 o'clock). Mean vol. (unclear whether vol. per person or per inj.) 7.3 ml (4–9). Inj. repeated in 7 pts in 'few months' owing to inadequate response.
						Complications	7 (32%) burning around urethra after inj. 3 (14%) paraurethral infection (became abscess in 1, 1 developed urethral diverticulum) 1 (5%) foreign body granuloma	
Herschorn 2000[135]	Case series EL = 3	46	F mean age 69 years (26–88), stress UI 59% had prior continence surgery; 46% also had prior urethral injections (at least 2 years prior to study) 2 (4%) had MS, 1 extrophy	Polytetrafluoroethylene (Teflon, peri-urethral)	Various*	Subjective cure or improvement (*mean follow-up 18 months cured grp, 16 improved, 9 failed)	30% cure 41% improved 28% failure	Funding: Mentor provided material. First author had financial relationship with Mentor. 6 ml inj. under LA as outpatients, at 3and9 o'clock positions guided by cystoscope. Reinjection after 2–3 months when necessary. Cure = dry; improvement = reduced number of pads and subjective improvement. No sig. difference between cure/ improved/failed groups in pre-op LPPs
						Complications (*mean follow up 28 months [11–38])	11% acute retention 4% UTI 2% voiding difficulty	
Beckingham 1992[603]	Case series EL = 3	26	F mean age 63 (27–77), UD stress UI. 42% had prior pelvic surgery	Polytetrafluoroethylene (Teflon, peri-urethral)	Mean 3.5 years (3–5)	Subjective cure/ improvement	7% dry 20% improved 73% failed (of whom 68% underwent other surgery)	Funding: none declared. Mean 9 ml injected at 12, 3, 6, 9, o'clock positions. 19% had 2nd inj.; 4%×3

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Complications	31% acute retention (24–48 h); 4% (*n* = 1) for > 1 week 38% urethral discomfort or dysuria (15% for > 1 week) 12% passage of Teflon plug via urethra	guided by cystoscope.
Deane 1985[604]	Case series EL = 3	46 (28 F)	M/F, all F had stress UI, all M post-prostatectomy sphincter damage 39% F had prior colposuspension or anterior repair	Polytetrafluoroethylene (Teflon, peri-urethral)	3 months to 2 years	Subjective cure/ improvement (F only)	39% cure 29% improved 32% failed	Funding: none declared. Inj. guided by cystoscope into 3, 6, 9, o'clock positions; mean 10 ml per pt, repeated in 60% pts.
						Complications	'pyrexia and transient voiding difficulties common' (no definition)	
Harrison 1993[606]	Case series EL = 3	36*	F mean age 55 years (34–79), stress UI (UD done in 83%) 58% had prior continence surgery	Polytetrafluoroethylene (Teflon, peri-urethral)	5.1 years (2–7)	Subjective cure/ improvement	33% cure or much improved 17% slight improvement 33% unchanged 17% had further surgery	Funding: none declared. 7 ml injected in 3, 6, 9 o'clock positions. 22% had 2 injections, 11%×3; 3 of the 12 were cured/improved, other failed. No information on adverse effects. *73% of a series of 49 who were followed-up by questionnaire.
Vesey 1988[605]	Case series EL = 3	36	F mean age 55 years (32–80), UD stress UI 50% prior failed continence surgery (mainly anterior colporrhaphy)	Polytetrafluoroethylene (Teflon, peri-urethral)	Mean 9 months (3–36)	Subjective cure/ improvement	56% cure 11% improved 33% failed	Funding: none declared. Inj. under GA; 7–14 ml past into 3, 6, 9 o'clock positions guided by cystoscope. Repeat inj. in 8 (22%), 6 of whom were cured or improved.
						Urodynamics (*n* = 18)	No sig. change in MUCP or urine flow rate	
						Complications	1 (3%) UTI 3% acute retention	

Hydroxylapatite – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Mayer 2001[608]	Case series EL = 3	10	F mean age 68 years (60–82), stress UI with ISD, who had failed conservative treatment	Calcium hydroxylapatite (transurethral)	Mean 12 months (3–25)	Subjective (pad usage) at 1 year	3 no pads 4 many fewer pads 2 fewer pads 1 no change	Funding: Convatec/Bristol-Meyers Squibb. Inj. given via ratchet gun, mean vol. injected 3.9 ml (1.9–5.5).

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			60% had prior continence surgery			Telephone review at mean 37 months (22–43)	6 satisfied (2 dry; 4 used pads variably)	2nd injection given to 7 after mean 8.4 months (6–12).
						Complications	3 transient UTI 5 transient retention 0 *de novo* DO	

Autologous fat – controlled trials

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Lee 2001[561]	DB RCT EL = 1+	68	F mean age ~57 years, stress UI; 27% had urethral hypermobility Exclusions: other diagnoses of incontinence e.g DO	Autologous fat (peri-urethral), up to 3 injs *n* = 35	Placebo (saline) *n* = 33	3 months after last inj.	Cure or improvement*	22.2 vs 20.7%	Funding: Physicians Sources Inc. Pts and research nurse blinded to tx allocation. *cure = no leak on 1 h pad test, none seen on coughing, and incontinence questionnaire score of 0; Improvement = reduction in continence questionnaire score by ≥ 5 points.
							Other outcomes	No sig. change from baseline in either grp in UI score, pad weight, MUCP, LPP	
							Complications	Of 189 procedures: 3% acute retention 5% UTI Of total no pts 13% short-term urgency 1 death from fat embolism	Inj. as outpatients; 30 ml fat harvested from anterior abdominal wall or buttock. Inj. guided by cystoscope under LA (some GA), into 3 and 9 o'clock positions using ratchet-type injection gun. Reinjection offered at months 1,2,3 if wet; 100% in saline grp had 3 inj.; in fat grp, 7%×1, 10%×2, 82% ×3. All except 6 inj. done by single surgeon.
Haab 1997[563]	Cohort EL = 2+	67	F mean age 64 (SD 9) years, stress UI owing to ISD. Mean no of prior failed procedures	Autologous fat (peri-urethral), up to 3 injs *n* = 45	GAX-linked collagen (peri-urethral)	mean 7 months	Subjective cure/ improvement	Cure 14% vs 24% Improved 30% vs 62% Failure 57% vs 14% *P* < 0.001	Funding: none declared. Fat harvested from lower abdomen using liposuction, under LA. Peri-urethral inj. under cystoscope

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			1 vs 1.43 Exclusions: uninhibited detrusor contractions		*n* = 22		Pt-rated subjective improvement (VAS 0 to 100%, none to total)	22% vs 64%	guidance at 3 and 9 o'clock positions ; mean 1.67 (SD 0.5) inj., mean 12 (SD3) ml. Skin test to collagen 1 month before procedure. Collagen inj. under cystoscope guidance at 3 and 9 o'clock positions, mean 1.9 inj., mean vol. 7.1 (SD 3) ml.
							Complications	60% overall (12% UTI, 10% transient irritative voiding symptoms) 2% (*n* = 1) in fat grp subcutaneous abdominal wall haematoma 4% vs 9% reqd ISC for 2 weeks postop	

Artificial urinary sphincters

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Costa 2001[609]	Case series EL = 3	206 (13% neurogenic bladders) Results reported for 168 with idiopathic UI	F genuine stress UI owing to ISD, with a negative Marshall test Mean age idiopathic grp 59 years (24–80); 18% had prior prolapse surgery, 51% prior failed continence surgery (no further details)	Silicone artificial urinary sphincter (AMS 800) Device activation after 6 weeks	Mean 3.9 (SD 2.4) years, range 0.3–9.3	Subjective continence status (*n* = 168 idiopathic UI)	89% cure 8% social continence (few drops but no pad use) 4% leakage with pad use	Funding: none declared but ≥ 1 author had financial relationship with American Medical Systems Inc. If present, prolapse was corrected during the procedure AMS 800 implanted through a transverse abdominal approach.
						Peri-operative complications (*n* = 168)	28% injury (13% vaginal, 11% posterior neck, 3% anterior neck, 0.5% urethral)	
						Post-operative adverse effects (*n* = 168)	8.3% device removal, 12/14 owing to erosion at median 1 month (14.3 ± 14.6, range 1–54) 7% incisional hernia 5.4% urgency ± leakage 4% haematoma of labia majora and scar 3.6% mechanical complications (1 tube leakage, 3 cuff leakages, 1 balloon leakage, 1 pump malfunction) 1.2% urinary retention 1% phlebitis	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Diokno 1987[610]	Case series EL = 3	32	F mean age 55 years (32–82), idiopathic stress UI, failed suspension procedures (mean no. 2.2) 44% also had urgency and urge UI (16% DO) 28% abnormal bladder emptying symptoms	AS800 in 66% AS 791/792 in 22% AS 742/761 in 13%	9% 6–11 months, 31% 1–2 years, 9% 2–3 years, 25% 3–4 years, 6% 4–5 years, 19% ≥ 5 years	Continence Complications	91% cure (no pads)[#] 6% using 1/3 pads 3% incontinent (device removed)* 19% mechanical (2 loose cuffs, 2 cuff leaks, 2 tubing kinks, 1 connector leak) 6% transient retention 3% superficial wound dehiscence 3% pelvic abscess (device removed)*	Funding: none declared. [#]device kept deactivated in 3 as continent after procedure.
Webster 1992[611]	Case series EL = 3	25 (24 followed-up, 1 died of CVA)	F mean age 61 (19–79) with type III stress UI. 84% had prior continence surgery, 24% also had DO	Artificial urinary sphincter (AS792 in 2, AS800 in 23)	Mean 2.6 years (up to 8.9 years)	Subjective cure Satisfaction (n = 15) Complications	92% cure 8% minor activity-related leakage 12 excellent 3 above-average 4 (17%) reqd revisions for device malfunction (of cuff or pump)	Funding: none declared. AUS implanted abdominally with sphincter cuff placed at the bladder neck. 1 pt also underwent ileocaecocystoplasty for DO
Appell 1988[612]	Case series EL = 3	34	F aged 24–65 years, type III UD stress UI All had ≥ 2 prior continence procedures	Artificial urinary sphincter (AS800)	n = 19 (56%) have follow-up of ≥ 3 years	Continence Complications	Cure – 91% 'initially', 100% long-term 3 (9%) required revision (2 cuff replacement, 1 connector leak) 4 (12%) ISC	Funding: none declared. Cuff implanted transvaginally. Device not activated until at least 6 weeks post-op.
Light 1985[613]	Case series EL = 3	39	F mean age 63 years (39–78), with severe persistent UI following corrective surgery for UI (mean 2.2 procedures/pt) 61% totally incontinent in the erect position, with 46% incontinent in the supine position; the remaining 39% used multiple pads/day Exclusions: neuropathic bladder dysfunction, post-traumatic incontinence	Artificial urinary sphincter (no description or name)	Mean 38 months (3–72)	Continence status Complications	87% dry or using ≤ 1 pad/day 5% reqd 2–3 pads/day 36% reqd mean of 1.5 additional procedures each; indications were mechanical failure (9), non-mechanical (11), and infection (1) 10% device removal (1/4 for infection, 3/4 for primary erosion of cuff); reimplantation done in 2/4; successful in 1	Funding: none declared.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Petero 2006[614]	Case series EL = 3	108 (55 [51%] women)	M/F mean age 59 years (SD 15) who had AUS for stress UI. Some had neurogenic disease (proportion not stated) Of the 55 women, 89% had prior continence surgery, and 5% failed AUS	AUS AMS 800	Mean 8.1 years (SD 5.6) 9.3 in women	Duration and aetiology of AUS failure (in women)	56% same device in situ 9% device removed with replacement 35% had revisions in 16% women device in deactivated state owing to achieving continence overall 40% failure rate (22% mechanical, 14% nonmechanical, 4% iatrogenic) Median duration of implanted device: 11.2 (SD 1) year	Funding: none declared; author financial interest with some pharmaceutical companies. Review of cases undertaken between August 1983 and January 2004.
						Continence measures (in women)	84% satisfactory continence 64% dry	

Procedures for stress urinary incontinence – operations to suspend the vaginal wall

Open vs laparoscopic colposuspension

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Ankardal 2005[624]	RCT EL = 1–	211 randomised, 87% underwent surgery and analysed* (though not all pts for all endpoints)	F mean age ~35–39 years, stress or mixed UI (predominant stress) Exclusions: recurrent incontinence	Burch colposuspension (*n* = 79 randomised, 63 [80%] analysed)*	Laparoscopic colposuspension with sutures (*n* = 53 randomised, 49 [92%] analysed)* Lap colposuspension with mesh and staples (*n* = 79 randomised, 72 [91%] analysed)*	1 year	Objective cure	< 8 g/24 h on 48 h pad test: 92 vs 91% vs 76%, *P* = NS < 5 g on stress test: 92 vs 90% vs 63%, *P* < 0.05 open vs mesh	Funding: Swedish Medical Research Council and Goteborg Medical Society Fund. *owing to changing mind about surgery or not meeting incl/excl criteria (11% overall; 50% of which from Burch grp), or loss to follow-up (3; lap mesh grp). [EL = 1–] Only completers analysed, no attempt made to discuss implications of withdrawals. Unclear method of randomisation; especially as all pts randomised to Burch or lap colpo with mesh and staples were also included in Ankardal 2004[948] which is not considered here owing to 'double-counting' of pts. abstract publication of this study included in Cochrane review.[616] 4% underwent concomitant surgery (posterior colporrhaphy, sterilisation, adnexal surgery). **2 bladder perforations, 3 technical problems, 1 anaesthetic complications.
							Subjective cure	94 vs 88% vs 63%, *P* = NS	
							Bother (0–100 mm VAS, lowest- highest satisfaction)	56 vs 55% vs 26% no leak, no bother *P* < 0.05 Burch/suture vs mesh 41 vs 40% vs 60% improvement in score, *P* < 0.05 Burch/suture vs mesh 3 vs 4% vs 13% no improvement/worse, *P* = NS	
							'QOL' on 100 mm VAS	No sig. difference in improvements in physical activity, working ability, social life, sexual life	
							Satisfaction (100 mm VAS)	90 vs 90 vs 72 mm 87 vs 90% vs 79% would recommend to friend	
							Hospital parameters (mean)	Anaesthesia time 112 vs 132 vs 122 min, *P* < 0.05 lap suture vs Burch surgery time 66 vs 84 vs 74 min, *P* < 0.05 lap suture vs Burch duration bladder drainage 5.9 vs 6.2 vs 1.9 days, *P* < 0.05 Burch/lap suture vs mesh duration hospital stay 3.9 vs3.3 vs 2.1 nights, *P* < 0.05 mesh vs Burch/lap colpo	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Complications	*n*/a vs 8% vs 3% conversion to open colposuspension** 5 vs 8% vs 1% bladder perforation 2 vs 2% vs 0% haematoma requiring op 23 vs 26% vs 0% UTI (within 1 month) 3 vs 2% vs 1% wound infection 27 vs 39% vs 8% urinary retention > 5 days, *P* < 0.05 Burch/lap suture vs mesh	
Fatthy 2001[625]	RCT EL = 1+	74	F mean age ~40–43 (range 30–65) years, UD stress UI Exclusions: DO, underactive detrusor, ISD (VLPP < 90), limited vaginal mobility, stage 3 or 4 vaginal prolapse, contraindications to laparoscopy and surgery in general	Open Burch colposuspension (*n* = 40)	Laparoscopic colposuspension with sutures, (*n* = 34)	18 months	Cure (subjective and objective*)	90 vs 90.9% at 6 months, *P* = NS 85 vs 87.9% at 18 months, *P* = NS (negative stress test 77.5 vs 84.8%, *P* < 0.001)	Funding: none declared. Included in Cochrane review.[616] UD follow-up done by surgeon blinded to procedure performed. *subjective = dry or rarely needing pad and pt satisfied; obj cure negative stress test, no leak on Valsalva during UD, and significant increase in MUCP. No concomitant surgery reported.
							Hospital parameters	Mean operating time 53 (SD 10) vs 70 (SD 16.5) mins, *P* < 0.001 Mean blood loss 250 (SD 35) vs 42 (SD 7.2) ml, *P* < 0.001 Mean hospital stay 76 (SD10) vs 36 (SD6) h, *P* < 0.001	
							Complications	Peri-operative: Bladder injury 2.5 vs 2.9% bladder perforation 0 vs 2.9% Post-operative (*P* = NS for all): wound infection 5% vs 0% retropubic haematoma 2.5% vs 0% spontaneous voiding 90% vs 91% *de novo* DO 7.5 vs 5.9%	
Cheon 2003[626]	RCT EL = 1+	90	F mean age 51 years, UD stress UI 30% vs 15% open vs lap also had DO Exclusions: prior continence surgery,	Open Burch colposuspension (*n* = 43)	Laparoscopic colposuspension (sutures) (*n* = 47)	1 year	Objective success	86 vs 85.1%, *P* = NS (dry during cough on UD)	Funding: none declared. All procedures done by 2 senior urogynaecologists (done min 15 laparoscopic colposuspensions prior to study). 37% vs 15% underwent
							Subjective success	86 vs 80.9%, *P* = NS	
							Satisfaction	85.3 vs 97.9%, *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			conditions that may reduce flexibility of vaginal wall e.g. fibrosis; ISD				Hospital parameters	Mean operating time 29 vs 42 min, $P < 0.0001$ Mean blood loss 327 vs 125 ml, $P = 0.001$ Mean hospital stay 9.6 (3.9) vs 9.7 (5.0) days, P = NS	concomitant hysterectomy (before colposuspension). Included in Cochrane review.[616] *1 reqd conversion to open.
							Complications (all P = NS)	Bladder injury 0 vs 4.3%* UTI 6.9 vs 2.1% wound complication 2.1 vs 2.3% DVT 0 vs 2.1% *de novo* DO 11.6 vs 25.5% obstruction (peak flow rate < 15) 37.2 vs 27.7% enterocele 4.7 vs 2.3% dyspareunia 9.3 vs 6.4%	
Ustun 2005[627]	RCT EL = 1+	52	F mean age 43–47 years, UD stress UI None had prior continence surgery Exclusions: DO	Open Burch colposuspension* (n = 26)	Laparoscopic colposuspension* (sutures) (n = 26)	Mean 13 months open grp, 14 months lap (range 3–24)	Cure (dry on UD, no pads used)	80.8 vs 80.8% at 3 and 12 months	Funding: none declared. *both with other gynaecologic procedures (4 vs 3 vaginal hysterectomy, 8 vs 7 posterior colporrhaphy, 9 vs 9 tube ligation, 2 vs 4 salphingo-oopherectomy, 3 vs 3 cyst extirpation. **not stated whether transient or persistent.
							Hospital parameters (median [min, max.])	Operating time 60 (30–100) vs 90 (45–140) mins, $P < 0.001$ Hospital stay 6.5 (3–13) vs 2 (1–8) days, $P < 0.001$ Duration catheterisation 3 (3–3) vs 3 (1–5) days, $P = 0.002$	
							Complications	Peri-operative: bladder injury 3.8 vs 3.8% bleeding 0 vs 3.8% Post-operative:** *de novo* DO 11.5% vs 7.6% retention 7.6 vs 7.6%	
Su 1997[628]	RCT EL = 1–	92	F mean age ~42–44 years, UD stress UI Exclusions: pathological conditions limiting flexibility of vaginal	Open Burch colposuspension* (n = 46)	Laparoscopic colposuspension with sutures* (n = 46)	6 months	Objective cure (dry on severe cough and bouncing on UD testing)	95.6% (95% CI 89.7 to 100) vs 80.4% (68.9, 91.9), $P = 0.044$	Funding: none declared. [EL = 1–] patients randomised except where preference expressed for Burch, in which case choice given and next pt allocated lap colpo then randomisation continued. This
							1 h pad test	No sig. differences between groups in reduction in urine loss	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			wall; uterine prolapse or cystocele > 1st degree, DO, underactive detrusor or outflow obstruction, prior continence surgery or prior hysterectomy				Hospital parameters	Operative time 73 vs 67 min *P* = NS Duration bladder drainage 6.8 vs 3.9 days, *P* < 0.001	applied to 'few patients'. All procedures by senior gynaecologist. Power calculation based on 152 pts.
							Complications	4.3 vs 4.3% outflow obstruction 6.5 vs 4.3% DO 4.3% vs 0% haematuria 2.2 vs 2.2% UTI	*30% from both grps also underwent abdominal hysterectomy – in the Lap colpo grp the laparotomy for hysterectomy was done immediately after the laparoscopic procedure.
Kitchener 2006[629]	RCT EL = 1+	291; data on subjective outcomes in 88%, and objective in 83%, but impact of losses considered	F mean age ~50 years for whom colposuspension was chosen to treat UD stress UI Exclusions: prior retropubic surgery (although 7% had); DO, 'grossly obese' women considered unsuitable for surgery	Open Burch colposuspension (*n* = 147)	Laparoscopic colposuspension (*n* = 144)	2 years	Objective cure* (data for 79.6 vs 85.4%)	70.1 vs 79.7%	Funding: MRC 6 UK centres; surgeons at each had 'extensive' experience of both techniques. No concomitant surgery undertaken. *negative 1 h pad test (gain of ≤ 1 g. #a response of 'perfectly happy/pleased' to question 33 of BFLUTS. Aim of study was to show that laparoscopic colposuspension is non inferior to open colposuspension. Of 144 in lap grp, 11 received open surgery, 2 received no surgery; of 147 in open grp, 1 underwent the lap procedure, and 3 no surgery at all. Condition-specific questionnaire not used to assess QOL (only SF36)
							Subjective cure#	Satisfaction#: 54.6 vs 54.9% By symptoms (never leaks/leaks < 1 month): 53.1 vs 55.4%	
							Operative care	Hospital stay mean 6 vs 5 days, *P* = NS	
							Time to return to work (~50%)	10.54 vs 9.42 weeks, *P* = NS	
							Complications (peri-operative)	0.7 vs 2.8% bladder injury 0 vs 0.7% bowel injury 1.4 vs 0.7% haemorrhage > 500 ml 1.4% vs 0% wound dehiscence 7.8 vs 0.7% wound infection 5 vs 5.7% UTI 5 vs 3.5% chest infection	

RCTs comparing different suturing methods for laparoscopic suspension

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Persson 2000[630]	RCT EL = 1–	*n* randomised unclear. 161 treated and analysed at 1 year	F mean age ~50 years, UD stress UI with bladder neck hypermobility. 39% vs 41% had mixed UI Exclusions: urge UI, SUI owing to low UCP (< 20 cmH_2O), > grade 1 cystocele, failed prior vaginal repair, recurrent UI	Laparoscopic colposuspension using double-bite sutures (*n* = 83; 80 followed-up to 1 year)	Laparoscopic colposuspension using single-bite suture (*n* = 78; 77 followed-up to 1 year)	Median 12 months (9–24)	Objective cure (no leak on 'ultrashort' pad test; improved if leakage ≤ 1/3 of pre-op leakage)	83% vs 58% cured 12% vs 27% improved 5% vs 15% failed *P* = 0.001 for all comparisons	Funding: none declared. [EL = 1–] Enrolment stopped after analysing results for 108 women at 1 year (when another 60 had been treated), which showed a sig. difference in favour of double-grip sutures. Not all pts evaluated for all outcomes – several refused pad test Sutures made of PTFE. 37% vs 41% had additional gynae surgery.
							Subjective cure	89% vs 65% cured 7% vs 32% improved 4% vs 3% failed *P* < 0.001 for all comparisons	
							Operating time (median)	77 (45–110) vs 60 (35–121) mins, *P* < 0.001	
							Complications	Immediate: 0% vs 1% osteitis 4% vs 6% cystitis 0% vs 1% pyelonephritis 2% vs 0 superficial wound infection 1% vs 1% abdominal wall haematoma 4% vs 3% abdominal pain causing prolonged hosp stay 6% vs 6% transient urgency Post-operative: 5% vs 3% recurrent UTI (≥ 4 per year) 1% vs 0% dyspareunia 2% vs 3% cicatricial hernia 10% vs 3% new onset recto/enterocele 4% vs 1% slow bladder emptying 5% vs 8% new onset/worsened urge symptoms 0% vs 3% persisting pelvic discomfort	
Ross 1995[631]	RCT EL = 1+	69	F mean age ~51 years (37–75), UD stress UI with hypermobility	Laparoscopic colposuspension using sutures	Laparoscopic colposuspension using	1 year	Objective cure*	91% vs 94% (5 failures owing to: 2 recurrent SUI, 2 DO, 1 intrinsic sphincter dysfunction)	Funding: none declared. *negative Q-tip test, ultrasound, cough stress test, and UD

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			(positive Q-tip test) Exclusions: prior continence surgery, DO inferred ISD	(*n* = 35)	mesh and staples (*n* = 34)		Complications	3% vs 0% haematuria 6% vs 6% UTI 6% vs 3% cystotomy 0% vs 3% thrombophlebitis 0% vs 3% retention	negative for DO. One surgeon.
Zullo 2001[633, 634] and Piccione 2001[632] (3 publications of same study) 3 year follow-up in 2004[635]	RCT EL = 1+	60	F mean age ~53 years, UD stress UI, mild to moderate Exclusions: severe UI (VAS); POP ≥ 2nd degree, prior pelvic or continence surgery, severe abdo-pelvic infections, DO and/or ISD, other gynaecologic pathologies, BMI > 30	Laparoscopic colposuspension using sutures (*n* = 30; 27 analysed)	Laparoscopic colposuspension using mesh and staples (*n* = 30; 26 analysed)	3 years	Objective failure (positive stress test)	10.7% vs 25% at 1 year 29.6 vs 57.7% at 2 years 42.3 vs 61.5% at 3 years all *P* < 0.05 between grps	Funding: none declared. Only completers analysed in 2001 paper; ITT used in 3 year follow-up. Transperitoneal laparoscopic Burch performed. No concomitant surgery performed. One surgeon.
							Subjective failure (no change or worsening of score on VAS)	3.3 vs 13.3% at 1 year 20.0 vs 36.7% at 2 years 33.3 vs 53.3% at 3 years all *P* < 0.05 between grps	
							Hospital parameters	Mean operating time 68 vs 82 min Post-op stay 1.7 vs 1.6 days	
							Complications	3.7 vs 3.8% bladder injury 7.4 vs 11.5% DO	

Burch colposuspension vs MMK procedure

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
McCrery 2005[636]	SB RCT EL = 1+	138 with > 6 months follow-up, *n* randomised unclear	F mean age ~48–51 (29–77), stress UI and anterior wall prolapse, with urethral hypermobility (Q-tip > 30° from horizontal) UD diagnosis in 64%: 78% stress UI, 22% mixed UI Exclusions: prior continence surgery, cough LPP < 60, or MUCP < 20	Open Burch colposuspension* (*n* = 66)	MMK* (*n* = 72)	Mean 24 months (7–55) Burch grp, 28.8 (6–60) MMK grp	Subjective cure/ improvement/ failure	ITT analysis: 59.1 vs 48.6% cure 25.8 vs 15.3% improvement 15.2 vs 36.1% failure *P* = 0.02 Excluding losses to follow-up: 65 vs 57.4% cure 28.3 vs 18.0% improvement 6.7 vs 24.6% failure *P* = 0.02 In 64% who had pre-op UD: ITT analysis: 14 vs 42.2% failure *P* = 0.005 Excluding losses to follow-up: 10% vs 35% *P* = 0.008	Funding: none declared. Randomisation by coin toss in the operating room. 9% vs 15% lost to follow-up. *both with concomitant paravaginal defect repair; 55% vs 68% also had hysterectomy, 30% vs 33% abdominal sacral colpopexy, 50% vs 49% posterior repair, 33% vs 30% abdominal cystocele repair, 82% vs 85% culdoplasty.
Colombo 1994[637] Colombo 1998[949] reported long-term follow-up of the MMK group (and another 29 pts)**	RCT EL = 1+	80	F mean age ~50–51 years, UD stress UI with moderate or severe symptoms (daily leakage episodes range 13–21) Exclusions: MUCP < 30, DO, POP 2nd degree or greater, urethral diverticula, urogenital fistulas, prior failed continence surgery	Open Burch colposuspension (*n* = 40)	Modified MMK (*n* = 40)	2–7 years (mean 3.1 Burch, 3.5 MMK)	Objective cure (negative stress test)	80% vs 65%, *P* = NS	Funding: none declared. *reduction in severity score of ≥ 50%. 35% vs 20% had concomitant culdoplasty.
							Subjective cure or improvement*	Cure 92% vs 85%, *P* = NS Improvement 8% vs 15%	
							Hospital parameters (mean, SD)	Days catheterisation 8.5 (7) vs 13.4 (6.9), *P* = 0.002 Days hospital stay 6.3 (1.4) vs 7.4 (1.5), *P* = 0.001	
							Complications	0% vs 5% haematoma 5% vs 10% *de novo* DO (2.5% vs 10% urge UI)	
							Long-term complications in MMK grp (*n* = 69)** at mean follow-up 4.2 years[949]	MMK grp only: 19% voiding difficulties 9% worsening of pre-existing urge UI 7% *de novo* DO 7% chronic urinary retention (6% had urethral dilation) 7% developed genital prolapse 3% recurrent UTI	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Quadri 1999[638]	RCT EL = 1+	30	F mean age 58 vs 63 years, stress UI with low urethral pressure (MUCP ≤ 20), and hypermobility (> 30° on Q-tip) 23% had prior vaginal surgery for anterior vaginal prolapse and stress UI	Open Burch colposuspension (*n* = 15)	MMK (*n* = 15)	1 year	Objective cure (negative stress test)	80% vs 86% at 2 months 53% vs 93% at 1 year, *P* = 0.017	Funding: none declared. Abstract publication of study included in Cochrane review.[638] MMK under cystoscopic control. Sig. difference in 'flow times' at baseline, 232.2 vs 14.1 s, *P* = 0.004. Procedures performed by 2 surgeons.
							Subjective cure	80% vs 100% at 2 months 66% vs 100% at 1 year, *P* = 0.02	
							Complications	7% vs 20% cystitis 13% vs 13% fever mean (SD) time to normal voiding 6.5 (3.3) vs 20.5 (13.4) days, *P* < 0.001	
Liapis 1996[639] Liapis 1996[950] reports Burch and AC arms only at 3 year follow-up; *n* = 81) – data not reproduced here, believed to be the same patients as in	RCT EL = 1–	170 randomised, 155 (91%) followed to 5 years	F mean age 51 years (36–75) UD stress UI	Burch colposuspension* (*n* = 54)	MMK* (*n* = 51) Anterior colporrhaphy* (with Kelly plication, *n* = 50)	4 years	Objective and subjective cure (no definition, other than 'by urodynamic study'	95 vs 85% vs 78% at 2 months 89 vs 67% vs 56% at 4 years (*P* < 0.001 for Burch grp vs others)	Funding: none declared. [EL = 1–] No baseline data or comparisons for grps; no definition of urodynamic cure; only completers analysed; differences in other procedures undertaken. *posterior colporrhaphy also performed in Burch and AC grps; and in MMK if 'there was a degree if rectocele' (*n* not stated).
							Complications/ adverse effects	7 vs 14% vs 10% *de novo* DO 4 vs 6% vs 6% urge UI	

Colposuspension vs anterior colporrhaphy – RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Colombo 2000[640]	RCT EL = 1+	71 randomised, 68 evaluated (3 lost to follow-up)	F mean age ~55 years, UD stress UI and concomitant grade 2 or 3 cystocele, urethrovesical junction hypermobility (> 30° max. straining angle on Q-tip test) Exclusions: DO, prior continence or prolapse surgery, concomitant pelvic disease requiring laparotomy	Burch colposuspension* (*n* = 37 randomised, 35 analysed)	Anterior colporrhaphy* (*n* = 34 randomised, 33 analysed)	Min 8 years; mean 14.2 (9–17) Burch vs mean 13.9 (8–17) AC	Objective cure (negative stress test)	74% vs 42% OR 3.9 (95% CI 1.3 to 12.5), *P* = 0.02	Funding: none declared. Included in Cochrane reviews.[616,620] *total abdominal hysterectomy performed in Burch grp, and vaginal hysterectomy in colporrhaphy grp. 34% vs 100% also had posterior colporrhaphy and perineorraphy.
							Subjective cure	86% vs 52% OR 5.6 (95% CI 1.6 to 21.6), *P* = 0.005	
							Recurrent prolapse	At vaginal site: 54% vs 54% Cystocele grade 2/3 with or without prolapse at other vaginal sites: 34% vs 3%, OR 16.7 (95% CI 2.0 to 368.1), *P* = 0.003	
							Complications	Not listed as such: 24% vs 35% had not voided spontaneously before hosp discharge, but did so within 2 weeks	
Kammerer-Doak 1999[641]	RCT EL = 1+	35	F mean age 45 years Burch vs 53 years colporrhaphy grps (*P* = 0.02); UD stress UI Exclusions: neurogenic bladder, DO, prior radical pelvic surgery, pelvic radiation, ISD (abdominal LPP < 65 and MUCP < 20 cmH_2O), history of interstitial cystitis or urethral syndrome	Burch colposuspension* (*n* = 19)	Modified anterior colporrhaphy* (*n* = 16)	1 year	Objective cure	dry on cough and 265rethra265 in supine/ standing positions with full bladder: 89% vs 31%, RR 0.15 (95% CI 0.04 to 0.59) pad weight < 1 g on 20 min test: 83% vs 40%, RR 0.28 (0.09, 0.85)	Funding: none declared. All except main author blind to procedure until day of surgery. 1 pt in Burch grp had prior anterior colporrhaphy. *women also had hysterectomy or cystocele repair if required – unclear now many did, and what procedures were used in total; there were sig. differences in % who had anterior colporrhaphy to repair cystocele (16% vs 100%) or paravaginal defect repair (42% vs 6%).
							Subjective cure	95% vs 19% RR 0.16 (95% CI 0.04 to 0.58)	
							QOL (IIQ) scores at 1 year	0.32 (0.6) vs 0.91 (0.9), *P* = 0.04	
							Hospital parameters and complications	Duration of hospital stay and post-op catheterisation not sig. different (no data given) 21% vs 50% urgency symptoms	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Bergman 1989[642] and Klutke 1999[643] (latter is analysis of urodynamic data; only available for 53%)	RCT EL = 1–	298 analysed (88% of those randomised)	F mean age 57 years (31–80), stress UI and 'pelvic relaxation' (cystorectocele) requiring surgery Exclusions: prior continence surgery; mixed UI; gynaecologic conditions requiring laparotomy	Open Burch colposuspension* (*n* = 101)	Modified Pereyra procedure* (*n* = 98) Anterior repair* (*n* = 99)	3 months and 1 year	Objective and subjective cure (neg. stress test on UD, no history, no urine loss at any post-surgery assessment)	89 vs 81% vs 80% at 3 months 87 vs 70% vs 69% at 12 months, *P* ≤ 0.02 Burch vs other grps	Funding: none declared. Included in Cochrane reviews.[616,619] Postmenopausal women (66%) given oestrogen vaginal cream ~6 weeks prior to UD and surgery, and encouraged to continue its use. *all women had vaginal hysterectomy and cystorectocele repair (or vaginal cystorectocele correction if had prior hysterectomy [6% of the 342 screened for inclusion]). [EL = 1–] Number randomised unclear; 339 'eligible', and 41 lost to follow-up, so only data reported for completers. No baseline data given (except for UCP, functional urethral length and abdominal PTR) and no comment on whether similar across groups.
							Urodynamics (changes in UCP, abdominal pressure transmission ratio)	No sig. changes in either parameter in any group vs baseline	
							Days of catheterisation (mean, SD)	4 (2.7) vs 4.4 (2.3) vs 4.3 (2.5)	
Bergman 1989[644] and 1995[645] (latter is follow-up of pts cured at 1 year)	RCT EL = 1–	127 randomised, 107 [84%] followed-up and analysed	Women who were ineligible for Bergman 1989[642] study because hysterectomy not required were entered into this study protocol F mean age 55 years (29–77), UD stress UI Exclusions: indication for laparotomy or hysterectomy	Open Burch colposuspension (*n* = 38)	Modified Pereyra procedure (*n* = 34) Anterior repair (with Kelly 266rethra 266*n*, *n* = 35)	1 year and 5 years	Objective and subjective cure (neg. stress test on UD, no history, no urine loss at any post-surgery assessment)	92 vs 82% vs 80% at 3 months 89 vs 65% vs 63% at 12 months, *P* < 0.05 Burch vs other grps *At 5 years (n = 64 [82%] of 78 cured at 1 year)*: 82 vs 43% vs 37%, *P* ≤ 0.05 Burch vs other grps If losses to f/up assumed cured: 84 vs 50% vs 43%, *P* ≤ 0.05 Burch vs other grps If losses to f/up assumed failed: 71 vs 38% vs 31%, *P* ≤ 0.05 Burch vs other grps	Funding: none declared. Included in Cochrane reviews.[616,619] Postmenopausal women (58%) given oestrogen vaginal cream ~6 weeks prior to UD and surgery, and encouraged to continue its use. No attempt to describe outcomes of pts lost to follow-up at 1 year, unclear how many lost from each group; only data reported for completers. No baseline data given (except for UCP, functional urethral length and abdominal PTR) although said to be similar in age, parity,

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Urodynamics (changes in UCP, abdominal pressure transmission ratio) at 1 year	Sig. increase in PTR with each procedure. No other sig. changes	menopausal status. *of those cured at 1 year.
							Days of catheterisation post-op (mean, SD)	4.1 (1.9) vs 4.3 (1.7) vs 3.9 (2.1)	
							Complications between years 1 and 5	3 pts *de novo* DO*	

Colposuspension vs needle suspension – RCTs

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Athanassopoulos 1996[646]	RCT EL = 1–	51	F mean age 50 (20–78), UD stress UI; Stamey grading: 10% grade 1, 51% grade 2, 39% grade 3	Burch colposuspension (*n* = 27)	Stamey (*n* = 24)	8–27 months	Objective cure (UD – no details)	74% vs 71%	Funding: none declared. [EL = 1–] Randomisation by date of birth, baseline data not reported per pt group (only overall). *by ≥ 1 Stamey grade. Included in Cochrane systematic reviews.[616,619]
							Subjective improvement*/ failure	15 vs 12.5% improved 11 vs 16.5% failed	
							Hospital parameters	Mean hospital stay 5.8 (4–11) vs 3 (6–12) days	
							Complications	15% vs 17% haematoma 7 vs 12.5% retention 7% vs 0% abscess 11% vs 4% urgency (none leading to urge UI and none with DO)	
Mundy 1983[647]	RCT EL = 1–	51	F mean age 48 years (29–70), UD stress UI with no evidence of DO 56% had prior continence surgery	Burch colposuspension (*n* = 26)	Stamey (*n* = 25)	Minimum 1 year	Subjective 'success'/failure	Success 88% vs 76% Failure 12% vs 24%	Funding: none declared. [EL = 1–] quasi-randomisation (alternate); no baseline data for patients. 1 surgeon (author) included in Cochrane systematic reviews.[616,619]
							Complications	None	
Gilja 1998[648]	RCT EL = 1+	204 randomised; 146 (72%) followed up for 3 years and are subject of report	F mean age 36 years (28–48), UD stress UI Exclusions: prior continence surgery, neurological disease	Burch (retropubic), *n* = 56	Raz (*n* = 46) Burch (transvaginal), *n* = 44	3 years	Objective cure (on UD)	94.6 vs 91.3 vs 93.2% at 1 year, *P* = NS 91.1 vs 89.1 vs 93.2% at 2 year, *P* = NS 89.3 vs 80.4 vs 86.4% at 3 year, *P* = NS	Funding: none declared. Included in Cochrane review.[619] One surgeon undertook procedures. War in country given as explanation for losses to follow-up.
							Subjective cure	96.4 vs 93.5 vs 97.7% at 1 year, *P* = NS 92.9 vs 91.3 vs 93.1% at 2 year, *P* = NS 92.9 vs 84.8 vs 90.9% at 3 year, *P* = NS	
							Complications	6.8% overall had *de novo* DO	
German 1994[649]	RCT EL = 1–	50	F mean age 50/53 years, UD stress UI	Vagina/obturator shelf	Modified Stamey needle	Mean 2 years (12–	Subjective cure	71% vs 58% for 58% in whom these were primary procedures: 86% vs 53%, *P* < 0.05	Funding: none declared. Included in Cochrane reviews.[616,619]

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			42% prior continence surgery (no details) 60% had 'urge syndrome'	procedure (*n* = 24)	suspension (*n* = 26)	44 months)	Hospital stay and convalescence	Hosp stay 8.3 vs 7.0 mean days Convalescence 10.4 vs 7.9 weeks	Single centre [EL = 1–] randomisation method not stated, grps only compared at baseline in terms of age and weight.
							Complications	4% vs 8% *de novo* urgency 25% vs 12% wound infection 17% vs 0% voiding problems (no definition) 46% vs 73% post-op pain	

Colposuspension vs other interventions

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Colombo 1996[651]	RCT EL = 1+	36	F socially disabling, UD stress UI, with grade 1 urethrocystocele resulting in uni- or bilateral paravaginal defect; daily leakage episodes 9–19 Exclusions: MUCP < 20, DO, prior failed abdominal continence surgery	Burch colposuspension (*n* = 18)	Abdominal paravaginal defect repair* (*n* = 18)	Mean 2.2 vs 2.3 years (1–3)	Objective cure (negative stress test)	100% vs 61%, *P* = 0.004	Funding: none declared. Included in Cochrane review.[616] *study discontinued after 36 F recruited as 'no longer ethical' to conduct a paravaginal repair to treat stress UI. 78% vs 89% underwent hysterectomy concomitantly, and 56% vs 72% culdoplasty.
							Subjective cure	100% vs 72%, *P* = 0.02	
							Hospital stay (mean, SD)	5.2 (0.8) vs 5.0 (0.9) days, *P* = NS	
							Complications	67% vs 94% resumed spontaneous voiding before discharge 28% vs 3% required ISC for mean 8 vs 7 days (1 [3%] Burch grp reqd surgery for retention) 17% vs 11% persistent voiding difficulties 6% vs 0% *de novo* DO (with urge UI) 11% vs 3% recurrent grade 1 urethrocystocele (median 8 months)	
Enzelsberger 1996[657]	RCT EL = 1+	72	F mean age 58 years (45–72), recurrent stress UI after hysterectomy plus anterior repair	Open Burch colposuspension	Lyophilised dura mater sling (*n* = 36)	32–48 months (mean	Cure (subjective and objective [negative stress test])	86% vs 92%	Funding: none declared. (Quasi-randomisation [even/odd numbers] but baseline characteristics reported to be

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
				(*n* = 36)		35 vs 37)	Hospital parameters	6.4 vs 12.4 days to spontaneous voiding, *P* < 0.05 7 vs 15 days catheterisation 8 vs 16 days hospital stay	similar in the 2 grps). Included in Cochrane review.[616] One surgeon performed all procedures. *from 2 to 13% in Burch grp, and from 8 to 3% in sling grp.
							Complications	Peri-op/immediate post-op: 6% vs 3% bladder laceration 5% vs 13% *de novo* urgency/urge UI 3% vs 13% voiding difficulty *P* < 0.05 6% vs 22% retention (PVR > 100 ml), *P* < 0.01 11% vs –5% developed rectocele (changed vs pre-op),* *P* < 0.05	
Berglund 1996 [652] and 1997[653] Lalos 2000[654] 5–7 year follow-up	RCT EL = 1–	45 (43 [95%]) in long-term follow-up	F mean age 50 years (34–62), stress UI Exclusions: prior continence surgery, age > 65 years, other gynae disorders requiring surgical treatment	Burch colposuspension (retropubic urethrocystopexy) (*n* = 30)	Pubococcygeal repair (*n* = 15)	1 year and 5–7 years	Objective cure (≤ 2 g gain pad weight)	67% vs 47% at 1 year	Funding: Kemp foundation and Faculty of Medicine, University of Umea. Included in Cochrane review.[616] Postmenopausal women treated with oestrogen for ≥ 3 months prior to surgery. [EL = 1–] All seen by physio and had PFMT prior to surgery; F with none or poor pelvic muscle contraction on digital assessment were excluded from pubococcygeal grp (*n* not stated); casts doubt over whether study was randomised, as no description of randomisation given. 7/30 in Burch grp operated on by other, less experienced surgeon. Urodynamic findings also reported at 5–7 years; not reproduced here.
							Subjective cure	73% vs 80% at 1 year (27% vs 20% improved) 43% vs 60% at 5–7 years (all others considered failures)	
							Median hospital stay	6 (range 5–21) vs 11 (7–18) days	
							Post-op complications	7% vs 47% UTI 5 (3–18) vs 8 (6–13) days bladder drainage (median)	

Needle suspension vs other interventions

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Hilton 1989[656]	RCT EL = 1+	20	F mean age 57 vs 53 years, UD stress UI with or without other symptoms, considered unsuitable for colposuspension owing to surgical scarring, or marked atrophic narrowing of the vagina 60% both grps had prior continence surgery (total 11 vs 12 procedures; mostly anterior repair)	Stamey endoscopic bladder neck suspension (*n* = 10)	Porcine dermis suburethral sling (*n* = 10)	2 years	Objective cure (on urodynamics)	80% vs 90% at 3 months	Funding: none declared. Included in Cochrane review.[619] Randomisation by random number chart; even nos Stamey, odd nos sling. Urinary symptoms at 3 months also reported, and pre- and post-op UD data.
							Subjective cure	90% vs 90% at 3 months 70% vs 90% at 2 years	
							Hospital stay (mean, SD)	7 (0.3) vs 20 (12.9) days, *P* < 0.05	
							Complications (mean [SD] or % pts)	Blood loss 37 (28.3) vs 700 (469)ml, *P* < 0.05 Wound drainage 0 vs 197 (12.9)ml Bladder injury 20% vs 10% infection (wound/UTI) 0% vs 70%, *P* < 0.001 pulmonary embolism 0% vs 10% *de novo* DO 10% vs 20%	
Di Palumbo 2003[655]	RCT EL = 1+	80	F stress UI (Blaivas type 1 and 2), with grade 3–4 cystocele 50 vs 42,3% had urge UI at baseline	Four-corner bladder and urethral suspension (Raz)* (*n* = 28)	Anterior colporrhaphy (Nichols technique)* (*n* = 52)	Range 280–1670 days (0.8–4.5 years)	Failure (not dry on stress test)	14.3 vs 26.9%, *P* < 0.01	Funding: none declared. *93% vs 90% also had hysterectomy. limited info on baseline UI parameters in both grps. Single centre.
							Hospital stay (mean, range)	5 (4–34) vs 6 (4–20), *P* = NS	
							Complications	Time to spontaneous voiding mean 3.62 (2–9) vs 4.78 (3–9) days, *P* = NS Urinary retention (> 5 < 10 days) 3.6 vs 1.9%	

Colposuspension vs synthetic slings

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Ward 2002[659] 2 year follow-up[660]	RCT EL = 1++	344 randomised; 316 (92%) received tx as randomised	F mean age 50 years (42–59) who had completed their family; UD stress UI Exclusions: DO, vaginal prolapse requiring tx; prior continence or prolapse surgery, major voiding dysfunction (voiding pressure > 50 cmH_2O, PVR > 100 ml), neurological disease*	Tension-free vaginal tape (*n* = 175; 170 [97%] received tx as allocated, 167 [95%] followed up at 6 months; 78% at 2 years)	Open colposuspension (*n* = 169; 146 [86%] received tx as allocated, 137 [81%] followed up at 6 months; 64% at 2 years)	6 months[659] and 2 years[660]	Objective cure (neg stress test on UD and < 1 g change in weight on 1 h pad test) at 6 months	66% vs 57%; (95% CI for difference –4.7%, +21.3%) (81% vs 67% neg stress test 73% vs 64% neg pad test)	Funding: Ethicon ltd. 14 centres (gynae or urology, uni teaching or DGHs). target 436 pts for power calculation. tape under LA and sedation (96%), colpo according to standard procedure of units (99% under GA). All investigators underwent training for tape insertion at a recognised centre. *5 who had surgery violated protocol (4 DO, 1 voiding dysfunction); were included in analysis. Baseline characteristics of pts who withdrew same as others, except for smaller reduction in pad weight for withdrawals vs those undergoing surgery. LOCF = last observation carried forward.
							Objective cure (< 1 g on 1 h pad test) at 2 years	81% vs 80% (OR 1.67, 95% CI 0.59 to 2.06) [completers analysed] with assumptions for withdrawals: OR 1.67 (1.09, 2.58) if all failures, *P* = 0.02 OR 0.86 (0.47, 1.58) if all cured OR 1.64 (1.01, 2.65) with LOCF OR 0.93 (0.54, 1.60) with LOCF and if presurgery withdrawals cured (best and worst case cure rates for both arms 63–85% TVT, 51–87% colposuspension)	
						6 months[659]	Symptoms (bladder diary)	No sig. difference between grps in changes in leakage episodes, frequency, voided volume	
						6 months[659] and 2 years[660]	1 h pad test	No sig. difference between grps in reduction in pad weight at 6 months or 2 years	
						6 months[659] and 2 years[660]	QOL	BFLUTS (6 months and 2 years): sig. improvement in both grps in 21/30 questions (13/20 urinary, 6/6 lifestyle, 2/4 sexual) SF-36: less improvement in colposuspension grp in 4/8 domains (emotional role, social functioning, mental health, energy/vitality) at 6 months; still true for role emotional and mental health at 2 years	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
						6 months[659]	Time to return to (median, IQR)	To normal activities 3 (2–4) vs 6 (4–8) weeks $P < 0.001$ To work 4 (3–7) vs 10 (8–12) weeks $P < 0.001$	
						6 months[659]	Satisfaction	85% vs 82% satisfied or very satisfied 4% vs 3% dissatisfied 84% vs 82% would recommend to friend	
						6 months[659]	UD	No sig. difference between grps in changes in cystometry or UPP variables	
						6 months[659]	Hospital parameters	Theatre time (median, IQR, mins): anaesthetic room 15 (10–50) vs 17 (14–25), $P < 0.001$ operating theatre 40 (30–48) vs 50 (35–60), $P < 0.001$ recovery area 41 (31–60) vs 85 (65–115), $P < 0.001$ Duration catheterisation: 38% vs 100% 1–7 days 5% vs 33% 8–28 days, $P < 0.001$ 3% vs 13% 29 days to 6 months, $P < 0.001$ > 6 months 2% vs 8%, P = NS Median hospital stay: 1 (1–2) vs 5 (5–7) days, $P < 0.001$	
						6 months[659] and 2 years[660]	Post-op complications, up to 6 months[659] (all P = NS unless otherwise stated)	39 vs 44.5% total 22% vs 32% UTI (in 6 weeks postop) 9% vs 2% bladder injury (perforation/trauma) $P = 0.013$ 3% vs 0% vaginal perforation 2% vs 7% wound infection 1% vs 5% fever, $P = 0.027$ 0% vs 2% DVT N/A vs 2% incisional hernia 2% vs 0% retropubic haematoma 1% vs 0% vascular injury 1 vs N/A tape erosion	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Complications and further procedures occurring between 6 months and 2 years (*P* = NS unless otherwise stated)	5.9 vs 2.1% symptoms of recurrent UTI voiding disorder requiring ISC 0 vs 2.7%, *P* = 0.0045 1.8 vs 3.4% surgery for UD SUI 0 vs 4.8% surgery for uterovaginal prolapse, *P* = 0.0042 *n*/a vs 3% incisional hernia repair 2% vs *n*/a division or trimming of tape 5% vs 3% 274rethra274*n*274 2% vs 0% urethral dilatation 0.6% (*n* = 1) vs 0 caesarean section 2 vs 0.7% abdominal hysterectomy	
Liapis 2002[661]	RCT (quasi randomisation) EL = 1–	71	F mean age ~47 years (32–64), UD stress UI with competent intrinsic urethral sphincter Exclusions: greater than first degree prolapse, prior surgery for SUI, DO	Tension-free vaginal tape (*n* = 35)	Open Burch colposuspension (*n* = 36)	2 years	Objective cure/ improvement*	Cure 84% vs 86% Improvement 7% vs 6%, *P* = NS	Funding: none declared. Surgeon blinded. [EL = 1–] procedures done alternately (= not true randomisation). Baseline data (age, parity, weight) shows no difference between grps. *cure = pad weight difference < 1 g on 1 h test; improvement ≥ 50% reduction in leakage.
							Hospital parameters	Duration of procedure (range, mins) 16–25 vs 46–70, *P* < 0.01 Hospital stay (mean, days) 2.1 vs 5.7, *P* < 0.05 Return to normal activity 10 vs 21 days (Mean), *P* < 0.05	
							Complications	11% vs 0% bladder perforation 14% vs 6% UTI 17% vs 14% DO 6% vs 3% sensory urgency 0% vs 6% haematoma 0% vs 9% retention 0% vs 11% pain at incision site	
Wang 2003[662]	RCT EL = 1+	98 randomised (90 analysed)	F mean age 52 (34–73) years, UD stress UI without POP Exclusions: bladder outlet obstruction, prior continence surgery	Tension-free vaginal tape (*n* = 49)	Modified Burch colposuspension (*n* = 49; 41 analysed*)	Median 22 months (12–36)	Objective cure/ improvement (cure: ≤ 2 g on 1 h pad; improvement > 50 % reduction; failure > 2 g)	Cure 82% vs 76% Improvement 8% vs 12% Failure 10% vs 12% (*P* = NS all comparisons)	Funding: none declared. Fewer analysed than randomised in Burch grp; *all pts who withdrew moved abroad. Tape procedure under LA; modified Burch under regional anaesthesia. 90 pts required for power calculation; this based on
							Subjective success (cure or improvement)	92% vs 93% *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Complications	'no sig. complications' with either procedure; no further details given	obstructive outcomes, not cure. Subjective cure: no urine loss during physical exercise; improvement > 50% reduction in leakage; failure: reduction of < 50%. Voiding also reported on Blaivas-Groutz nomogram as a measure of obstruction.
El-Barky 2005[663]	RCT EL = 1–	50	F mean age 50 years (SD 14) with UD stress UI Exclusions: high grade cystocele, prior surgical failure for SUI, uninhibited detrusor contraction during bladder filling on urodynamic study and incompetent internal sphincters	Burch colposuspension (*n* = 25)	TVT (*n* = 25)	At least 2 years but results given at 3–6 months	Subjective assessment of continence status (at 3–6 months)	72% vs 72% 'completely' cured 16% vs 20% improved (had occasional UI) 12% vs 8% no improvement, *P* = NS for all	Funding: none declared. [EL = 1–] No details of randomisation, whether ITT done, nor whether groups balanced at baseline in parameters other than age, parity, and duration of symptoms.
							Operative care	Mean operating time 57 vs 20 min Mean hospital stay 6.2 vs 3.1 days Return to normal activity 21 vs 10 days	
							Complications	0% vs 8% bladder perforation 12% vs 20% retention 12% vs 8% de novo urgency 12% vs 20% UTI 8% vs 0% wound infection	
Bai 2005[658]	RCT EL = 1+	92	F mean age 56–58 (SD ~3) years, UD stress UI, of Stamey grade 1 or 2 Exclusions: DO, UTI, ISD, POP > grade 2	Burch colposuspension (*n* = 33),	Tension-free vaginal tape (*n* = 31) Pubovaginal sling using autologous rectus muscle fascia (*n* = 28)	12 months	Cure (symptom-free and negative stress test)	88 vs 87% vs 93% *P* < 0.05 for sling vs Burch or TVT	Funding: none declared. One surgeon performed all the procedures. Some % cure rates in text differ from those in tables (at 3 months).
							Complications	9% vs 0 vs 0 *de novo* DO 3% hesitancy (difficulty initiating voiding) 0 vs 13% vs 7% urinary retention	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Valpas 2004[664] and 2003[665] for complications	RCT EL = 1+	128 randomised (121 operated on)*	F age 29–68 (means 50 and 48) UD stress UI recruited from gynaecological outpatient clinics Exclusions: age > 70, prior continence surgery (except colporrhaphy), > 3 UTIs in past 3 years, UCP < 20, PVR < 100 ml	Polypropylene (tension-free vaginal tape) *n* = 70	Lap mesh colposuspension *n* = 51	12 months	Objective cure	Negative stress test: 86% vs 57%, (95% CI for difference 12.7 to 43.9), *P* = 0.000 Negative 48 h pad test (< 8 g/24 h): 73% vs 59% (–2.8, +30.4) < *P* = NS	Funding: none declared. Recruited fewer pts than required by power calculation (176). Tape procedure under LA; lap suspension under GA, by senior gynaecologist who had performed ≥ 20 of each procedure. *7 withdrawals: 4 refused surgery, 2 refused results of randomisation, 1 treated outside study centres. Of 121 treated, 6 lost to follow-up or withdrew (4 vs 2).
							Severity scores at 12 months	UISS (0–20): 1.1 vs 2.7, *P* = 0.02 VAS (1–10): 0.9 vs 2.2 *P* = 0.000	
							KHQ at 12 months	No sig. difference in general health perception, or sleep/energy Sig. lower scores in TVT grp for incontinence impact, role/physical/social limitations, personal relationships, emotions, severity measures	
							Satisfaction (whether met pts expectations)	totally 83% vs 59% partially 11% vs 28% not at all 0% vs 6%, *P* = 0.001 between grps	
							Hospital parameters[665]	Operating time 29 (14–153) vs 47 (19–120) mins, *P* < 0.001 theatre time 60 (35–183) vs 91 (50–190) mins, *P* < 0.001	
							Complications[665]	1% vs 2% (both *n* = 1) bladder perforation 3% vs 4% prolonged retention 0% vs 2% port site infection 1% vs 2% wound infection 0% vs 1% haematoma 4% vs 2% UTI 3% vs 0% urge symptoms 0% vs 4% other pain	
Paraiso 2004[666]	RCT EL = 1+	72 randomised (71 treated	F mean age ~54 years (38–80), UD stress UI No prior continence	Tension-free vaginal	Lap Burch colposuspension	Mean 21 (SD 8), median	Leakage episodes (mean)	1 year: 1.8 vs 0.4, *P* = NS 2 years: 0 vs 0.3, *P* = NS	Funding: none declared. Trial stopped early because of slow recruitment and lack of

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
		as randomised)* *n* = 63 (88%) at 1 year, 33 (46%) at 2 years	surgery, no DO on UD, no anterior vaginal wall prolapse to or beyond hymen. 47% vs 25% prior hysterectomy, 6% vs 3% prior anticholinergic tx	tape *n* = 36	*n* = 35	18 months, range 12–43 months	QOL (UDI, IIQ; mean scores)	UDI: 1 year: 6 vs 4 2 years: 4 vs 4, *P* = NS IIQ: 1 year: 49 vs 38 2 years 33 vs 47, *P* = NS	funding (recruited fewer pts than required by power calculation, *n* = 130). Tape procedure under LA, GA or spinal; lap suspension under GA *6 withdrawals: 1 colpo grp refused surgery. Of those treated, 2 both grps lost to follow-up, 1 from tape grp died (unrelated to surgery). 32 vs 35 concomitant procedures were performed (mainly hysterectomy [9 vs 8]; sig. difference in lysis of adhesions, 11% vs 32%; others included colporrhaphy, adnexal surgery, tubal ligation, bladder biopsy 24% vs 36% taking anticholinergics after surgery **costs also calculated Actual values rather than % change reported because no baseline data given.
							Urodynamics (*n* = 63; % with)	SUI: 3% vs 19%, *P* = NS (hence objective cure: 97% vs 81%) DO: 19% vs 6% (with UI 3% vs 0%), *P* = NS Voiding dysfunction 15% vs 15%	
							Satisfaction scores (VAS 0–10)	1 year: 8.5 vs 8.4, *P* = NS 2 years: 8.2 vs 9.0, *P* = NS	
							Hospital parameters	Total operating time 79 vs 132 min, *P* = 0.003**	
							Complications	*Intraoperative:* Tape: 3% blood transfusion, 6% cystotomies Colpo: 3% bowel injury (repaired), 9% converted to open surgery *Postoperative:* both groups, 3% haematoma, 3% pelvic abscess Tape: 3% vaginal erosion of mesh, 6% transection for voiding Colpo: 3% postop ileus, 3% PE, 3% pyelonephritis	
Ustun 2003[667]	RCT EL = 1–	46	F mean age ~46 years (SD 10–11), UD stress UI 17% in tape group vs 0 in colposuspension grp had prior continence surgery	Polypropylene (tension-free vaginal) tape *n* = 23	Lap Burch colposuspension *n* = 23	Range 3–24 months Mean 11.3 tape; 13.5 lap	Cure (subjectively dry, negative stress test, dry on UD)	83% vs 83%	Funding: none declared. Tape procedure under LA, GA or spinal; lap suspension under GA. [EL = 1–] No info on randomisation or allocation concealment, no description of methods of analysis. No attempt
							UD (pre vs post-op)	Sig. incr. in VLPP in both grps, *P* ≤ 0.02 vs baseline (126% vs 105%) Sig. reduction in max. flow rate in TVT grp (13%, *P* = 0.01)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
						colpo	Hospital parameters	Operating time (mean, mins): 31 vs 82 *P* = 0.001 Duration catheterisation (median, range): 1 (0–7), 3 (1–5), *P* = 0.03 Hospital stay (mean, days): 2 vs 3.4, *P* = 0.003	to adjust for differences in mean follow-up between grps.
							Complications	Total: 22% vs 22% Incomplete info: in TVT grp 2 (9%) retention 2 (9%) bladder lacerations 1 (4%) *de novo* DO In laparoscopy grp: 2 (9%) conversions to laparotomy (1 bleeding, 1 bladder laceration)	
Sand 2000[668] (3 months follow-up) Culligan 2003[669] (longer-follow-up)	RCT EL = 1+	37 randomised, 36 operated on (1 excluded owing to cardiac risk)	F mean age ~60–61 years, UD stress UI, urethral hypermobility (MUCP ≤ 20 in sitting position) and low-pressure urethra. 41% sling vs 95% Burch group had DO (*P* = 0.01); mean PVR pre-op 12.3 vs 25.4 ml *P* = 0.03. 9 vs 7 (47% vs 41% had undergone a total of 8 vs 10 continence procedures) Exclusions: significant anterior or apical pelvic support defects	Suburethral polytetrafluoroethylene sling* (*n* = 17)	Burch colposuspension (*n* = 19)	3 months and longer-term (*n* = 28): mean 72.6 months (33–116)	Objective cure (no leak on cough/Valsalva on UD)	100% vs 90% *P* = NS at 3 months longer-term (*n* = 28): 100 vs 84.6%, *P* = NS	Funding: none declared. *Gore-Tex soft tissue patch, running from rectus fascia into the retropubic space and beneath urethra at level of urethrovesical junction. Op in association with other procedure in 12% vs 21%.
							Subjective cure (no urine loss during activities that incr. intra-abdominal pressure)	100% vs 95% *P* = NS at 3 months Longer-term (*n* = 28): 84% vs 93%, *P* = NS	
							Hospital parameters	Mean stay 5.1 (1.2) vs 5 (1.4) days, *P* = NS Time to catheter removal 23.3 (24) vs 13.8 (16) days, *P* = NS	
							Complications	24% vs 5% *de novo* DO 100% vs 61% persisting DO (of those who had DO at baseline) 0% vs 5% cystotomy Longer-term: 2 (12%) vs 0 partial sling erosion 1 (6%) vs 0 reqd urethrolysis owing to prolonged urinary retention	

Colposuspension vs anterior repair or needle suspension – cohort studies

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Tamussino 1999[670]	Cohort EL = 2–	544 treated, 327 (60%) evaluated at 5 years	F median age ~51–53 (31–76) years, stress UI 84% primary surgery for SUI; in 16% recurrent surgery (primary procedure mainly anterior colporrhaphy)	Burch colposuspension (*n* = 106)	Anterior colporrhaphy (*n* = 107) Anterior colporrhaphy with needle suspension (*n* = 121)	5 years	Cure (believed to be subjective cure)	79 vs 61% vs 49% (*P* < 0.05 Burch vs other grps) In pts with MUCP > 20 (93%): 81 vs 61% vs 49%, *P* < 0.01 Burch vs other grps In pts with MUCP ≤ 20 (7%): 69 vs 57 vs 46, *P* = NS	Funding: none declared. 40% did not respond, had moved, died or declined exam. [EL = 2–] Sig. differences between groups in: % having primary surgery (58 vs 100% vs 94%); severity of UI (36% in AC grp had mild vs 0 in others), owing to surgeon choice – mild SUI cases underwent AC, moderate AC with needle suspension, severe Burch; BMI sig. higher in needle suspension grp (27.9 vs 26.4/26.9). AC done routinely with hysterectomy and colpoperineorrhaphy.
							Complications	6 vs 2% vs 7% post-op catheterisation > 14 days Overall 39% recurrent SUI: 23 vs 10% vs 5% failed owing to *de novo* DO (*P* = NS) Reoperation rate 1 vs 5% vs 11% (for condition or complications); overall 5% (64% of which were colposuspension)	
Cosiski Marana 1996[671]	Cohort EL = 2–	183 treated, 109 (60%) evaluated at 5 years	F ,age not stated, stress UI; 50% had urgency	Burch* (*n* = 52)	Anterior colporrhaphy* (*n* = 57)	Mean 5 years (range 54–66 months)	Cure (believed to be subjective cure)	60% vs 21% *P* < 0.01	Funding: none declared. *both with posterior colpoperineoplasty. Burch undertaken when cystocele grade 1 present, and AC for grades 2 or 3. Grps similar at baseline in age, parity, delivery methods, and UI severity.
							Prolapse (prevalence)	38% vs 88%, *P* < 0.001	
							Urge UI (incidence in 50% with urgency at baseline)	46% vs 59%	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Van Geelen 1988[672]	Cohort EL = 2–	90 treated, 88 (98%) followed up at 5–7 years	F mean age 46 vs 43 years, UD stress UI, none had prior surgery for UI or for prolapse. UI severity similar in both grps Exclusions: other causes of UI; UTI	Burch colposuspension (*n* = 34)*	Anterior colporrhaphy (*n* = 56)*	5–7 years	Cure (subjective and objective [no leak during straining with bladder vol. 300 ml])	At 3 months: 100% vs 74% cure 0% vs 20% improved 0% vs 6% failed At 1–2 years: 85% vs 45% cure 12% vs 36% improved 3% vs 22% failed At ≥ 5 years: 76% vs 31% cure 13% vs 31% improved 11% vs 38% failed *P* < 0.001 Burch vs AC at all time points	Funding: none declared. *combined with hysterectomy in 26% vs 32%. Choice or procedure based on degree of genital prolapse and mobility of anterior vaginal wall. Sig. more pts in AC grp had grade 2 or 3 prolapse (21% vs 64%). 86/90 procedures done by 1 surgeon. UD pressure profiles and PTRs also reported – not reproduced here. PE = pulmonary embolism.
							Complications	3% vs 0% bladder lacerations 3% vs 0% PE 3 vs 3.6% haemorrhage requiring exploration 3 vs 3.6% pyrexia > 3 days 6% vs 11% delayed voiding (≥ 3 days) 9 vs 1.7% recurrent cystitis 0 vs 3.6% recurrent prolapse 6 vs 1.7% urgency/urge UI 3% vs 0% dyspareunia	
Luna 1999[675]	Cohort EL = 2–	103	F mean age 51 vs 60 (*P* < 0.05) years, stress UI, treated surgically as a primary procedure	MMK (*n* = 26)*	Anterior colporrhaphy (*n* = 77)*	Mean 11.3 years (1–17)	Subjective cure	58% vs 55%, *P* = NS (100% in both grps 1 month post-op)	Funding: none declared. [EL = 2–] Retrospective chart review. Unclear why sample chosen, and whether it included all women who had surgery. AC undertaken in women
							Recurrence	10% vs 17% (remaining 32% vs 28% persistence) Mean time to recurrence 58 vs 12 months	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Immediate post-op complications	0% vs 9% retention 0% vs 1% cystitis 4% vs 0% pyelonephritis 0% vs 1% anaemia 0% vs 1% haematoma	with SUI and genital prolapse; MMK in those with other gynae diseases other than prolapse, necessitating laparotomy. *with other procedures in 92% vs 99% of pts; mainly hysterectomy (vaginal or abdominal).
Demirci 2002[673]	Cohort EL = 2–	95 treated, 25 (37%) followed up at 10 years	F, age not stated, stress UI	MMK (*n* = 28; 14 of 21 followed-up at 10 years)	Anterior colporrhaphy (*n* = 67; 21 of 34 followed-up at 10 years)	10 years	Subjective cure	At 3 months: 23/28 (82%) vs 50/67 (75%) At 40 months: 21/28 (75%) vs 34/63 (54%) At 10 years: 9/14 (64%) vs 8/21 (38%) *P* = NS at all time points	Funding: none declared. [EL = 2–] Continence status assessed by telephone interview; only those who were continent at 40 months followed-up. No explanation for missing pts. Mean body wt had increased sig. from 40 month follow-up; +5.8 vs +8.8 kg; postmenopausal status of women increased sig. too.
Park 1988[674]	Cohort EL = 2–	660 (60% followed to 5 years, 24% to 10 years)	F mean age 43–45 years, UD stress UI. Initial SUI procedure in 63 vs 99% vs 83%; repeat in 37 vs 1% vs 17% Exclusions: neurogenic UI, hypotonic bladder,	MMK (*n* = 227; 51% at 5 years, 13% at 10 years)	Anterior colporrhaphy with Kelly 281rethra281*n* (*n* = 336; 63% at 5 years, 22% at 10 years) Pereyra (*n* = 97; 70% at 5 years,	10 years	Success rates (cure or some urine loss but not troublesome)	At 5 years (assumed): 72 vs 70% vs 58% (*P* < 0.0001 MMK and AC grps vs Pereyra) If only primary procedures considered: 78 vs *n*/a vs 62% As repeat procedure: 62 vs 70% vs 41% Cure rates declined with time in each group (shown in graph)	Funding: none declared. Most suitable procedure chosen for pts, based on urodynamic 'philosophy' or concomitant gynaecologic disease; AC undertaken in type 1 UI. [EL = 2–] Differences between grps in % initial/repeat procedure; Green type 1 or 2 UI (23

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			medical conditions making a pt a poor surgical risk		57% at 10 years)		Complications*	4.3 vs 3.0 vs 11.2% wound/cuff infections, $P < 0.005$ 8.3 vs 7.4 vs 16.5% excessive blood loss (transfused), $P = 0.02$ 0.4 vs 0 vs 7.1% suture in bladder 2.2% vs 0 vs 0 osteitis pubis, $P < 0.01$ 2.2 vs 2.1 vs 7.1% cystitis $P = 0.02$	vs 65% vs 5%; 77 vs 35% vs 95%). Concomitant hysterectomy done in 42 vs 82% vs 69%; prior hysterectomy in 57 vs 16% vs 29%. Pts included in only the years in which they responded. Pts who had subsequent repairs considered failures. *although *P* values quoted for complications, not clear whether these apply to Pereyra vs other grps.
Giberti 1995[676]	Cohort EL = 2–	109	F mean age 53–54 years (24–82), stress UI Primary surgery in 74% vs 94%; repeat (2nd or more) in 26% vs 6% Degree of UI (not defined); 1st×15% vs 18%, 2nd 67% vs 76%, 3rd 18% vs 6%	Burch colposuspension ($n = 76$)*	Raz ($n = 33$)*	Mean 90 months (12–180) vs 36 (12–50)	Success (subjective cure or improvement [sporadic loss]) Complications	96% vs 90% at 2 years (70% at 7 years in Burch grp; equivalent follow-up not available for Raz grp) Only reported among 'healed pts' – data not reproduced here.	Funding: none declared. [EL = 2–] unclear whether grps similar at baseline. Retrospective review of case notes. *other procedures undertaken: hysterectomy 5% vs 24%; anterior colporrhaphy 0% vs 39%, colpoperineoplasty 0% vs 18%.
Christensen 1997[677]	Cohort EL = 2–	182; questionnaire sent to surviving 169 (93%), of whom 141 (83%) replied	F mean age 55 vs 60 (range 32–82), $P = 0.014$. 57% vs 39% pure stress UI, 40% vs 59% mixed UI, 0% vs 2% urge UI, undergoing	Burch colposuspension ($n = 99$)	Stamey ($n = 83$)	Median 7 years (2–10)	Subjective cure (questionnaire) Satisfaction	33% vs 32% cured 29% vs 39% improved 38% vs 29% failed (unchanged, worse or using ISC) 38% vs 47% very satisfied 26% vs 23% satisfied 36% vs 30% dissatsfied	Funding: none declared. 'greatly obese' pts, pts on anticoagulation or scarred/short vagina, or history of prior continence surgery predominantly treated with Stamey. 25% vs 6% also underwent

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			primary surgery for stress UI 28% both grps had prior hysterectomy, 25% vs 20% prior colporrhaphy				Further surgery required	22% vs 16% patients *P* = NS 29% vs 18% no. procedures *P* = NS 2.2% vs 2% required ISC	hysterectomy. Cystocele requiring treatment was generally treated by surgery prior to continence surgery. [EL = 2–] unclear whether grps similar at baseline. Retrospective review of case notes, Burch done in gynae dept, Stamey in urology dept.
Wang 1996[678]	Cohort EL = 2–	503	F mean age 52 years (29–71), UD stress UI needle suspension undertaken predominantly for pts with significant uterovaginal prolapse, and those with UCP > 70 or flow rates < 15 ml/s; abdominal approach for isometric contraction and supine UCP > 20	Burch colposuspension (*n* = 294)	Stamey (*n* = 209)	Minimum 2 years	Failure	Objective (*n* = 389 [77%]); < 1 g weight gain on pad test: 15 vs 20% Subjective (*n* = 114 [23%]): 14% vs 10%	Funding: none declared. Retrospective analysis of cases, with repeat of UD after min 2 years in 72% vs 85% of pts; remaining 23% answered questionnaire. *residual vol. > 20% of vol. voided 3 weeks after catheter removal. [EL = 2–] no baseline data for grps. Other procedures done concomitantly (e.g. hysterectomy, anterior or posterior colporrhaphy) not reported for each grp.
							Complications	10% vs 16% voiding dysfunction* *P* = 0.03 4% vs 4% wound infection 6% vs 0% enterocele 2% vs 2% suprapubic pain 6% vs 12% DO (*P* = NS) 0% vs 2% suture pledget pull-through 0.7 vs 0.5% haemorrhage 0% vs 1% urethral injury 2% vs 0% cystotomy 2% vs 2% dyspareunia 0.3% vs 0% vesicovaginal fistula 7% vs 13% UTI	
							Further surgery	Removal of sutures for prolonged delay of spontaneous voiding: 0.3% vs 10%	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Riggs 1986[679]	Cohort EL = 2–	742 (complete follow-up available for 86%)	F stress UI, mean age 44 vs 49 years; 22% vs 50% postmenopausal	Modified MMK (*n* = 490; 411 [84%] followed-up)	Modified Pereyra combined with anterior colporrhaphy (*n* = 252; 225 [89%] followed-up)	Up to 17 years	Subjective cure or improvement (In % pts within certain categories of duration of follow-up)	Cure: 95% vs 83% up to 6 months 88% vs 91% 6 mo to 5 years 86% vs 78% 5–10 years 82% vs 66% 10–15 years 67% vs 50% 15–17 years Improved: 0% vs 9% up to 6 months 4% vs 8% 6 mo to 5 years 10% vs 10% at 5–10 years 6% vs 25% at 10–15 years 33% vs 50% at 15–17 years Failed: 5% vs 9% up to 6 months 9% vs 2% 6 mo to 5 years 4% vs 12% 5–10 years 3% vs 9% 10–15 years	Funding: none declared. [EL = 2–] Differences between groups in procedures undertaken. Pereyra with anterior colporrhaphy for POP; MMK performed if there were indications for abdominal surgery (e.g. uterine fibroids, ovarian masses, endometriosis). Posterior colporrhaphy also performed in 42% vs 95%. *abdominal or vaginal retropubic.
							Immediate post-operative complications	No sig. differences reported between grps in any complications Common complications were: 2% vs 2% wound complications 0% vs 3% vaginal granulation tissue All other complications reported were uncommon: prolonged catheterisation, pelvic haematoma, retropubic haematoma, wound separation/dehiscence, incisional hernia; post-op bleeding, urethritis and/or cystitis, pneumonia, phlebitis, ileus, coronary insufficiency, depression; osteitis pubis, ‘rent in bladder’, urethral obstruction, 284rethra-vaginal fistula, vaginal synecchia, urine extravasation	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Further surgery*	5% vs 20%	
Spencer 1987[680] Clemens 1998[681]	Cohort EL = 2–	95	F mean age 55 years, stress UI (26% vs 22% Stamey grade 1; 60% vs 61% grade 2, 13% vs 17% grade 3) 41% vs 44% had prior continence surgery (mainly anterior colporrhaphy) 44% vs 51% had frequency with or without urgency (with urge UI in 15% vs 24%)	MMK (*n* = 54; 67% with long-term follow-up)	Stamey (*n* = 41)	Median 68 months (21–118) MMK vs 46 (22–102) Stamey, *P* < 0.005 Long-term: median 16.8 (13.2–21.9) vs 15 (9.4 vs 19.9) years	Subjective cure or improvement	Cure: 85% vs 88% at 6 months 57% vs 61% at ≥ 21 months Longer-term*: 33% vs 44% cure 8% vs 16% improved	Funding: none declared. Retrospective analysis of cases. Baseline characteristics of pts similar; type of procedure determined by pt and physician preference. *Kaplan–Meier curves show more rapid loss of continence years 0–5; at 5 years, actuarial cure rates 62% vs 65%; at 10 years 59% both; 15 years 41% vs 48%.
							Complications	5.5% vs 7% chronic retention 0% vs 10% chronic suprapubic pain 7% vs 7% new onset urge UI 28% vs 70% urgency *P* = 0.004	

Burch or MMK colposuspension – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Alcalay 1995[682] UK study	Case series EL = 3	366 treated, 109 (30%) followed up at ≥ 10 years*	F mean age 47 years (29–70), UD stress UI with urethral sphincter incompetence, bladder neck descent, and adequate vaginal capacity and mobility 30% had prior bladder neck surgery (mostly anterior repair)	Burch colposuspension	Mean 13.8 years	Objective cure**	20% at 10–20 years	Funding: none declared. *161 did not reply/had difficulty attending, 71 could not be traced, 25 died. **no UI during clinical exam and on provocative UD Changes in UD parameters also reported, not reproduced here, and success in relation to age, parity, menopausal status, weight, blood loss.
						Subjective cure	94% at 3 months 80% at 5 years 72% at 10–20 years	
						Further surgery	26% cystocele repair 5% enterocele repair 4% urethrotomy for persistent voiding difficulties and recurrent UTI 10% surgery for recurrent SUI (13 bladder neck procedures undertaken)	
						Complications	15% *de novo* DO at 3 months 29% urgency at 10–20 years 23% urge UI 5% recurrent UTI	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Herbertsson 1993[683]	Case series EL = 3	100 treated, 72 had complete follow-up*	F mean age 46 years (29–65) at operation, 55 (39–75) at follow-up, stress UI	Retropubic colpourethrocystopexy (Burch colposuspension)	Mean 9.2 years (8–12)	Objective cure**	97.3% at 1 year 91.7% at 5 years 90.3% at mean 9.2 years	Funding: none declared. *4 not traced, 6 stayed abroad, 19 declined. **symptom-free, dry on all occasions without objective urine loss during clinical and UD testing with provocation at bladder vol. 300 ml. Changes in UD parameters also reported, not reproduced here.
						Complications	11% cystocele 11% rectocele 4% enterocele 40% (20/50) *de novo* urgency (not associated with surgery in 'at least' 15; mean duration symptoms 2.4 years prior to follow-up; in 6 urgency related to hysterectomy, in 2 related to surgery for prolapsed intervertebral disc) 41% (9/22) cured of pre-existing urgency	
Ladwig 2004[684]	Case series EL = 3	374; 318 (85%) responded to postal questionnaire	F mean age 50 years (27–88); 28% postmenopausal, stress UI 28% also underwent hysterectomy 28% had prior continence surgery (mainly anterior repair)	Burch colposuspension	Mean 9.2 years (2.1–15.8)	Satisfaction (*n* = 190, 51%)	52% very satisfied 17% moderately satisfied 13% some relief 3% poor relief 7% quite unsatisfactory	Funding: none declared. Peri- and immediate post-op complications listed – not reproduced here.
						Complications (*n* = 237 max. for q's; 63%) (new or recurrent symptoms or further treatment)	31% reqd further surgery (at mean 5.4 years [0–14]; mean no of ops 1.9 [1–5]) 29% req medical tx 47% sough advice for persistent, *de novo*, or recurring symptoms Sig. increase in following symptoms (% with; % needing further help for symptom): stress UI (58%, 28%) urgency (48%; 38%) difficulty emptying bowel (30%, 18%) pressure in lower abdomen (29%, 15%) drag in lower abdomen (19%, 12%) vaginal 'lump' (22%, 22%) frequency (no sig. incr., 24% needing help with day freq, and 21% with night)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Eriksen 1990[685]	Case series EL = 3	91; 79 (87%) followed up at 5 years)*	F mean age 53 years (26–83) pre op; 54% stress UI, 46% mixed UI symptoms; UD diagnosis 72% SUI, 28% MUI 69% had stable bladder pre-op 11% had prior hysterectomy, 10% prior anterior repair; 8% UI after anterior repair	Burch colposuspension	5 years	Subjective cure/ improvement (*n* = 86)	67% cured (71% in pure SUI grp, 57% MUI) 21% improved significantly 8% unchanged 4% worse	Funding: none declared. *2 died, 3 lost to follow-up, 7 declined (latter had telephone follow-up). Changes in UD parameters also reported, not reproduced here **Poor stream and straining during voiding.
						Symptoms	13% stress UI, 20% mixed UI, 15% urge UI; 52% symptom-free 25% (14/55) *de novo* DO 67% (14/21) cured of pre-existing urge UI Sig. increase in % with: post-void fullness (+24.4%), stranguria** (+10.5%), rectocele (+8.1%) Sig. reduction in % with: frequency (–20.9%), daily leakage (–72.1%), cysto-urethrocele (–41.9%) No sig. change in % with urgency, nocturia, rectocele	
						UD findings (*n* = 76 [84%])	57% normal 16% stress UI 11% mixed UI 18% urge UI	
Kiilholma 1993[686]	Case series EL = 3	186	F mean age 52 (22–78) stress UI (27% grade 1, 44% grade 2, 29% grade 3) 24% had prior continence surgery 19% also had urgency/urge UI	Burch colposuspension*	2 years (continence status) 1 year complications	Subjective cure/ improvement	76% cure 16% improved 8% failed In women undergoing primary procedure: 81%/14%/5% cure/improved/failed In women undergoing repeat procedure: 62/20/18%	Funding: in part by Grant from Paulo Foundation, Finland. *with hysterectomy in 44%, and correction of enterocele by vaginal or abdominal route in 6%.
						Complications	Post-op: 14% transient retention 14% UTI 4% wound infection 3% wound haematoma 1% DVT At 1 year: 12% symptomatic rectocele/enterocele or both (all underwent surgical repair) 19% had urgency/urge UI (as at baseline) 9% voiding difficulty	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Akpinar 2000[687]	Case series EL = 3	50 (64% of 78 treated replied to follow-up questionnaire/ telephone call)	F mean age 45 years (25–67); stress UI (76% mixed) 12% prior failed continence surgery	Burch colposuspension	Mean 50 months (38–94)	Subjective cure	52% cure 24% urge UI 8% socially continence 16% failed	Funding: none declared. *mild = descent above level of introitus with strain, moderate = descent to level of introitus with strain, severe = descent through the introitus with or without strain.
						Complications	0 ISC 4% significant (> 100 ml) PVR urine and obstructive urine flow 16% cystocele (10% mild, 2% moderate, 4% severe*) 60% rectocele (40% mild, 18% moderate, 2% severe)* 30% uterine prolapse (10% mild, 4% moderate)*	
Feyereisl 1994[688]	Case series EL = 3	87 (92% of the 95 treated*)	F mean age 50 years, stress UI with grade 1 cystocele and hypermobile urethrovesical junction (Q-tip > 30°), no DO 40% prior continence surgery (most common anterior colporrhaphy or MMK)	Burch colposuspension	Minimum 5 years (up to 10)	Cure**	82% (81% in women undergoing primary SUI surgery; 83% in those undergoing repeat) if all losses to follow-up considered failed, cure rate = 75%	Funding: none declared. *3 died, 5 lost to follow-up. **dry, symptom free, dry on stress test and demonstrable positive UCP during stress provocation.
						Complications	30% rectocele grade 1 or 2 16% PVR > 60 ml 15% DO 5% 'late voiding difficulties' 2% pain in groin at site of hitch, requiring intermittent analgesic therapy 1% (*n* = 1) enterocele with partial vaginal vault prolapse requiring abdominal sacropexy	
Kjolhede 2005[689] Further information on these patients provided in Kjolhede	Case series EL = 3	190 (220 sent questionnaire after 10 years [91% of 243 treated*]; 190 [81%] responded)	F mean age ~49 (28–75), stress UI	Burch colposuspension**	Median 14 years (10–18)	Subjective cure	19% dry 25% UI a few times a year 56% UI at least monthly (26% SUI, 17% urge UI, 42% mixed, 15% atypical UI)	Funding: Ostergotland County Council. *19 died, 4 lost to follow-up. **with other surgery in 10%, mainly hysterectomy #In these refs the patient group was matched with 316
						Further surgery	37% surgery for prolapse 29% hysterectomy 12% bilateral salpingo-oophorectomy 3% faecal incontinence surgery	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
2005[#690,691]						Complications	36% had ≥ 1 symptom of voiding difficulty: 12% difficulty starting, 11% straining at voiding, 30% difficulty emptying 11% recurrent UTI (≥ 3 per year)	age-matched controls from the public register, and symptoms of pelvic floor dysfunction compared using multiple logistic regression analysis owing to sig. differences between grps in parity, BMI, heavy daily work, COPD, hiatus hernia, performing PFMT or using oestrogen.
						Symptoms compared with controls[#]	Symptoms of genital prolapse: 25% vs 13% pelvic pressure or heaviness (OR 1.67 [95% CI 0.89 to 3.15] on multiple logistics regression analysis) 18% vs 4% bulge in the vulva or rubbing the mucosa (OR 2.68 [95% CI 1.13 to 6.36]) 19% vs 8% vaginal flatulence (OR 1.76 [95% CI 0.87 to 3.55]) Bowel symptoms: Sig. differences between grps (higher frequency in pt vs control grp) in responses to the following questions on a bowel questionnaire (where frequency is weekly or more often): need to use fingers to help empty bowels, feeling of incomplete bowel emptying, no warning before bowel movement, anal incontinence, need to wear protection for faecal incontinence daytime, adversely affected in general well-being by bowel function	
Langer 2001[692]	Case series EL = 3	127 (81% of the 156 treated)*	F mean age 49 (29–79), stress UI (25% mixed) 18% had prior continence surgery, mainly anterior repair	Burch colposuspension**	Mean 12.4 years (10–15)	Subjective failure	6.3% during 1st year (*n* = 8; of whom 6 had repeat surgery successfully) No other failures from years 2–15	Funding: none declared. *8 died, 21 lost to follow-up. **62% had concomitant hysterectomy for gynae indications Urodynamic data also reported – not reproduced here.
						Complications	22% DO (76% of which within year 1) 14% rectoenterocele 5% recurrent UTI (> 3 per year) 4% dyspareunia 4% late voiding difficulties 3% vault prolapse 1.5% uterine prolapse 0.8% vesicovaginal fistula	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Burch 1968[693]	Case series EL = 3	143	F aged 20–79, stress UI 37% had prior gynae surgery (17% hysterectomy) Associated pathology 52% cystocele, 15% fibroids, 6% ovarian cysts	Burch colposuspension*	44% less than 10 months; 56% > 10 mo, 42% > 20, 30% > 30, 25% > 40, 20% > 50, 13% > 60	Subjective failure	7%	Funding: none declared. *concomitant procedures: 13% vaginal repair of cystocele 65% perineorrhaphy 45% hysterectomy 26% 'obliteration of cul de sac' 2% Olhausen suspension.
						Complications	Enterocele: 5% operated on, 3% suspected 3% post-op hernia 3% recurrent posterior cystocele	
Galloway 1987[694]	Case series EL = 3	50	F 34–76 years, 80% pure stress UI, 20% additional bladder symptoms. 38% had prior continence surgery, 26% hysterectomy for uterine pathology Exclusions: possible outflow obstruction (flow rates < 15 ml/s)	Burch colposuspension	Mean 4.5 (1–6) years	Subjective cure	84%	Funding: none declared. Only F with complete voiding history and video-UD data pre-op were included. *pain in one or other groin at site of hitch.
						Further surgery (required in 36%)	12% urethral dilatations for voiding difficulties 8% release of one side of the hitch (for *) 8% bladder training or oxybutynin tx 4% 'Mundy' procedure 2% urinary diversion 2% phenolisation	
						Complications	16% voiding difficulties 14% urge syndrome 12% 'post-colposuspension syndrome'* 4% uterine prolapse 4% enterocele 4% dyspareunia 4% recurrent UI	
Lim 1990[695]	Case series EL = 3	113	F age 20–79, stress UI	Burch colposuspension	5 years	Subjective cure/ improvement	80% at 2 years 12% improved 78% at 5 years 13% improved	Funding: none declared. Single surgeon *on basis of 'routine urine

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Complications	Peri- post-op: 2% subcutaneous haematoma 11% inflamed or infected wound 2% cardiovascular 0.9% CVA 52% UTI* 0.9% acute retention Late complications: 0.9% dyspareunia 2% deep left sided pelvic pain 4% voiding difficulty 5% incisional hernia 11% rectocele made worse	culture'.
Kinn 1995[696]	Case series EL = 3	153 (92% responded to 5 year questionnaire)	F mean age 55 (27–82) stress UI (20% with mixed symptoms) 10% prior hysterectomy 3% prior surgery for vaginal prolapse or UI Exclusions: neurological disease, concomitant prolapse; pts with ISD (UCP at rest < 15) treated by sling urethroplasty	Burch colposuspension	Mean 5 years (39–102 months)	Subjective cure or improvement	86% cure at 2 years 7% improved 7% failed 78% cure at 5 years 11% improved 11% failed	Funding: none declared. Single urologist performed procedures.
						Long-term complications (> 2 months to 5 years)	3% urge UI 1.3% rectocele 1.3% cystocele 1.3% coital pain 0.7% cicatricial hernia	
Ou 1999[697] and 1993[698]	Case series EL = 3	40 (5 year follow-up available for 34 [85%])	F mean age 52 (33–80), UD stress UI	Laparoscopic Burch using hernia mesh and surgical staples*	5 years	Subjective success	93% at 1 year 89% at 3 years (*n* = 32/36) 88% at 5 years (*n* = 30/34)	Funding: none declared. *with concomitant surgery in 80%; anterior/posterior repair, bilateral salpingo-

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Complications	Peri-/post-operative (all transient): 3% haematuria 6% low grade fever 3% retention 53% sensation of urgency post-op 38% transient *de novo* DO (resolved by 5 months) *Longer-term:* 5% (*n* = 2) asymptomatic enteroceles at 1 and 3 years; (1/2 had surgery) 2.5% cystocele	oophorectomy, hysterectomy and others. 10% underwent further surgery during follow-up; hysterectomy, appendectomy, cholecystoectomy, hernia repair.
Ross 1998[699]	Case series EL = 3	48	F mean age 57 (39–73) years, stress UI Exclusions: DO, ISD, POP > grade 2 (Baden scale) 73% had prior hysterectomy 42% prior suspension procedure or vaginal repair for UI	Laparoscopic Burch colposuspension*	2 years	Objective cure (negative ultrasound, stress test and UD)	93% at 1 year 89% at 2 years	Funding: Laborie Medical Technologies (equipment), Ethicon Endo-surgery (grant-in-aid). *Concomitant procedures: 27% vaginal hysterectomy, 31% paravaginal repair, 23% posterior vaginal repair.
						Complications	On vaginal examination at 1 year: 2% (*n* = 1) cystocele, 4% rectocele; both asymptomatic grade 1 At 2 years, on vaginal examination: 4% cystocele (grade 1) 6% rectocele (1 grade 2; 2 grade 1) 4% apical vault eversion (all grade 1)	
Briel 1986[700]	Case series EL = 3	239	F mean age 47 years, stress UI (49% with urgency; 13% urge UI) Ingelman-Sundberg grading: 75% grade 1, 22% grade 2, 3% grade 3	MMK	3–6 years (31% for 3 years, 32% for 4, 24% for 5, 13% for 6)	Subjective cure (dry or markedly improved)	89%	Funding: none declared. UD also done and reported for 16% - data not reproduced here.
						Urge UI	24% at 3–6 years (mean change +11%)	
						'severe' post-op complications	0.8% enterocele (*n* = 2) 0.4% vesico-vaginal fistula (posthysterectomy fistula) 0.4% ureteral injury	
Zorzos 1996[701]	Case series EL = 3	151; 67% (101) responded to	F mean age 47 years (31–85), 46% pure stress UI, 54% also had	MMK	Mean 51.5 months (14–130);	Success (dry or symptoms improved)	73% (83% in pure stress UI grp, 65% in grp with irritative symptoms)	Funding: none declared Retrospective review of records. Senior surgeon or

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
		questionnaire	minor irritative symptoms 28% had prior hysterectomy 24% prior continence surgery		median 36 months 40% ≥ 6 years	Complications	Peri- or post-operative: 4% UTI 5% wound infections 9% transient retention 2% bladder perforation from a suture (1 of whom had a bladder stone) 1% osteitis pubis 1% 'sexual problems' Longer-term: 4% prolonged voiding difficulty treated by urethral dilation	trainees under his supervision undertook procedures.
Czaplicki 1998[702]	Case series EL = 3	60 (75% of 81 treated responded to questionnaire)	F mean age 53 years (36–76), grade 2 or 3 stress UI 27% prior continence surgery 10% prior hysterectomy	MMK*	Mean 9.9 years (2–15)	Subjective cure	88% at 3 months 81% at 6 months 57% at 5 years 28% at 10 years	Funding: none declared. Retrospective review of cases, with questionnaires mailed to pts. 5 surgeons undertook procedures. *5% pts other procedures done concomitantly incl. Beck's ventrofixation, anterior colporrhaphy.
						Complications	12% dyspareunia 15% feeling of obstruction 43% feeling of residual urine 77% nocturia 77% dribbling 5% had repeat continence surgery (MMK, Stamey, or Ingleman-Sundberg)	

Needle suspensions – case series

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Raz 1992[703]	Case series	290 treated,	F mean age 59 years (15–87), stress UI with	Raz needle suspension	Mean 15 months	Subjective cure/ improvement	83% cured 7% improved	Funding: none declared. Retrospective review.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3	206 evaluated*	hypermobility, and with or without grade 1 cystocele 59% prior continence surgery (anterior colporrhaphy, MMK, Burch, needle suspension) 44% urgency, 29% urge UI Exclusions: ISD		(13–95)	Complications	14% *de novo* DO or worsening of existing DO 3.5% protracted suprapubic pain 3% enterocele (6/7 underwent surgical repair) 2.4% required CISC 2% grade 2 or 3 cystocele (3/4 had surgical repair) 1.5% dyspareunia 1% uterine prolapse 1% wound infection 0.5% clitoral anaesthesia	*65 had significant obstruction, 19 inadequate follow-up data.
Korman 1994[704] and Sirls 1995[705]	Case series EL = 3	106 (70% of the 151 treated)	F mean age 56 years (19–82), UD stress UI (type 2 [anatomical] incontinence). 67% also had irritative symptoms 57% prior hysterectomy 37% prior continence surgery	Modified Pereyra procedure (Raz)*	Mean 25 months (9–45)	Subjective cure/ improvement (cure = no urine loss regardless of provocative manoeuvres)	By questionnaire assessment (14-items): 47% cured 17% improved 26% same 10% worse By retrospective chart review: 72% cured 17% improved 1% same 10% worse	Funding: none declared. Single surgeon performed all procedures. Retrospective review of cases; and questionnaire assessment. *with correction of vaginal vault .prolapse by colporrhaphy in 61%.
						Complications	17% *de novo* irritative symptoms 8% symptomatic vaginal prolapse requiring treatment 16% moderate to severe dyspareunia 6% constant pelvic pain 4% prolonged (no definition) urinary retention 2% pelvic haematoma 1% surgical release of 1 suspension suture to relieve suprapubic discomfort 1% DVT 1% recurrent UTI 1% suprapubic wound infection 1% pseudomembranous colitis	
Gilja 2000[706]	Case series EL = 3	88 treated and evaluated	F aged 29–76, UD stress UI with hypermobility Exclusions: suspected	Modified Raz procedure*	1 year and 5 years	Subjective cure	89% at 1 year; of whom 76% were still continent at 5 years (objective cure 69% at 5 years [UD])	Funding: none declared *suspension sutures fixed to rectus fascia using technique

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
		at 1 year 71 of 76 cured at 1 year evaluated at 5 years	ISD			Complications	8.3% urge UI owing to *de novo* DO 3.4% unilateral suture removal owing to infection 2.2% permanent pain in suprapubic area where suspension sutures tied	of crossing suspension suture without incision of the suprapubic area. Single urologist undertook all procedures.
Kelly 1991[707]	Case series EL = 3	114 (79% of the 145 treated)	F mean age 57 years, UD stress UI; 59% also had urgency and urge UI (23% of whom had DO), and 59% frequency 41% had prior continence surgery (mostly MMK and anterior colporrhaphy) 46% prior hysterectomy	Modified Pereyra procedure*	Median 3.5 years (2–7.7)	Subjective outcomes	51% cured 76% success ('better' or 'much better')	Funding: none declared. Retrospective chart review with telephone follow-up. *with concomitant procedure in 35% (cystocele repairs, hysterectomy, excisions of urethral diverticula, urethrolysis).
						Complications	Post-operative: 41% reqd intermittent catheterisation owing to retention, 62% resumed normal voiding within 2 weeks 3% (*n* = 3) suprapubic wound infection 2% vaginal bleeding 2% groin pain 1% pull-through of one suspension suture 1% urethrovaginal fistula 1% granuloma of anterior vaginal wall Longer-term: 8% pelvic discomfort 16% dyspareunia 53% urgency (Less than 59% at baseline), of whom 30% were *de novo* symptoms	
Elkabir 1998[708]	Case series EL = 3	52 (60% of 87 treated)*	F mean age 53 years (35–86) stress UI	Gittes procedure	Mean 46 months, median 53 (24–103)	Subjective cure/ improvement	23% cured (52% at 1 year, 39% at 2 years) 27% improved 50% failed	Funding: none declared. Retrospective review of cases and mailed questionnaire. One urologist performed procedures. *3 died, 9 moved away; unclear what happened to the other 23.
						Complications	2% (*n* = 1) pneumonia 4% wound infections 2% 'several' UTI 10% persistent unilateral groin pain requiring suture removal from affected side in 92%, normal voiding resumed within 1 month Further surgery undertaken in 15% (8); 3 further Gittes, 5 'other procedures'	
Takahashi 2002[709]	Case series	86	F mean age 59 (35–81), stress UI	Stamey procedure*	Mean 38 months	Subjective success (cure or improvement)	90%	Funding: none declared. *with or without anterior

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		None had prior continence surgery		(25–108)	Complications	17% abdominal pain 17% voiding difficulty (duration not stated) 2% UTI 2% inflammation 1% peritoneal perforation 1% CIC for > 4 weeks 2% reqd removal of suspension sutures	colporrhaphy (proportions not stated).
Gofrit 1998[710]	Case series EL = 3	63 (88% of 72 treated*)	F mean age 51 years (31–82), stress UI 19% prior continence surgery (mainly anterior colporrhaphy)	Stamey procedure	Mean 90 months (60–130; minimum 5 years)	Success (no longer needing pads)	70% (30% failure)	Funding: none declared. Retrospective review of case notes, with telephone follow-up. *2 died, 7 lost to follow-up.
						Complications	13% *de novo* urgency 10% worsening of pre-existing urge symptoms 8% stitch infection (reqd removal in 4/5) 3% bladder perforation (1/2 reqd laparotomy owing to generalised peritonitis) 10% 'temporarily large residual vol.' 1% suture removal owing to severe obstructive symptoms	
Huland 1984[711]	Case series EL = 3	66 (77% of 86 treated who had 'sufficient' follow-up)	F mean age 55 (23–80), stress UI (15% mixed) 56% had prior continence surgery, mainly anterior repair	Stamey procedure	Mean 48 months (20–90)	Subjective cure or improvement	85% (71% cure)	Funding: none declared.
						Complications	5% post-op obstructive bladder syndrome suprapubic fistulas (occurring 2–36 months after op): 11% one side 5% both sides 3% required removal of sutures owing to fistula 8% temporary suprapubic pain	
Hilton 1991[712]	Case series	100	F median age 58 (33–81), UD stress UI with or	Stamey procedure	Median 27 months (3–	Actuarial success rate*	~60% at 4 years	Funding: none declared.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		without DO, and vaginal narrowing such that colposuspension not possible. 84% had urgency, 78% urge UI, 36% symptoms of voiding difficulty 65% had prior continence surgery (32% of whom ≥ 2 procedures); 48% had other pelvic surgery, mainly hysterectomy		51)	Complications	6% pain in 1 or other suprapubic incision 3% UTI 1% superficial thrombophlebitis 1% DVT 1% (*n* = 1) passed 1 of the suture buffers vaginally 0 *de novo* DO	*life-table analysis.
Ashken 1984[713]	Case series EL = 3	60	F mean age 55 (32–85), stress UI, 42% had mixed UI 42% had prior continence surgery, mainly vaginal repair 22% hysterectomy	Stamey procedure	Unclear; 43% > 1 year, 20% > 2 years	Subjective cure/ improvement	77% cured 5% improved 18% failed (Leakage or retention)	Funding: none declared. *pt also had diabetes and syphilis.
						Complications	7% temporary retention 2% (*n* = 1) permanent retention requiring ISC* 5% post-op pain 3% unilateral stitch 3% stitch extrusion or cheese wiring (Stamey repeated, with pts cured)	
Kuczyk 1998[714]	Case series EL = 3	85 (74% of 115 treated)*	F median age 55 (30–85), stress UI. 11% Stamey grade 1, 66% grade 2, 24% grade 3 61% had prior continence surgery (mainly colporrhaphy or MMK), 53% hysterectomy	Stamey procedure	Mean 61 months (13–93)	Subjective cure or improvement	34% cured 18% improved	Funding: none declared. *completed an anonymous 5-item postal questionnaire.
						Satisfaction	62%	
						Complications	41% 'intermittent' retention (Mean duration 12 weeks [1–52]) 2% persistent retention 9% suprapubic pain 11% infections 7% reqd surgery for tx-related complications 4% reqd repeat bladder neck suspension owing to recurrent stress UI	
O'Sullivan 1995[715]	Case series	66	F mean age 52 (28–76), stress UI; 12% had DO 48% had prior	Stamey procedure	Mean 3 years, 7 months (6 months –	Subjective cure or improvement ≥ 1 year (*n* = 58)	34% cured 28% improved	Funding: none declared. Questionnaire by mail.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		gynaecological surgery. 16% had prior continence surgery		7 years 3 months)	Complications	Early: 25% UTI 15% voiding difficulty (catheterised for 4–6 weeks) 3% wound infections Long-term: 7% pelvic pain (sutures removed in 1/5 pts) 3% ISC 3% developed wound infections and had the sutures removed 1.5% (*n* = 1) cuff eroded into urethra and caused fibrous obstruction which was excised 1.5% sutures and cuffs found subcutaneously in suprapubic incisions (but still continent)	

TVT vs biological slings – comparative studies

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Wadie 2005[717]	RCT EL = 1+	53	F mean age 45 years (30–60) with stress UI 36% had prior surgery Exclusions: pelvic or vaginal surgery within 6 months, predominant urge UI, cystocele > grade 2, associated urethral or bladder pathology, active UTI 60% also had correction of grade 2 cystocele	TVT (*n* = 28)	Rectus fascial sling (*n* = 25)	6 months	Cure (dry, no pads used, and negative stress test)	92% vs 92%	Funding: none declared. One surgeon performed both procedures. Randomisation undertaken after pts received spinal anaesthesia.
							Complications	0% vs 4% de novo overactivity 7% vs 28% wound pain 0 urethral erosion 0 vaginal erosion	

Study of different surgical techniques for TVT

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Lo 2005[718]	Cohort EL = 2–	90	F mean age ~47–50 years, undergoing primary stress UI surgery, after unsuccessful conservative therapy	Caudocranial tension-free vaginal tape (TVT) 'bottom-up' approach *n* = 45	Craniocaudal TVT 'top-down' approach	About 1 year*	Subjective continence status	89% vs 91% cure 7% vs 4% improved 4% vs 4% failed, *P* = NS	Funding: none declared. [EL = 2–] Retrospective review of cases, undertaken at different time points. No consideration of whether groups different in aspects other than for the intervention considered. *results for this time reported, although actual duration of follow-up was mean 1.4 (range 1–2.1) and 1.9 (range 1.7–2.9) years.
							Operative care	Mean operating time 26 vs 28 min Hospital stay 1.53 vs 1.78, *P* = NS	
							Complications (%)	2.2 vs 6.7 bladder perforations 0 vs 4.4 vaginal mucosa perforation 6.7 vs 8.9 retention 4.4 vs 0 *de novo* DO	

TVT vs other synthetic slings – comparative studies

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Arunkalaivanan 2003[719] 3 year follow-up Abdel-Fattah 2004[720] UK study	RCT EL = 1+	142 (at 3 year follow-up, response rates were 88% vs 92%; *n* = 128)†	F with UD stress UI, offered surgery following unsuccessful conservative therapy. Median age 54 (32–91) in TVT grp, 53 (34–79) in sling grp 37% vs 26% had prior hysterectomy, 12% vs 14% prior continence surgery Exclusions: DO, unhappy to be randomised	Tension-free vaginal tape *n* = 68	Porcine dermal collagen sling (Pelvicol) *n* = 74	Median 12 months (6–24) And longer follow-up; median 36 vs 34 months[720]	Subjective cure or improvement* (all comparisons *P* = NS)	*According to pt-determined continence status at 12 months:* 85% vs 89% dry 9% vs 3% improved 6% vs 8% failed *At ~3 years:* 88% vs 82% dry 5% vs 10% improved 6% vs 8% failed If non-responders assumed to be failures at 3 years: 79% vs 78% dry 5% vs 10% improved 16% vs 13% failed *According to pt-determined 'QOL' status at 12 months:* 75% vs 76% with 90–100% improvement 10% vs 14% with 75–90% improvement 16% vs 11% with < 75% (considered failed)	Funding: none declared. 74% vs 80% procedures carried out as day cases; others with planned overnight stay. Cystoscopy done to ensure lower urinary tract integrity – no bladder perforations were identified. *all outcomes expect intra-operative complications assessed by postal questionnaire. †*n* = 1 vs 2 died; 7 vs 4 lost to follow-up.
							Satisfaction	77% vs 80% would have same operation (83% vs 85% at 3 years) 71% vs 84%, *P* = 0.014 would recommend op to a friend (83% vs 88% at 3 years)	
							Pad use at 1 year (believed to be daily pad use)	Mean 0.46 vs 0.64 median 0 vs 0 range 0–4 vs 0–8	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Hospital parameters	Mean operating time 35 (15–60) vs 30 (20–80) mins, *P* = NS Hospital stay 1 (1–5) vs 1 (1–12) days, *P* = NS	
							Complications (*P* = NS for all comparisons)	19% vs 23% with any 13% vs 10% retention < 1 week 2% vs 8% retention up to 6 weeks 3% vs 4% haemorrhage 2% vs 0 infection 0% vs 1% severe pain 3.4 vs 1.4% permanent CISC (3.3 vs 2.9% at 3 years) 3% vs 7% reqd release of sling 2% vs 3% reqd urethral dilatation 15% vs 18% *de novo* urgency| 9% vs 6% *de novo* urge UI 3% vs 0% dyspareunia	
Liapis 2006[721]	RCT EL = 1+	89 (of 91 operated on)	F mean age ~52 years, stress UI without evidence of bladder overactivity Exclusions: DO, gynae condition requiring hysterectomy or other gynae operation; previous failed surgical	Tension free vaginal tape (*n* = 46)	Tension-free vaginal tape obturator (*n* = 43)	12 months	Objective outcomes*	Cure 89% vs 90% improvement 6.5 vs 7.6% failure 4.3 vs 2.5%	Funding: none declared. Single surgeon *cure = negative cough stress test during multi-channel cystometry, and 1 h pad test < 1 g; improvement = negative cough stress test and 1 h pad teat < 5 g; failure = positive cough stress test and 1 h pad > 5 g.
							Subjective outcomes	Cure 74% vs 77% improvement 22% vs 16% failure 4% vs 7%, *P* = NS	
							Operative care	Hospital stay: 91% vs 95% 1 day 6.5 vs 4.6% 2 days 2.2 vs 0 3 or more days Duration of procedure: 26.7 vs 17.4 min, *P* < 0.001	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			treatment				Complications	Haemoglobin loss during 1st post-op day: 1 ± 0.5 g/dl vs 0.9 ± 0.4, *P* = NS 6.5% (*n* = 3) vs 0 bladder perforation 8.7 vs 2.3% urinary retention > 100 ml 8.6 vs 9.3% *de novo* instability 10.8 vs 13.9% *de novo* urgency 6.5 vs 2.3% UTI 2.2% (*n* = 1) in TVT group had vaginal erosion owing to rejection (tape removed)	
Mellier 2004[722]	Cohort EL = 2–	193 (75% contacted by telephone in January 2003)	F mean age 58 years, stress UI. None had genitourinary prolapse. 28% vs 34% had prior continence surgery, and 26% vs 18% prior hysterectomy. 13% both grps had urgency. 27% had ISD	Tension free vaginal tape (*n* = 99)	Transobturator tape* (*n* = 94)	Mean follow-up (clinic and telephone) 29.5 months (20–48) TVT, vs 12.8 (2–20) TOT	Subjective cure or improvement (at most recent post-op visit	91% vs 95% cure, *P* = NS 7% vs 4% improved 2% vs 1% failed	Funding: none declared. [EL = 2–] Retrospective analysis of cases performed non-concomitantly over 18 month periods; TVT done between 1999 and 2001, and TOT between 2001 and 2002. All procedures undertaken by same surgeon; data said to reflect learning curve for surgeon for TOT.
							Satisfaction (telephone interview of 75%)	85% vs 92% very 11% vs 5% moderately 4% vs 0% not very 1% vs 3% unsatisfied	
							Time of discharge from hospital	71% vs 93% day 1 25% vs 7% day 2–3 4% vs 1% day ≥ 4	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			Exclusions: F who underwent a concomitant surgical procedure				Complications	10% vs 0% bladder perforation 4% vs 0% vaginal perforation 0% vs 1% difficulty with needle passage 0% vs 1% urethral laceration 8% vs 2% haemorrhage < 200 ml 1% vs 0% retzius haematoma 1% vs 0% subpubic haematoma 0% vs 1% vaginal erosion 6% vs 8% persisting urgency 3.4 vs 4.1% *de novo* urgency	*'same woven mesh of the gynecare or SPARC devices, but [we] used only the meshes and removed their needles'. In all cases the TOT was fitted in the same place at an angle of 45°. Cystoscopy performed in all TVT cases, and in 1st 26 of TOT grp. Local anaesthetic in 31% vs 65% cases, spinal or general in remainder.
Fischer 2005[723]	Cohort EL = 2–	440	F age range 30 to > 80 years, with UD stress UI owing to urethral hypermobility and/or ISD. Primary procedure in 72% vs 76% 11% vs 14% mixed UI 47% vs 54% had prior hysterectomy	TVT (*n* = 220)	TOT (outside-in), *n* = 220	'more than' 1 year	Cure (no symptoms and 1 h pad test < 2 g change)	76% vs 81%	Funding: none declared. TVT cases May 98 to Nov 99; TOT cases Feb to Sept 2003. [EL = 2–] Retrospective review of cases, no consideration of possible confounding in analysis of results.
							Satisfaction	With outcome 88% vs 91% With procedure 89% vs 98%	
							Operative care	Median operating time 24 vs 8 min	
							Complications	4.5 vs 0.5% bladder perforations 0.75% vs 0% revisions for post-op bleeding 4% vs 2% divided tapes within 1 year 2.5 vs 1.3% persistent sensory urge	
Rechberger 2003[724]	QuasiRCT (every other person) EL = 1–	100	F mean age 54–56 years (34–79), UD stress UI. Prior surgery: 11/50 from TVT grp; 7	Tension-free vaginal tape (a monofilament tape) (*n* = 50)	Intravaginal slingplasty (IVS); a multifilament tape	Planned 18 months (median 13.5)	Objective and subjective cure/ improvement	Cure 88% vs 80% Improvement 10% vs 18% Failure 2% vs 2% *P* = NS all comparisons	Funding: none from manufacturers. Follow-up assessment blind to tx. Cure = symptom free and

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			TAH, 1 Burch, 1 Kelly, 1 MMK, 1 TAH+Burch, and 13/50 IVS grp: 2 TAH, 1 vaginal hysterectomy, 6 Kelly, 1 Burch, 1 MMK, 1 MMK + Kelly Exclusions: ISD		(*n* = 50)		Post-op complications (*P* = NS unless stated otherwise)	20% vs 4% retention, *P* = 0.023 4% vs 8% bladder perforation 4% vs 2% haemorrhage from venous plexuses around bladder neck 16% vs 8% *de novo* urgency	negative cough test in supine and standing positions. Improved = negative cough test, but still leakage (less than pre-op) and pads occasionally wet. TAH = total abdominal hysterectomy.
Lim 2005[725]	SB RCT EL = 1+	195 randomised, (93% analysed; others had missing data)	F mean age ~56–58 years, UD stress UI, who had failed conservative tx or required prophylactic continence surgery during prolapse repair for occult stress UI (no symptoms, but stress UI found on UD) 28 vs 32% vs 16% had prior vaginal repair; 51 vs 53% vs 36% prior hysterectomy, 16 vs 18% vs 13% prior continence surgery 69 vs 55% vs 67% urgency, 48 vs 45% vs 53% urge UI, 5 vs 10% vs 5% DO; 15 vs 12% vs 13%	Tension-free vaginal tape* (*n* = 65)	Intravaginal sling* (*n* = 65) Suprapubic arc sling* (*n* = 65)	6–12 weeks	Subjective cure/ improvement (improved if ≥ 50% reduction in symptoms) Objective cure (on UD) Satisfaction Change in other symptoms (*P* = NS for all comparisons)	79 vs 78% vs 75%, *P* = NS 16 vs 12% vs 17% *P* = NS 0 vs 3% vs 3% failed 88 vs 82% vs 72% *P* = NS 84 vs 83% vs 85%, *P* = NS Frequency: 34 vs 33% vs 33% cured 7 vs 15% vs 20% improved 3 vs 8% vs 5% *de novo* Urgency 33 vs 33% vs 33% cured 36 vs 15% vs 20% improved 7 vs 8% vs 5% *de novo* Urge UI: 31 vs 30% vs 40% cured 16 vs 13% vs 7% improved 7 vs 2% vs 10% *de novo* Incomplete bladder emptying: 15 vs 28% vs 25% cured 3 vs 2% vs 0% improved 3 vs 3% vs 3% *de novo*	Funding: none declared. All procedures by or under supervision of senior author. General anaesthetic in 90%. *concomitant surgery: 18 vs 17% vs 7% urethrotomy 31 vs 22% vs 36% anterior vaginal repair 3 vs 3% vs 7% hysterectomy 8 vs 3% vs 3% enterocele repair 0 vs 2% vs 3% posterior intravaginal slingplasty 3 vs 2% vs 2% transvaginal sacrospinous fixation 57 vs 50% vs 44% posterior vaginal repair.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			poor urine stream, 18 vs 30% vs 26% incomplete emptying, 13 vs 10 vs 10 bladder pain				Complications (*P* = NS unless otherwise stated)	Intra-operative: 0 vs 0% vs 5% urethral puncture 2 vs 3% vs 7% bladder puncture 3 vs 2% vs 13% sling protrusion, *P* = 0.04 0 vs 0 vs 0 sling infection 3 vs 4% vs 2% *de novo* DO	
Andonian 2005[726]	SB RCT EL = 1+	84	F mean age ~60–62 years, UD stress UI with or without POP (proportion not stated). SUI grading: 1 in 9% vs 10%, 63% vs 63% grade 2, 28% vs 27% grade 3. IIQ scores 61 vs 66 Exclusions: obstructive, unstable bladder function; neurogenic bladders	Tension-free vaginal tape* *n* = 41	Suprapubic arc sling (SPARC)* *n* = 43	Minimum 1 year	Objective cure**	95% vs 83%, *P* = NS	Funding: none declared. *with simultaneous anterior and posterior colporrhaphy in symptomatic women with POP. % affected not stated. ** wt gain ≤ 2 g on 1 h ICS pad test. Blind assessment at 1 year; 1 pt in TVT grp had died. 72% vs 83% had spinal anaesthesia, 23% vs 15% general, 5% vs 2% local.
							IIQ score	45 (95% CI 36 to 54) vs 50 (38 to 70) (where < 50 good to 50–70 moderate, > 70 poor)	
							Hospital parameters	Operating time: 36 (95% CI 27 to 44) vs 32 (26 to 38) mins Median hosp stay (range): 1 night (0–3) vs 1 (0–7)	
							Complications	Intra-operative: 23% vs 24% bladder perforation 50 (0 to 250)ml median blood loss both grps 9% vs 5% complete retention 5% vs 5% further surgery to loosen tape after 3 days Other complications (SPARC grp): 2.4% (*n* = 1) tape erosion into vagina requiring partial tape removal 2.4% infected pelvic haematoma 2.4% fever	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Tseng 2005[727]	SB RCT EL = 1+	62	F mean age 51 years (SD 12) UD stress UI alone or combined with prolapse Exclusions: POP > stage 2; prior continence surgery	Tension-free vaginal tape* (*n* = 31)	Suprapubic arc sling (SPARC)* (*n* = 31)	Planned 2 years (median 25 months, range 24–30)	Objective cure/improvement	Cure 87% vs 81%, *P* = NS improvement 13% vs 19%	Funding: none declared. all follow-up exams and outcome assessment blind to tx allocation. *with anterior colporrhaphy ± posterior colporrhaphy for symptomatic vaginal prolapse (23% vs 16%), and vaginal total hysterectomy for pelvic prolapse > ICS stage 2. One surgeon performed all procedures, was 1st experience of SPARC vs 700-case experience with TVT. Objective cure = pad weight ≤ 1 g; improvement = reduction to < half of baseline value. **no baseline data against which to compare.
							Hospital parameters	Operating time 33 vs 41 min 55% vs 39% local anaesthesia 45% vs 61% regional 3.14 vs 3.97 days mean hospital stay, *P* = 0.03	
							Post-op complications (*P* = NS unless stated otherwise)	Intra-operative: 0% vs 13% bladder injury 106 vs 135 ml mean blood loss 16% vs 10% retropubic haematoma ≥ 5 cm Post-operative: 6.5 vs 3.2% tape rejection 10% vs 3% defective vaginal wound healing 13% vs 3% protrusion of tape edge Voiding parameters** (% with): 3% vs 7% nocturia 10% vs 16% frequency 10% vs 16% urgency 7% vs 16% urge UI 0% vs 3% dysuria 19% vs 32% incomplete voiding 7% vs 10% strain to void 0% vs 13% post-micturition dribble	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Hammad 2005[728]	Cross sectional survey EL = 3	–	Survey mailed in June/July 2003 to 326 member of Urological Society of Australasia; aim was to establish incidence of urethral and vaginal erosions following use of polypropylene slings, and the management of these complications 326 members sent questionnaire; 198 (61% returned; of these, 39% [*n* = 77] performed sling procedures; 74/77 had complete data) 1459 cases	Tension-free vaginal tape *n* = 993 (68% of cases) OR Suprapubic arc sling *n* = 466 (32% of cases)	–	N/A	Vaginal erosions	17 cases (1.2%); range among respondents 0–33% Presenting symptoms: 7 palpable tape and vaginal discharge 2 local pain, vaginal discharge and UTI 2 dyspareunia 6 vaginal examination Presented at: 1 < 6 weeks 12 < 3 months 1 < 6 months 2 < 1 year 1 > 1 year Treatment: 13 removal of part of sling 4 removal of entire sling	Funding: none declared. Results not given separately by procedure. Duration of performing procedures: 5% < 6 months 9% 6–12 months 50% 1–2 years 32% 2–5 years 3% 5–10 years.
							Urethral erosions	9 cases (0.6%) Presenting symptoms: 4 urinary retention 2 bleeding 2 local pain 1 cystoscopy for other reasons Presented at: 2 < 6 weeks 4 < 3 months 3 > 1 year Treatment: 4 treated conservatively 5 removal of part of sling	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Post-op urinary retention	95 cases (6.5%) Treatment: 38 CISC 33 indwelling urethral catheterisation 33 surgery (19 sling division, 7 sling loosening, 7 urethrolysis and removal of sling)	
Hung 2004[729]	Cohort EL = 2–	80	F mean age 63 (46–85) in TVT grp, vs 55 (32–77) in prolene grp. UD stress UI	Tension-free vaginal tape (*n* = 23)	Polypropylene mesh sling (Prolene) (*n* = 57)	Mean: 23 months TVT, 20 months sling	Cure or improvement	Cure (negative cough stress test and no reports of leakage during stress): 65% vs 72%, *P* = NS Improved (negative cough stress test but may have occasional leakage during stress	Funding: none declared. [EL = 2–] fewer in the TVT group had conditions that reqd gynaecological surgeries (30% vs 77%, *P* = 0.0002); *pre = op UDI-6 scores also sig. different at baseline (49 vs 38). Surgeons had performed both procedures in at least 10 pts. pts followed-up regularly at the urogynaecology clinic by principal author. #both scales translated in to Chinese.
							QOL (IIQ-7, UDI-6#); % improvement	IIQ-7: 80% vs 78%, *P* = NS UDI-6: 77% vs 69%, *P* = NS*	
							Complications	Intra-op: 4% vs 0% bladder perforation, *P* = NS 9% vs 4% urinary retention requiring sling revision (at mean 12 days [7–17]) 0 vs 3.5% *de novo* urge UI 9% vs 7% voiding difficulty 0% vs 3% dyspareunia 0% vs 2% vaginal/suprapubic pain	

TVT case series – 1 year follow-up or less

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Bodelsson 2002[754]	Case series EL = 3	177	F mean age 56 years (28–84), UD stress UI 7% prior continence surgery 9% had concomitant surgery	TVT under LA (73%) and SA (27%)	6–8 weeks	Subjective data	88% cure 11% improved 1% no change	Funding: none declared. Setting: Sweden. Cure = absence of urinary leakage as judged by patients. *9.3% in LA group, 29% in SA group, $p = 0.002$ (SA = spinal anaesthesia). Overall, no sig. association between low urethral pressure, concomitant surgery or previous surgery and failure to void.
						Intra- and post-operative complications	15% bladder perforations* 1% urethral perforation 0.5% repeated bladder perforation 4% intra-op bleeding 0.5% haematoma 20% failure to void 12% urethral dilation 7% cystitis 6% *de novo* urge 2% sling rejection	
						Operative care	Mean hospital stay 3.9 days	
Mazouini 2004[739]	Case series EL = 3	71	F mean age 58 years (36–84), stress UI 25% postmenopausal 39% had prior surgery No concomitant surgery	TVT under LA (56%), SA (42%) and GA (1.5%)	6 weeks	Objective data	87% cure 7% improved 5% failed 1 h pad test: pre-op: 15 g, post-op: 1 g $P < 0.001$	Funding: none declared. Setting: France. Objective criteria: Cure = no urine loss during stress test and 1 h pad test < 100 ml. Improved = pad test with 50% decrease in leakage compared to pre-op. Failed = persistent incontinence. Subjective criteria by authors
						Subjective data ($n = 55$)	76% cure 20% improved 4% failed	
						Satisfaction	87% satisfied 13% disappointed	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Intra- and post-operative complications	4% bladder injury 3% tape rejection 4% normal voiding after 12 days 7% tape cut 25% recurrent cystitis 25% urgency 33% frequency 60% voiding difficulties	questionnaire.
						Sexual function (in sexually active group, 77%)	58% normal 20% not satisfactory 2% improved 15% dyspareunia 5% loss of libido	
						Operative care	Mean hospital stay 2.3 days (2–4)	
Niemczyk 2001[755]	Case series EL = 3	100	F mean age 62 (33–90) years, UD stress UI 86% had prior pelvic surgery Mean parity: 2.3 82 postmenopausal 18 premenopausal	TVT under LA with sedation (97%) RA (3%)	3 weeks and 2 months	Subjective cure/ improvement	At 3 weeks (93%) 88% cure 9% improved 3% unchanged At 2 months (54%) 85% cure 11% improved 4% unchanged	Funding: none declared. Setting: USA.
						Satisfaction	77% reported minimal/no discomfort with surgery 64% rated inconvenience of surgery as none/minimal 91% would recommend to friends	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Intra- and post-operative complications	23% bladder perforation 1% retained plastic sheet 8% UTI 5% urinary retention 1% retropubic haematoma 1% fungal vaginitis 5% *de novo* urge	
						Operative care	Mean operation time 35 min (19–99)	
Deans 2004[756]	Case series EL = 3	62	F with UD stress UI median age: TVT alone: 57 years TVT+combined surgery: 60 years 29% prior continence surgery, 31% prior gynae surgery Combined with vaginal procedure in 23% median parity: TVT alone: 2 TVT+combined: 2.5	TVT under LA or GA (no data)	6 weeks	Post-op complications	Voiding difficulty (immediate post-op): 25% TVT alone 50% TVT+combined (8% and 28% at 6 weeks) 11% bacterial cystitis 10% *de novo* urge	Funding: none declared. Setting: Australia.
Virtanen 2002[757]	Case series EL = 3	46	F mean age 61 years (37–83), stress UI Mean parity: 2.2 (0–8) Mean BMI: 27.2 (20–36) 32% had prior pelvic surgery	TVT under LA	Mean time: 11 weeks (7–16)	Success rate (negative cough stress test)	94%	Funding: none declared. Setting: Finland. Ultrasound outcomes also reported – not reproduced here.
						Intra- and post-operative complications	2% haematoma 0 bladder, urethral or ureteral injury/laceration; infection, or tape rejection	
Wang 2002[758]	Case series	59	F with stress or mixed UI (%mixed not stated)	TVT under spinal anaesthesia (SA)	3 months	Subjective data	86% cure	Funding: none declared. Setting: USA.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		42 normal voiders 15 abnormal voiders Mean age: normal voiders: 65.8 years abnormal voiders: 72 years Previous surgery: normal voiders:47% abnormal voiders: 67%			Factors correlated with post-op voiding dysfunction (% voiding dysfunction in pts with normal vs abnormal voiding post-op)**	Abnormal pre-op uroflow* (*P* = 0.007) Pre-op low peak flow rate (< 15 ml/s), 10% vs 45% (*P* = 0.049) Pre-op vault collapse or enterocele 10% vs 36% (*P* = 0.017) Concomitant vault suspension surgery 10% vs 33% (*P* = 0.03) Post-op UTI 14% vs 60% (*P* = 0.006)	Subjective criteria as reported by patients. *'pattern and configuration'. **normal voiding = PVR < 100 ml, max. daily frequency 6, and urinary stream considered normal by the patient.
Abdel-Hady 2005[759]	Case series EL = 3	658	F mean age 57 years (28–90), with UD stress UI (19% mixed) 10% aged > 70 years 18% prior failed surgery 29% also underwent concomitant surgery median BMI: 27 (19–56), 30% with BMI > 30	TVT under SA unless contraindicated	6 months	Subjective data	Overall 91% cure and happy with operation 8% sig. improved < 1% failed 81% in women > 70 years old	Funding: none declared. Setting: UK. Subjective criteria: Women's perception of symptoms: cure, improved > 50% or no change. Data available on 454 women (31% drop-out). 300 completed QOL assessment. Women with previous surgery or vaginal hysterectomy (*n* = 75) reported to be more liable to urethral and bladder injuries.
						QOL (KHQ), mean change from baseline	–83%, *P* < 0.001	
						Intra- and post-operative complications	Bladder perforation (incidence not stated) 4% voiding difficulty 0.6% retropubic haematomas 0.5% thromboembolism 4% inability to void/incomplete voids/poor stream 0 division of tape Women who had concomitant repair surgery (*n* = 190) tended to take a longer time to recover, but by 6 weeks, outcomes NS between TVT group and TVT +repair surgery	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Karram 2003[760]	Case series EL = 3	350	F mean age 58 years (28–89) with UD stress UI 20% had prior continence surgery 55% had concomitant pelvic surgery Mean parity: 2.8 (0–12) Mean BMI: 28.5 (18–46)	TVT under GA	Min 6 months	Intra- and post-operative complications	4.9% bladder perforations 1.1% increased bleeding 2% haematomas (1 needing laparotomy) 5% voiding dysfunction 2% prolonged voiding dysfunction needing cutting of tape 11% at least 2 UTI 12% persistent urge incontinence 1% femoral nerve injury 1% wound healing defect 0.3% (*n* = 1) tape erosion 0.3% wound breakdown 0.3% tape excision	Funding: none declared. Setting: USA. Sig. association between women with previous continence surgery and voiding dysfunction (RR 3.27, 95% CI 0.015 to 4.2).
Moss 2002[761]	Case series EL = 3	320	F median age 55 years (24–85) with UD stress UI 48% TVT only 51% had prior pelvic surgery 231 postmenopausal (61% on HRT) 89 pre/intra-menopausal	TVT under LA+ sedation (64%), LA (6%), SA (22%) GA (9%)	Min 6 months	Subjective cure Intra- and post-operative complications	92% 0 mortality 4% bladder perforation* 11% UTI 10% voiding difficulties (based on 245 women) 0.3% tape resection 0.3% underwent open colposuspension for recurrent SUI	Funding: none declared. Setting: UK. Subjective criteria = no leakage as judged by patient. *3 in TVT as a primary procedure, 10 in women who had previous pelvic surgery, *P* = NS.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Risk factors/sub group analysis	Previous surgery: No sig. association between success rates of TVT as a primary procedure and in women who had previous pelvic surgery No. of previous operations: No sig. association between voiding difficulties and no. of previous operations Body weight: Sig. higher subjective success rate in women > 80 kg Menopausal status: No sig. differences in success rates between pre- and postmenopausal groups, and no sig. difference associated with HRT usage	
Zhu 2005[750]	Case series EL = 3	42	F mean age 52 years (35–79) with UD stress UI Mean parity: 2 (1–5)	TVT under LA	10 months	Subjective and objective cure (combined)	93% cure 7% sig. improved	Funding: none declared. Setting: China. Subjective and objective criteria: Cure = no leakage on cough stress test and patient-determined continence status. Improved = small leakage on cough test and urine leakge < 50% on 1 h pad test. Failed = not fulfilling the above.
						Intra- and post-operative complications	0 bladder/blood vessel injury 76% urge incontinence x 1 week, 24% for 2 – 6 weeks 12% urinary retention x 11 days 0 TVT erosion 0 wound infection 0 tape rejection	
						Operative care	Mean operation time 26.3 min (26–30) Mean hospital stay 2.9 days (2–12) 82% discharged within 2 days	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Paick 2005[136] Associated publications Paick 2004[137,138] (one considered results in stress vs mixed grps and both whether pre-op MUCP or VLPP predict outcomes)	Case series EL = 3	274 (221 at time of reporting of one series[138])	F mean age 55 years (28–80) with UD stress U (73% pure stress UI, 27% with mixed) 20% had prior hysterectomy, and 5% prior continence surgery In study with 221 pts, 28% had low VLPP (≤ 60 cmH_2O) 73% had VLPP > 60[138] No concomitant surgery reported	TVT under LA (96%), SA (3.6%) and GA (0.7%)	Mean time: 10.5 months (6–52)	Subjective and objective data (combined)	91% cure 9% failed Cure in pure stress UI vs mixed UI grps[137]: 96% vs 78% $P < 0.001$ (multivariate analysis, TVT failure sig. associated with urge symptoms (OR 15.12, 95% CI 1.90 to 120.61)[138] According to VLPP[138]: 82% vs 93% for high vs low VLPP, $P = 0.013$ Risk of failure higher with MUCP < 20[138]: (OR 0.92 95% CI 0.86 to 0.99)	Funding: none declared. Setting: Korea. One surgeon. Subjective and objective criteria. Cure = absence of subjective complaint of leakage and absence of objective leakage on stress testing. All other cases considered failures. Low VLPP < 60 cmH_2O. Another Paick publication may include some of these pts who had longer-term follow-up.[802]
						Intra- and post-operative complications	4.7% bladder perforations 14% urinary retention 10% poor flow 6% frequency 3% dysuria 1.7% hesitancy 1.7% *de novo* urge (of pure SUI grp) 0.4% wound infection 0.4% UTI 0.4% acute pyelonephritis 1% tape released 0.4% tape resected 0 haematoma 0 wound erosion/poor healing 0 tape rejection	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Sokol 2005[741]	Case series EL = 3	267	F mean age 61 years (29–93) who underwent TVT Mean parity: 2 (0–10) Mean BMI: 29 (18–52) 77% menopausal 30% on HRT 178 (66%) concomitant prolapse repair 71 (26%) concomitant hysterectomy 82 (30%) TVT only	TVT under GA (72%) TVT only (54% GA, 23% LA, 22% LA+sedation)	Mean: 2 months (0.1–42.6)	Predictors of prolonged urinary retention after TVT	Sig. association between increasing age ($P < 0.001$), decreasing BMI ($P = 0.002$) and presence of post-op UTI ($P < 0.001$) with longer time to adequate voiding median days to voiding TVT: 5 days (0–32) TVT+surgery: 8 days (0–44) (NS) Voided the day of surgery: 21% of isolated TVT 2% of TVT+concomitant surgery ($P < 0.001$) Sig. association with previous history of continence surgery (OR 2.96, 95% CI 1.17 to 7.06) No sig. difference between TVT as an isolated procedure (11.3%) and TVT +prolapse repair (11.2%)	Funding: none declared. Setting: USA. Adequate voiding = 2 consecutive voids of at least 80% of total bladder volume when total vol. ≥ 150 ml. Time to adequate voiding = no. of days after surgery required to meet the above criteria for catheter removal.
Mukherjee 2001[752]	Case series EL = 3	242	F with UD stress UI 36% with BMI ≥ 30 (Mean age: 56 years) 40% with BMI 25–29 (Mean age 57 years) 24% with BMI < 25 (Mean age 55 years) coexisting prolapse (number not reported) corrected before TVT under the same anaesthetic	TVT under SA	Mean: 38 ±16 weeks	Subjective cure/ improvement	Overall: 91% cure 8% improved 1% failed According to BMI (≥ 30, 25–29, < 25) Cure 89%, 95%, 85% Improved 11%, 5%, 12% Failed 0, 0, 3% P = NS between groups	Funding: none declared. Setting: UK. Subjective criteria: By King's QOL and bladder-specific (BSS) questionnaire.
						QOL (KHQ), mean change from baseline	BMI ≥ 30: –78% BMI 25–29: –86% BMI < 25: –80% P = NS between groups, $P < 0.001$ vs baseline	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Intra- and post-operative complications	No report on bladder injury 0.8% retropubic haematomas 0.4% persistent slow voiding (tape division at 1 year) 0.8% tape was stretched within 2 weeks (1 recurrent SUI) No sig. difference between the groups of different BMI	
Rardin 2002[751]	Case series EL = 3	245	F with SUI 36% had recurrent SUI following failed surgery Mean age: Primary surgery 59 years (27–94), recurrent surgery 65 years (34–87), *P* = 0.004 Mean parity: Primary – 2.4 (0–9) Recurrent – 2.7 (0–8) Intact uterus: 23% primary, 67% recurrent *p < 0.001* ISD: primary 47%, recurrent 71%, *P* < 0.001 36% had previous pelvic repair (20 had multiple repairs, 1 had 6 repairs) Concomitant surgery: 55% primary, 60% recurrent	TVT LA: Primary 58% Recurrent 75% RA: Primary 20% Recurrent 14% GA: Primary 22% Recurrent 11%	Mean time 38 weeks (± 16)	Subjective data	87% cure: Primary surgery 87% Recurrent surgery 85%, *P* = NS 6% improved: Primary 7%, recurrent 5% 4% failed: Primary 4%, recurrent 3%	Funding: none declared. Setting: USA. Subjective criteria: Success = absence of urine leakage by patient report. Improvement = improved stress-related leakage over baseline. Failure = full recurrence of GSUI. *All complications reported separately for women undergoing TVT as a primary or recurrent procedure. Two outcomes sig. different between groups; incomplete emptying (9% primary vs 1% recurrent, *P* = 0.01), and estimated blood loss (74 vs 46 ml, *P* = 0.03).
						Intra- and post-operative complications*	3% bladder perforations 2% readmission 2% haematoma/abscess 0.4% intra-op MI 0.4% reqd transfusion 0.4% intra-op death 0.4% tape erosion 4% reqd tape release 5% urinary retention 6% incomplete emptying 5% urge UI (4% *de novo*) 31% OAB (26% *de novo*)	
						Operative care	Mean hospital stay Primary – 1.1 day (± 0.7) Recurrent – 1 day (± 0.4)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Abouassaly 2004[753]	Case series EL = 3	241	F mean age 58 years (25–87), with stress UI Mean parity: 2.5 (0–10) 49% had prior hysterectomy, 30% prior pelvic surgery. 36% using HRT 9% underwent concomitant pelvic surgery	TVT under LA (2.5%), RA (96%) GA (1.7%)	Mean time: 147 days (60–484)	Intra- and post-operative complications	6% bladder perforations 19.5% urinary retention 3% tape released 1.2% tape sectioned 1.7% recurrent SUI 1.9% pelvic haematoma 0.4% wound infection *At 1 year* 5.8% *de novo* urge 5.8% reported urgency/frequency 17% minor difficulty in voiding 7.5% suprapubic discomfort 11.8% ≥ 1 UTI 1% tape erosion and removal	Funding: none declared. Setting: Canada. Subjective criteria: Cure as judged by the women.
						Operative care	Mean operation time 32 min (12–135) Mean hospital stay 2.6 days (1–15)	
Mutone 2003[740]	Case series EL = 3	153	F with UD stress UI with or without ISD (MUCP < 20 or VLPP < 60; 48% with). Hypermobility present in 91% (defined as Q-tip straining angle ≥ 30°) Mean age: Hypermobile: 58 years (26–87), others: 63 years (49–79) median no of previous surgical procedures: Hypermobile:0 (0–4) Non-hypermobile: 2 (0–3)	TVT under LA and sedation	median: 6 months (0.5–26)	Subjective data	Overall: 91% cure 8% improved 0.7% no change or worse In subgroups with hypermobility vs no hypermobility*: 92% vs 79% cure 7% vs 21% improved 0.7% vs 0% failed, *P* = NS for comparisons	Funding: none declared. Setting: USA. Subjective criteria: Cure = complete absence of SI symptoms. Failure = partial improvement, no change or worsening of Si symptoms. Objective criteria: Objective cure = subjective cure and negative standing stress test. *straining angle > 30°.
						Objective cure in pts with hypermobility vs without	92% vs 79%, *P* = NS	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			($p < 0.01$) None underwent concomitant surgery			Intra- and post-operative complications (overall)	2.6% bladder perforations 0.7% mesh erosion 0.7% haemorrhage requiring transfusion 78% voiding normally without catheter within 2 weeks post-op	
Segal 2004[762]	Case series EL = 3	98	F mean age 54 ± 12.8 years, with stress UI (34% pure stress, 66% mixed) Mean parity: 2.6 ± 1.7 Mean BMI: 29.7 ± 7.4 54% Postmenopausal 62% on HRT 39% had prior continence surgery	TVT under LA and sedation	Mean time: 7 months	Urge incontinence and OAB symptoms	SUI (*n* = 33) 9% had urge UI post-op 34% had OAB post-op (*n* = 98) 27% used anticholinergics post-op	Funding: none declared. Setting: USA.
						QOL (median changes from baseline)	IIQ –57 (from 57 to 0 score change), *P* = 0.013 UDI: –44 (from 61 to 17), –72%, *P* = 0.22 (significant change in stress, irritative and obstructive scales)	
						Intra- and post-operative complications	8% bladder perforation 6% voiding dysfunction 2% urethral dilatation 2% tape revision Sig. association between prior continence surgery and post-op OAB requiring anti-cholinergic (OR 8.2, 95% CI 1.32 to 13.3)	
Quershi 2003[763]	Case series EL = 3	96	F mean age 54 years (32–84) who had undergone a TVT procedure Parity: 0–6 72% had previous gynae surgery	TVT under LA (3%) and SA (97%)	Up to 3 months	Patient satisfaction	85% success 7% partial success 10% not successful (pre-op: changed pads ≥ twice/day, post-op: none)	Funding: none declared. Setting: UK. Author's questionnaire used to assess subjective satisfaction.
						Intra- and post-operative complications	7% bladder injury 30% minimal bleeding 4% pain on voiding at 3 months 12% readmission for UTI/constipation 1% tape removal 1% worsening DO and recurrent UTI	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Walsh 2004[764]	Case series EL = 3	67	F with UD stress UI 69% aged < 70 years (mean 54), and 31% aged > 70 (mean 76) 28% of younger age group had prior continence surgery, 6% collagen injection. 67% of older age group had prior surgery, 38% collagen injection	TVT (Type of anaesthesia not stated)	Mean time 9 months (for under 70 years) and 12 months (for over 70 years)	Subjective data	SUI improved: By 90% in under 70 (P = 0.037) By 80% in over 70 (P = 0.046) Sig. improvement in frequency and urgency symptoms pre-op and post-op in the two age groups	Funding: none declared. Setting: USA. Subjective criteria: QOL using King's Health Questionnaire.
						Intra- and post-operative complications	4% bladder perforations 0 bowel/vascular injury/other complications 57% spontaneous voiding post-op in both groups	
Ghezzi 2005[746]	Case series EL = 3	53	Sexually active women with stress UI Mean age 51 years (34–70) 29% using HRT 43% experience UI during intercourse	TVT under GA (38%) or spinal (62%)	Median 12 months (range 6–12)	Change in sexual function	62% unchanged 34% improved 4% worsened Coital UI cured in 87%	Funding: none declared. Setting: Italy.
						complications	3.8% bladder perforation 5.7% voiding dysfunction 3.8% *de novo* DO 1.9% (n = 1) vaginal erosion	

TVT case series – 1 and 2 years follow-up

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Meschia 2001[777] Earlier report, including some of same patients	Case series EL = 3 Prospective	404	F mean age 57 years (31–83), with UD stress UI. 29% had urgency; 14% urge UI 3% marked genital prolapse + urinary leakage during stress 25% women had	TVT 44% under LA, 50% SA, 6% GA	21 months (range 12–35)	Objective cure	90%	Funding: none declared. Setting: 6 hospitals in Italy. All patients received prophylactic antibiotic therapy before surgery. Objective cure = no urine leakage during cough
						Subjective data	92% cure 4% improved 4% failed	
						Mean symptom score	Post-op: 0.7 (range 0–10)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Meschia 1999[951]			associated anatomical defects at vaginal sites Mean parity: 2 (range 0–2) Mean BMI: 26 (range 17–36) 19% had prior pelvic surgery 21% had other reconstructive procedures			Intra- and post-operative complications	6% uneventful bladder perforations 4% voiding difficulties (PVR ≥ 100 ml) 1.5% retropubic haematoma – spontaneously absorbed 0.5% laparotomy for retropubic bleeding 0.5% defective healing 0.3% obturator nerve injury	provocation test. Subjective criteria. 'cure' = no urine loss during stress; 'improved' = significantly fewer leakage episodes during stress with a satisfied patient. 'failed' = similar no of leakage episodes post-op as pre-op. Symptom score: perception of severity of incontinence by VAS (0–10).
Richter 2005[778]	Case series EL = 3	87	F mean age 56 years (31–95) with stress UI 60% had prior therapy (behavioural, medication or pessary use) 40.2% had no previous treatment 82.8% underwent ≥ 1 concomitant surgery	TVT under SA 82%	Mean time 19 months Data available for 84% at 1 month, 24% at 2 years)	IIQ (mean change from baseline)	–95%, $P < 0.001$	Funding: Health Services Foundation, University of Alabama, Birmingham, USA. Setting: USA. Concomitant pelvic reconstructive surgery: ant/post colporrhaphy, vaginal vault suspension, vaginal hysterectomy, colpocleisis.
						UDI (mean change from baseline)	–72%, $P < 0.01$	
						Satisfaction (at 24 months)	96% satisfied	
						Post-op complications	Not reported	
Lo 2002[779]	Case series EL = 3	45	F mean age 69 years (65–85), with UD stress UI 27% had previous surgery median parity: 5 (2–9)	TVT under LA	Mean 19.7 months (12–34)	Objective and subjective data	91% cure 2% improved 7% failed	Funding: none declared. Setting: Taiwan. Objective and subjective criteria: Cure = 1 h pad test < 2 g/h, no urinary leakage. Improved = 2–5 g/h pad test, leakage on coughing. Failed = > 5 g/h leakage.
						Post-op complications	4% bladder perforation 11% cystitis 15% urge 4% *de novo* DO 4% voiding discomfort 0 retention 0 defective healing 0 tape rejection	
						Operative care	Mean operation time 21 min (18–35) Mean hospital stay 24 h (12–72)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Wang 2000[780]	Case series EL = 3	39	F mean age 43 years (range 22–74), UD stress UI Mean parity: 4.1 (range 0–7)	TVT under SA	median time 19 months (range 12–24 months)	Objective data	85% cure 5% improved 10% failed	Funding: none declared. Setting: Taiwan. Objective cure: pad weight < 5 g on 1 h pad; improvement > 50% reduction, failure > 5 g weight. Subjective cure: no urine loss during exercise; improvement < 50% leakage episodes vs pre-op, failure > 50% leakage episodes vs pre-op.
						Subjective data	87% cure 5% improved 8% failed	
						Post-op urological symptoms	21% frequency 15% feeling of incomplete voiding 5% dysuria 8% positive urine culture 0 *de novo* DO	
Palma 2002[781]	Case series EL = 3	110	F median age 53 years (42–72), UD stress UI 31% cystocele (94% Grade I, 6% Grade II) 11% rectocele 7% perineal rupture Dystopy correction performed	TVT 92% SA, 8% LA	Mean time 18 months (range 2–24)	Subjective cure /improvement	81% cure 9% improvement 10% unsatisfied	Funding: none declared. Setting: Brazil. Antibiotic prophylaxis 1 h pre-op and for 24 h post-op.
						Post-op complications	13% bladder perforation 9% urinary retention 0.9% required surgical lysis of TVT 0 vaginal infection or tape erosion 29% transient irritative post-voiding symptoms; urgency persisted in 18%, and urge UI in 5% (DO present in 35% of these)	
						Operative care	Mean operation time 30 min (20–90 min) 40 min if dystopy correction Mean hospital stay 24 h (12–36 h)	
Ulmsten 1996[782] HTA	Case series EL = 3	75	F mean age 52 years (36–81) with SUI (urodynamically proven)	TVT under LA	2 years	Subjective and objective data	84% cure 8% improved 8% no change	Funding: none declared. Setting: Sweden. Subjective and objective criteria: QOL assessment and pad test.
						Intra- and post-operative complications	7% voiding problems 0 defective healing 0 sling rejection	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Operative care	Mean operation time 22 min (16–42) Mean sick leave 10 days (7–21)	
Gateau 2003[783]	Case series EL = 3 Prospective	112	F mean age 60 years (29–87), with UD stress UI 37% had prlor continence surgery	TVT under SA or GA	Mean time 22.6 months (7–23)	Subjective data	CONTILIFE (QOL) 87% cure 13% improved MUH* Significant improvement in all elements: mean no of complaints about SUI, sensation of dysuria, micturition urge, satisfaction, ($P \leq 0.01$)	Funding: none declared Setting: France. QOL assessed by Contilife and *MUH (measurement of urinary handicap).
						Complications	10% bladder perforations 2.7% haematomas 7.2% urinary retention at 1 month 11.6% *de novo* urge	
Vassallo 2002[784]	Case series EL = 3	151	F mean age 61 (SD13) Women with SUI (77% 'anatomic', 9% ISD, 15% occult) Mean parity: 3.01 ± 1.8 52% on HRT 31% prior continence surgery 75% underwent concomitant procedures	TVT under LA and GA (for concomitant surgery)	Mean time 22.1 months (6.1–49.8)	QOL (score change from baseline)	IIQ-7 –73%, $P < 0.001$ UDI-6 –57%, $P < 0.001$	Funding: none declared. Setting: USA. QOL results also reported for subgroups of anatomic, ISD and occult SUI; data not reproduced here.
Cetinel 2004[785]	Case series EL = 3	75	F mean age 51 years (33–69), with UD stress UI (79% mixed UI) Mean parity: 5.2 (1–28) 17% previous surgery	Modified TVT under LA (57%), GA (39%) and EA (4%)	Mean time 21.6 months (6–38)	Subjective data (at 12 months or more)	87% cure 10% improved 3% failure In pure stress vs mixed UI groups: In women with MUI ($n = 59$) 44 (74%) urge incontinence disappeared In women with SUI ($n = 16$) 0 *de novo* urgency	Funding: none declared. Setting: Turkey. 56 (75%) operated by experienced urologists. 19 (25%) by residents under tutor's supervision. Subjective criteria: Cure = did not leak urine at all. Improvement = use < 1 pad

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Satisfaction	93% satisfied 90% would accept op again and recommend to friends	daily and/or declared complete satisfaction. Failure = any leakage.
						Intra-operative complications	4% bladder perforation 3% bleeding needing transfusion 16% voiding difficulties 1% lower urinary tract symptoms 12% inguinal pain 2.6% skin and prolene skin infections 7% UTI	EA = epidural analgesia.
						Factors predicting cure rate	Patient's age over 55 years (logistics regression, multivariate analysis; Exp[β]:8.76, 95% CI 1.57 to 48.95) Type of anaesthesia (local, epidural, general): NS Experienced surgeons and residents: NS	
						Operative care	Mean operating time 34.7 min (20–70) Mean hospital stay 1.2 days (1–5)	
Fiori 2003[786]	Case series EL = 3	57	Women with SUI and Grade 1–2 cystocele (urodynamically proven) Mean age: 62 years (42–83) 33.4% had previous laparotomy 15.8% had vaginal procedures	TVT under SA	22.2 months	Objective data	88% cure 9% improved	Funding: none declared. Setting: Italy.
						QOL	Sig. improvement (no data given) 0 modification of sexual habits	QOL assessed by self-evaluation questionnaires (VAS 1–10).
						Intra-and post-op complications	1.7% bladder perforation 1.7% retropubic haematoma 1.7% loin pain 1.7% persistent pubic pain 1.7% *de novo* urgency 24% short-term voiding difficulties	Objective cure = full-time continence with negative stress test. 'Improved' = slightly positive stress test with pad test leakage < 20 g/24 h.
						Operative care	Mean operation time 35 min	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Allahdin 2004[787] Associated study Allahdin 2004[788] which reported outcomes irrespective of age, although fewer pts recruited at time of report	Case series EL = 3	179	F mean age 61 years (31–90), with UD stress or mixed UI (~36% mixed) Group A = 30–49 years (*n* = 53) Group B = 50–69 years (*n* = 91) Group C = 70–90 years (*n* = 35)	TVT (type of anaesthesia not stated)	Mean time 21 months (1–40)	Subjective data	83% cure (85% in A; 81% in B; 86% in C) 10% sig. improved (4% in A; 14% in B; 9% in C) 7% failure (11% in A; 4% in B; 6% in C)	Funding: none declared. Setting: UK. Subjective cure = 80–100% improvment by QOL. Sig. improved = 50–70% improvement. Failure = < 50% improvement. Intra-operative antibiotic prophylaxis.
						Intra-and post-op complications	3% bladder perforations 0.5% urethral perforation 1.6% bleeding > 200 ml 9% voiding problems 16% urgency 2.8% CISC 1.6% TVT erosion	
						Operative care	Length of hospital stay: 150 day cases 24 stayed 1–8 days	
Allahdin 2004[788] Associated study Allahdin 2004[787] which aimed to compare outcomes in different age grps	Case series EL = 3	162 (data for 79%)	F mean age 64 years (38–90) with UD stress or mixed UI (36% mixed) 143 TVT only 16 TVT+concomitant surgery Mean age: 64 years (38–90) Mean BMI: 36 (23–49)	TVT under LA (32%), SA (64%) and GA (4%)	Up to 1 year	Subjective data	Overall 85% cure 11% improved 4% failed In mixed UI group: 88% cure 9% improved 3% failed	Funding: none declared. Setting: UK. 1 trained urologist supervised 52 cases. 1 trained gynaecologist supervised 110 cases. 10% operations involved trainees, supervised. Subjective criteria by QOL questionnaire. Cure = 90% improvement in symptoms of incontinence. Improved = 70–90% improvement in these symptoms. Failed = < 70% improvement. 128 women completed study at
						Intra- and post-op complications	3.6% bladder perforations 1.2% urethral perforations 1.2% bleeding > 200 ml 0.6% retropubic haematoma 2% voiding problem needing CISC 5% urgency 1.2% vaginal wall erosion of TVT 0.6% intractable urge incontinence	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Operative care	Mean hospital stay TVT only: 2 days (1–3) TVT+surgery: 6 days (5–8)	1 year.
Price 2004[789] (Audit of TVT use vs NICE guidance)	Case series EL = 3 audit	95	F mean age 59 (33–90) with UD stress UI 84% failed physiotherapy. 7% had complete genital prolapse, 5% declined physiotherapy 42% TVT for relapses 36% underwent concomitant surgery (pelvic floor repair, hysterectomy, or both)	TVT under SA (80%), GA (14%) and LA (7%)	Mean time 20 months	Subjective data	75% cure 21% sig. improvement 3% no change 1% worse	Funding: none declared. Setting: UK. 79 TVT performed by consultant; 16 by SpR under supervision. Subjective data from BFLUTS questionnaire.
						Satisfaction (questionnaire)	76% mostly satisfied 16% mixed feelings 5.6% mostly dissatisfied 0% unhappy 92% would recommend TVT	
						Intra-op complications	4% bladder/urethral perforation 1% bleeding 27% voiding problem post-op 2% long-term voiding problem 12% *de novo* urgency 0% tape rejection 0% defective healing	
Levin 2004*[770]	Case series EL = 3 prospective	313	F mean age 64 ± 11 years, UD stress UI. 27% had occult stress UI + prolapse) 86% postmenopausal (20% on HRT) 19% had hysterectomy 4% had undergone anti-continence surgery	TVT (50% under EA or SA)	Mean time 21.4 ± 13.5 months	Post-op complications (*n* = 241 [77%])	5% intravesical passage of tape 2.5% voiding problems 1.3% erosion of tape 10% fever 10% UTI 1.3% retropubic haematoma 6.6% persistent mild SUI 8.3% *de novo* urgency 0 blood transfusion	Funding: none declared. Setting: Israel. *these 313 patients also analysed in a case–control study of 460 women, where outcomes considered by age (Gordon 2005[820]).
						Operative care	Mean hospital stay 4.8 ± 3.1 days	
Lo 2003[773]	Case series	58	F mean age 55 years (38–29), UD stress UI	TVT under SA or EA	Mean: 18 months	Objective cure	91% cure 10% failed at 1 year	Funding: none declared. Setting: Taiwan.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		129 concomitant surgeries (no of women not stated) Mean parity: 5 (2–9) 16% had previous pelvic surgery			Complications	0 bladder injuries 0 healing defect of vaginal/abdominal wound 0 tape rejection 7% UTI 5% febrile episodes 3.4% gluteal pain	3 women loss to follow-up. Objective cure = pad test < 2 g/h without urine leakage on coughing. Failed = urine loss > 2 g/h and leakage on cough test.
						Operative care	Mean operating time 21 mins (18–35) median hospital stay 3.4 days (3–9)	
Carta 2002[766]	Case series EL = 3	52	F mean age 57 years (SD 10), UD stress UI (13% with MUI) 4 had previous continence surgery 28 postmenopausal Mean age: 56.7 ± 10.3 years Mean parity: 2.05 ± 1.3	TVT under SA (94%), LA (4%) and GA (2%)	Up to 18 months	Subjective data (in pure stress UI grp and mixed UI grp)	Cure (pure stress UI vs mixed UI) 81% vs 43% Improved 9% vs 28% No change 7% vs 28%	Funding: none declared. Setting: Italy. Subjective criteria by questionnaire. Objective criteria: Cure = if continent with stress test or no sign of urine retention or no sign of residual > 150 ml.
						Objective data (in pure stress UI vs mixed UI grp)	Cure 89% vs 43% Improved 11% vs 57% 0% no change	
						Intra- and post-op complications	5.7% bladder perforations 7.7% urinary retention 1st week post-op 2% urinary retention after 4 weeks – section of tape without removal 0 tape rejection 0 healing defect	
						Operative care	Mean operating time 25.3 min (20–40) Mean hospital stay 2.4 days (2–6)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Huang 2003[736]	Case series EL = 3	106	F mean age 57 (SD 11) years, UD stress UI 50% had uterine prolapse; 50% myomas 50% underwent TVT+LAVH, and 50% TVT+VTH+APC	TVT + hysterectomy (VH, APC and LAVH) under GA	Mean time 18 months (12–36)	Objective data	Overall cure 86% TVT+LAVH (*n* = 53) 86% cure 4% improved 4% failed TVT+VTH+APC (*n* = 53) 85% cure 6% improved 4% failed	Funding: none declared. Setting: Taiwan. APC = anteroposterior colporraphy. VTH = vaginal total hysterectomy. LAVH = laparoscopic-assisted vaginal hysterectomy. Objective criteria: Cure = negative cough stress, 1 h pad test < 5 g , no urine leakage. Improved = negative cough stress, 1 h pad test < 50% pre-op , urine leakage at cough provocation. Failed = positive cough stress, 1 h pad test > 50% pre-op, urine leakage. Subjective criteria (VAS): Cure = VAS > 90% Improved = VAS 75–90%. Failed = VAS < 75%. 100 women completed study.
						Subjective data	Overall cure 90% TVT+LAVH 91% cure 4% improved 0 failed TVT+VTH+APC 89% cure 6% improved 0 failed	
						Post-op complications (related to TVT only)	*Overall* 2% bladder perforations 11% voiding difficulty 10% urinary urgency 0% blood transfusion 0% laparotomy IISTVT+LAVH IIE8% urinary urgency 8% voiding difficulty IISTVT+VTH+APC IIE11% urinary urgency 4% voiding difficulty	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Operative care	TVT+LAVH Mean hospital stay: 3.5 days Mean catheterisation time: 1.5 days TVT+VTH+APC Mean hospital stay: 4.8 days Mean catheterisation time: 3.7 days	
Haab 2001[776]	Case series EL = 3 prospective	62	F mean age 63 (SD 7) years, with SUI 26% had previous surgery for SUI Exclusion: urge incontinence, DO, sphincter deficiency	TVT under SA (68%) and LA (32%)	Mean time: 16.8 months (12–24)	Subjective and objective data	87% cure 10% improved 3% failed	Funding: none declared. Setting: France. QOL/satisfaction by questionnaire using VAS. Cure = no leakage based on QOL and stress test. Improved = ≥ 50% decrease in symptoms based on QOL. Failed = did not meet above cure or improvement criteria. All women taught CISC Intra- and post-op antibiotics.
						Satisfaction	97% would undergo surgery again 94% would recommend TVT to friends 2% would not 5% not sure	
						Post-op complications	10% bladder perforations (5 in women who had previous surgery vs 1 in women who had no previous surgery; $P < 0.01$) 6% *de novo* DO 0 pelvic pain or dyspareunia 0 infection 0 sling rejection	
						Operative care	Mean operating time 23 ± 11 min (16–42)	
Laurikainen 2003[769]	Case series EL = 3	191	F median age: 60 years (32–84) with symptoms of stress UI (34% mixed UI)	TVT under LA (82%) and SA	Mean time: 17 months (3–36)	Subjective data	88% cure (69% of MUI, 97% SUI, *p = 0.001*) 12% minimal/no improvement	Funding: None declared. Setting: Finland. 90% performed by same

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			median parity: 2 (0–8) median BMI: 27 (19–39) 119 on HRT 58% had previous surgery: 20% continence surgery 40% hysterectomy 13% vaginal surgery 13% abd/gynae surgery Concomitant surgery +TVT 7% for prolapse 11% hysterectomy	(18%)		Post-op complications	2.6% bladder perforations 0.5% severe bleeding (400 ml) 2.6% haematomas 29 (15%) overall minor complications: 0.5% wound infection 9.5% UTI 4.8% *de novo* urge UI 10% urinary retention 0.5% underwent TVT twice 0 nerve/vessel/bowel injury 0 tape rejection Complications in women with previous surgery vs women without: 17% vs 13% (NS) Complications in obese vs non-obese women: 18% vs 14% (NS)	surgeon. Subjective criteria: cure = report by women of being completely continent at any stress situation.
						'Cure' data in subgroups	Obese vs non-obese: NS LA vs SA: NS Hysterectomy vs no hysterectomy: NS TVT vs TVT+other surgery :NS Concomitant chronic disease vs no such disease: NS	
						Operative care	Mean operating time 27 min (16–63) (Obese vs non-obese: NS) Mean hospital stay 2 days (1–10) Mean sick leave 18 days (2–50)	
Nilsson 2001 [771]	Case series EL = 3	161	F mean age 56 years (29–81), with recurrent UD stress UI and MUCP < 20	TVT under LA	Mean time: 16 months (6–24)	Subjective and objective data	87% cure (81% MUI, 78% of low UCP) 7% improved 5% failed	Funding: None declared. Setting: Finland. TVT performed by 2 surgeons.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			(37% mixed UI) Mean parity: 2 (0–9) Mean BMI: 25 (19–35) Duration of symptoms: 10 years (1–50) 41% prior hysterectomy 28% prior continence surgery			Post-op complications	20% minor complications overall 3.7% bladder perforations 4.3% urinary retention 6.2% UTI 3% *de novo* urgency (with/without UI) 0.6% blood loss of 450 ml 0.6% wound infection 0.6% retropubic haematoma 0 tape rejection 0 defective healing	Subjective and objective criteria: Cure = negative stress test, no leakage by 24 h pad test, < 5 on VAS scale, chose 'cure' from 4 answers. Improved = negative stress test, 75% on VAS scale, chose 'improved' from 4 answers. Failed = < 75% on VAS scale.
						Operative care	median operating time 22 min (10–40)	
Flock 2004[743]	Case series EL = 3	336	F mean age 63 years (40–87) with SUI (34% mixed UI) 11% had prior surgery 26% underwent TVT+other gynae surgeries	TVT under LA (73%), SA (23%) and GA (4%)	median time: 16 months (5–25)	Haemorrhagic complications	2% increased blood loss (> 200 ml) 4% retropubic haematoma (40–1000 ml) (obese vs non-obese: NS; TVT+other surgery vs TVT alone: NS) 1% surgical removal of haematoma (1 laparotomy, 3 laparoscopic aspiration)	Funding: none declared. Setting: Germany. No continence outcomes reported.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Ramaswamy 2004[765]	Case series EL = 3	90 pts treated; 86 had complete records, and 70 (78%) responded to questionnaire follow-up	F mean age: 50 years (31–83), with UD stress UI (8% mixed UI) Mean parity: 2.5 (0–7) 26% had co-morbidities	TVT under LA (2%) and SA (88%)	16.3 months (3–28)	Subjective and objective data	TVT questionnaire (*n* = 70): 79% success (cure or improvement) In women with pure stress UI (*n* = 63): 59% cure 22% improved 8% worsened 11% no change Mixed UI group (*n* = 7): 29% cure 29% improved 29% worsened 13% no change Audit of records (*n* = 84): Overall: 82% success In pure stress UI grp: 64% dry 23% mostly dry 13% wet Mixed UI grp 43% dry 29% mostly dry 29% wet	Funding: none declared. Setting: UK. TVT performed by 4 experienced surgeons. Subjective criteria: TVT questionnaire. Objective criteria: TVT audit survey.
						Complications	14% bladder perforations 8% CISC 1% further colposuspension 1% urinary diversion 28% urge	
						Operative care	median hospital stay 3.4 days (2–14)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
de Mattieis[737]	Case series EL = 3	98	F mean age 62 (39–79), with UD stress UI	TVT + other vaginal surgery under LA	14.6 months (4–24)	Success rate	77% cure (10% moderate DO – disappeared after 10 months) 4% improved 5% failed	Funding: not declared. Setting: Italy. Criteria not stated for 'cure, improved, failure'.
						Post-op complications	1% lesion on iliac vein 3% bladder perforations 1% haematoma of the Retzius	
Soulie 2001[768]	Case series EL = 3	52	F mean age 64 years (37–91), with stress UI (56% 29 recurrent SUI, 23% mixed UI). 67% had urethral hypermobility 15% underwent an associated pelvic prolapse repair Exclusions: Psychiatric patients, neurogenic and hypocontractile bladders	TVT under SA (82%), LA (12%) and GA (6%)	15 months (6–36)	Subjective and objective data	Overall 83% cure In pts with MUCP < 30 cmH_2O (*n* = 27): 78% cure In pts with MUCP > 30 cmH_2O (*n* = 25): 88% cure 17% improved 0 failed	Funding: not declared. Setting: France. TVT performed by 9 surgeons in 5 centres. Subjective and objective criteria using questionnaire: Cure = no leakage, no need of pads, no major urinary retention. Improved = minimal leakage without disturbing daily living. Failure = no change or worsened.
						Complications	11.5% bladder perforations 17% transient urinary retention 0 sling infection 0 vaginal erosion 0 *de novo* urge	
						Operative care	Mean operating time 30 min (20–60) Mean hospital stay TVT: 2.5 days (1–7) TVT+ repair: 4.3 days (2–17)	
Lo 2002[730]	Case series EL = 3	41	F mean age: 50 years with UD stress UI who had undergone at least 1	TVT under LA (78%) and SA	median time 16 months (12–24)	Objective cure/ improvement	83% cure 5% improved 12% failed (3 had ISD pre-op)	Funding: not declared. Setting: Taiwan. Subjective and objective

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			unsuccessful continence procedure 27% had ISD Mean parity: 3.5 22% had concomitant surgery	(22%)		Complications	10% bladder perforations 17% urge 5% voiding discomfort 0 healing defect 0 haematoma 0 *de novo* voiding difficulty	criteria: Cure = no leakage, 1 h pad test < 2 g/h. Improved = Urine leakage, pad test 2–5 g/h. Failed = leakage > 5 g/h.
						Operative care	Mean operating time 22 min (15–44) median hospital stay 22 h (12–72)	
Schiotz 2000[790]	Case series EL = 3	42	F mean age 50 years (36–77) with UD stress UI 64% previous surgery	TVT under LA (90%), SA (2%) and GA (2%)	16 months (6–27)	Subjective or objective data	Subjective: 85% cure 10% almost cure Objective: 81% cure 12% almost cure 7% somewhat improved	Funding: not declared. Setting: Norway. Criteria: Cure = no subjective or objective stress-related leakage, or minimal subjective leakage on severe stress but no leakage on objective testing. Almost cure = > 90% improvement, stop using protection, minimal leakage on severe stress, objectively proven leakage not exceeding 10% of pre-op quantity. Not cure = results poorer than the above.
						Satisfaction	97% pain of TVT procedure acceptable 95% willing to repeat experience 98% would recommend it to a friend in similar situation	
						Complications	5% bladder perforations 2% skin infection 2% defective healing of vagina 0 bleeding, tape rejection, UTI, long-term voiding problems, *de novo* urge	
						Operative care	Mean operating time 34 min (21–57) 90% women discharged within 24 h	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Munir 2005[791]	Case series EL = 3	76	F mean age 54 (25–85), UD stress UI (11% mixed UI) 50% had previous pelvic surgery 1.3% underwent concomitant gynae surgery Mean parity: 2.2 (0–6)	TVT under SA (99%) and GA (1%)	14.3 months (2–42)	Subjective data	59% completely dry or leaked < once a week 92% improved symptoms 8% no effect (80% reported improvement of > 75%; 44% reported improvement of 100%) In the 44% who reported improvement of 100%: 20% reported 'completely dry' 39% leaking ≤ once a week 71% resumed normal activities within 3 weeks	Funding: not declared. Setting: UK. Subjective criterion by modified BFLUTS. Objective criteria as documented in clinical notes by surgeons. 54 (72%) response rate.
						Satisfaction	94% satisfied 6% not	
						Objective data	46% completely dry or 100% improved 88% improvement of ≥ 75% 4% no change 0 worsened	
						Intra- and post-op complication	1 (1.3%) Haematoma 1.3% blood transfusion 1.3% failed to void 1.3% UTI Short- term complications after discharge: 15% bleeding 7% UTI 33% pain Delayed post-op complications 35% urgency 7% short-term urge incontinence 19% UTI 11% large residuals 10% post-op pain	
						Operative care	Mean hospital stay 1.7 days	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Moran 2000[733]	Case series EL = 3	40	F mean age: 51 years (33–86), with UD stress UI median parity: 2 (0–4) Mean BMI: 25.1 (19–35) 53% had previous hysterectomy None had prior continence surgery	TVT under LA and light sedation	Mean time 12.3 months (6–24)	Subjective data	80% cure 17.5% sig. improved 2.5% no change	Funding: not declared. Setting: UK. Subjective criteria = no details given. Objective criteria = urodynamics.
						Objective data	95% cure 17.5% *de novo* urge	
						Post-op complications	5% bladder perforations 15% post-op DO 5% voiding dysfunction 2.5% UTI 0 infection 0 tape rejection	
						Operative care	Mean operating time 42 min (25–65) Mean hospital stay 2.2 days (2–4) Mean time of return to work 2.2 weeks (1–6)	
Lebret 2001[772]	Case series EL = 3	100	F mean age 60 years (38–87), with UD stress UI 21% had prior continence surgery. 100% had undergone PFMT 15% had concomitant	TVT under LA (35%), EA (47%) and GA (18%)	≥ 1 year	Objective data	77% cure 15% sig. improved TVT+prolapse repair (*n* = 15%) 9 dry 4 improved 2 failed	Funding: not declared. Setting: France. TVT by 6 different surgeons (learning period in the 1st 50 patients, experienced period in the last 50 patients).

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			prolapse repair Exclusion: urge UI			Intra- and post-op complications	Overall: 15% bladder injury 13% retention 10% dysuria 5% urgency 2% bladder erosion During learning period: 22% bladder injury 20% retention 14% dysuria 4% urgency 8% pelvic pain 2% late bladder erosion (tape migration) Experienced period: 8% bladder injury 6% retention 6% dysuria 6% urgency 4% pelvic pain 2% late bladder erosion	Objective criteria: Cure = totally dry. Sig. improved = negative stress test, negative pad test (leakage on severe stress).
Wang 1998[775]	Case series EL = 3	70	F mean age 43 years *22–74), with UD stress UI (16% mixed UI) Mean parity: 4 (0–7)	TVT under EA	Median 12 months (3–18)	Objective data	87% cure 4% improved 9% failed	Funding: not declared. Setting: Taiwan. Objective criteria: Cure = pad test ≤ 5 g. Improved = loss decreased to < 50% experienced pre-op. Failed = pad test > 5 g. Subjective criteria: Cure = no urine loss with exercise. Improved = < 50% leakage than pre-op.
						Subjective data	83% cure 1% improved 16% failed	
						Intra- and post-op complications	4% bladder perforations 16% had blood loss > 200 ml 17% post-op voiding problems 6% UTI 0 defective healing 0 tape rejection	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Operative care	Mean operating time 29 min (20–51) Mean hospital stay 3 days (2–8)	Failed = > 50% leakage than pre-op.
Azam 2001[731]	Case series EL = 3	67	F mean age 49 years (38–78), with UD stress UI All had ≥ 1 prior surgery for incontinence median parity: 2	TVT under LA (34%), SA (63%) and GA (3%)	Up to 1 year	Subjective and objective data	81% cure 6% improved 13% failed	Funding: not declared. Setting: Australia. Subjective and objective criteria: Cure = no urine loss, pad test > 1 g' patient report of no leakage and satisfaction with outcome. Improved = no urine loss, pad loss improvement of at least 75%, and patient report of some leakage but overall satisfaction. Failed = demonstrable urine loss, pad loss improvement of < 75%, and patient report of some leakage and dissatisfaction.
						Intra- and post-op complications	19% bladder perforations 7% UTI 7% new onset DO 1.5% voiding disorder 0 excessive bleeding/retropubic haematoma 0 wound infection 0 tape removal	
						Operative care	Mean operating time 49 min 51% discharged within 24 h	
Pang 2003[738]	Case series EL = 3	45	F with UD stress UI All had pelvic floor reconstruction surgery and concomitant TVT	TVT + pelvic floor surgery under LA	At 1 year	QOL	Significant improvement in UDI-6 and IIQ-7 scores from baseline, $P < 0.01$	Funding: none declared. Setting: China. Operation by 2 surgeons. Subjective criteria assessed by QOL: UDI-6, IIQ-7. Objective criteria: Cure = negative stress test, normal cystometry.
						Satisfaction (n = 37)	72% satisfied 95% would recommend to friends 84% would choose same tx if reqd	
						Objective data	42.5% cure (37% in women who had cyctocele repair)	
						Intra- and post-op complications	7% bladder injury 2% UTI 8% vault haematoma 7% fever 2% repeated catheterisation	
						Operative care	median operating time 60 min (30–150) median hospital stay 6 days (4–15)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Davis 2004[774]	Case series EL = 3	97 (68% with 1 year follow-up)	F mean age 62 years (31–86), with stress UI 26% had prior continence surgery median parity: 2 (0–8) Mean BMI: 27	TVT	1 year	Satisfaction	80% satisfied 20% dissatisfied Satisfied women more likely to achieve subjective cure (P = 0.009) but not objective cure (NS) Dissatisfied women more likely to have OAB and required sling release (P = 0.001)	Funding: none declared. Setting: USA. Satisfaction criteria using UDI-6.
Sander 2002[767]	Case series EL = 3	45	F with UD stress UI (36% mixed UI) 73% had previous continence surgery	TVT under LA (91%) and SA (9%)	1 year	Subjective data Objective data Intra- and post-op complications	87% cure 13% improved 88% cure 2% bladder perforation 8% urinary retention needing cystoscopy (2 needing CISC at 1 year, 1 had partial excision of tape) Subjectively 25 (78%) considered their voiding more difficult	Funding: none declared. Setting: Denmark. Subjective criteria = asking women's if voiding has changed post-op (dysuria, hesitance, use and pressure, incomplete emptying) Objective criteria: Cure = pad test < 8 g/24 h and no leakage.
Yalcin 2004[792]	Case series EL = 3	61 (only 21 followed up at 6 months, and fewer thereafter)	F with UD stress UI 46% had concomitant surgery Mean age: 49 years (TVT) and 50 years (TVT+surgery)	TVT under LA or GA	6 months to 2.5 years	Subjective data (believed to be at 1 month) Intra- and post-op complications	92% cure 8% improved NS between TVT vs TVT +surgery 6.6% UTI 3.3% bladder perforations 3.3% voiding difficulty 3.3% post-op urge incontinence 1.6% nerve injury P = NS between TVT vs TVT +surgery	Funding: University of Istanbul. Setting: Turkey. Subjective criteria: Cure = leakage < than once a month. Improved = 50% improvement. No change. Follow-up: 21 women at 6 months 19 at 1 year 13 at 2 year 8 at > 2 years.
Lo 2001[793]	Case series EL = 3	82	F mean age 57 years (30–65), with UD stress UI 24% had prior continence	TVT under LA	Up to 1 year	Objective data	93% cure 5% improved 2% failed	Funding: none declared. Setting: Taiwan. Objective criteria:

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			surgery median parity: 3 (1–60)			Intra- and post-op complications	13% voiding problems 0 bladder injuries 0 wound healing defect 0 tape rejection 0 *de novo* DO	Cure = pad test < 2 g/h without urinary leakage on coughing. Improved = < 5 g/h on pad test and urinary leakage on coughing. Failed = leakage > 5 g/h.
						Operative care	Mean operating time 25 min (18–35) Mean hospital stay 2 days (1–4)	
Al-Badr 2003[794]	Case series EL = 3	63*	F mean age 58 years (32–82) with UD stress UI 10% had prior prolapse surgery Mean parity: 2.5 (0–7) 63% on HRT 33% had concomitant procedures	TVT under LA (5%), SA (81%) and GA (4%)	Up to 3 years (only 1 year data used: owing to high drop-out rate)	Objective data (*n* = 53)	87% cure	Funding: none declared. Setting: Canada. *16% loss to follow-up at 1 year; 97% loss at 3 years. Objective criteria: Cure = inability to demonstrate SUI in clinical exam and /or provocative UD. Subjective criteria: Cure = women's report of no SUI.
						Subjective data (*n* = 53)	95% cure	
						Intra- and post-op complications	6.4% bladder perforations 6.4% mild vaginal bleeding 1.6% retropubic haematoma 49% voiding dysfunction (38% unable to void, 11% high PVR)	
						Operative care	Mean hospital stay 1 day (0–6) 27% discharged within 24 h, 60% within 48 h	
Magatti 2002[795]	Case series EL = 3	78	F mean age 58 years (36–77) with stress UI 12% TVT + colpohysterectomy (28% TVT + prolapse repair [NOT in analysis]) Mean parity: 2.3 (0–5) 40 BMI > 25	TVT under LA (67%) SA (33%)	6–36 months	Objective and subjective data	93.5% cure at 6 months 92% continent and satisfied at 1 year	Funding: not declared. Setting: Italy. Objective criteria: Cure = stress test at 300 ml of fill while standing and supine-modified pad test). Subjective Cure = QOL by VAS.
						Intra- and post-op complications	3.8% bladder perforations 3.8% *de novo* urge 1.3% haemorrhage resulting in colposuspension 1.3% haematoma 1.3% vaginal erosion –tape re-stitching	
						Operative care	Mean operating time 34 min (20–60) Mean hospital stay 3 days (2–8)	

TVT case series – 2–3 years follow-up

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Neuman 2004[744] And Neuman 2003[796]	Case series EL = 3	524	F with UD stress UI 57% also underwent anterior and/or posterior Colporrhaphy, and 7% vaginal hysterectomy No demographics	TVT under LA (11%), SA (31%) and GA (58%)	Mean time 2.7 years	TVT needle bladder penetration rate	13% at least 1 TVT needle penetration 44% occurred in the first 100 procedures; 24% bladder penetration rate in the first 50 patients, 6% in the last 50 patients 0.6% had bilateral bladder penetrations Penetration rate and primary/non-primary SUI corrective surgery: NS Penetration rate and anesthetic modalities:NS Penetration rate and colporrhaphy and hysterectomy: NS 0 deleterious effect 0 post-op voiding dysfunction, UTI or bladder overactivity 1 recurrent UTI and severe dysuria: undiagnosed transvesical TVT at 2.5 years, removed under GA	Funding: none declared. Setting: Israel. All women had diagnostic cystoscopy before withdrawal of TVT needles.
						Prolapse[796]	4% new prolapse (from 158 without prolapse at baseline) *n* = 3 grade 1 rectocele 4 grade 1 cystocele	
Sevestre 2003[797]	Case series EL = 3 Propsective	76	Elderly F mean age 75 years (70–91) with UD stress UI (5% DO) 29% had previous continence surgery 96% had pre-op local	TVT Under GA (73%) LA (27%)	Mean time 24.6 months (16–49)	Subjective cure/ improvement	67% cure 13.7% persistent SUI 18.4% urge UI	Funding: none declared. Setting: France. BFLUTS questionnaire used; satisfaction by VAS. Discomfort score reported on 'EVA' scale – data not
						Satisfaction	82% satisfied 14% 'results inadequate' 4% 'Worse'	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			hormone treatment			Complications	No intra-op complications reported 21% *de novo* urgency 26.3% urinary retention 85% voiding difficulties 1.3% vaginal erosion 0 wound infection	reproduced here. 2 lost to follow-up.
						Operative care	Mean operation time 16 min (12–22) Mean hospital stay 1.7 days (1–4)	
Deval 2002[798]	Case series EL = 3 Restrospective	187	F mean age 55 (SD 11) years (31–102), with UD stress UI (29% mixed UI) Mean parity: 2.2 ± 1.3 (0–9) 61% BMI > 24 21% BMI > 30 9% no previous surgery 37% underwent hysterectomy during TVT; 16% posterior colporrhaphy	TVT under GA, SA or LA (no data)	Mean time 27 months (6–34)	Objective	90.4% 'cure' 9.6% 'failure or improvement'	Funding: none declared. Setting: France. Objective criteria: 'cure' = no stress incontinence on clinical and urodynamic exam, and on stress provocation test. 'failures' = all other cases. Subjective criteria: 'cure' = , 'improved', 'unchanged' or 'worse' according to responses to CONTILIFE questionnaire and VAS scores.
						Subjective data	70.6% 'cure' According to VAS (scores 0 to 12): Pre-op: 6.2 ± 2.4 Post-op: 0.9 ± 2.2 (P = 0.001) Lower after GA, LA than SA (P = 0.001); lower after GA than SA (P = 0.01) According to VAS: women with new onset urge symptoms: 2.2 ± 3.2 women without new onset urge symptoms: 0.2 ± 0.7 (P = 0.0001) 22% 'improvement' 1.6% 'no change' 5.9% 'worse'	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Post-op complications	35% total 10% bladder injury 3% haemorrhage 1% blood transfusion 9% UTI 0.5% septicaemia 6% urinary retention 0.5% haematoma 11% difficult voiding 21% new onset urge symptoms 0.5% persistent retropubic pain (most patients had more than 1 complication)	
						Operative care	Mean operative time 29 min (25 – 59)	
Kinn 2001[799]	Case series EL = 3	75	F mean age 60 (SD 12 years, range 39–83) with UD stress UI (31% mixed UI) Parity: range 0- > 5) 24% previous hysterectomy, 4% surgery for uterine prolapse, 21% prior continence surgery, 3% radiation therapy for cervical cancer	TVT under LA (97%) and SA (3%)	2 years	Continence by VAS	66.7% complete 13.3% minimal leakage 9.3% small leakage 9.3% unchanged 1.3% worsened	Funding: Grants from Johanna Hagstrands and Sigfid Linner's Foundation. Setting: Sweden. Bristol 12-item questionnaire = Score 1 = little discomfort; 5 = severe discomfort. VAS (visual analogue) = 0 = total incontinence 10 = perfect continence.
						Daily frequency by Bristol questionnaire	Pre-op: 9.1 daytime, 1.2 at night ($P < 0.001$) Post-op: 7.4 daytime, 0.9 at night ($P < 0.001$) Post-op improvement in leakage and pad test ($P < 0.001$)	
						Self-report of impact of incontinence on quality of life	Post-op improvement in social life, physical activity, depression/anxiety ($P < 0.001$)	
						Continence by surgery status	First time surgery:83.3% Previous surgery: 73% ($P < 0.01$)	
						Continence by BMI status	BMI 24–28: 70% BMI > 28: 41% ($P < 0.01$)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Post-operative complications	2.6% bladder perforations 12% temporary urine retention 2.6% vaginal sling erosion 2.6% UTI 5% transient urge 2.6% permanent increased urge	
						Operative care	Mean operation time 39 min Mean hospital stay 1 day	
Jeffry 2001[800]	Case series EL = 3 Retrospective	112	F mean age 54 years (33–102), with UD stress UI (21% mixed UI) 14 (12.5%) Grade I 47 (42%) Grade II 51 (45.5% Grade III) Mean parity: 2.1 (0–6) 64% BMI > 24 6% previous surgery for incontinence 33% concomitant pelvic surgery	TVT under LA	Mean time 25 months (18–34)	Objective	'cure': overall: 89% (91% for pure stress UI grp, 83% mixed UI) 'improved'; overall 11% (9% SUI, 17% MUI) None 'failed'	Funding: none declared. Setting: France. LA = local anaesthesia. Ingelman-Sundberg scale = Grade I: UI when coughing or sneezing, Grade II: UI when running or picking up objects from the floor Grade III: UI when walking or stair climbing. Objective cure = no stress UI on UD and on stress provocation test; no urinary retention; 'improved = no UI on stress provocation test; 'failed' = All other cases. Subjective cure, 'improved' and 'failed' according to response to the CONTILIFE questionnaire. *all occurred on left side, 5 occurred in women with previous continence surgery. Significant difference between women with and without previous surgery: 5 (71%) vs 8 (7.6%) $P < 0.001$.
						Subjective data	'cure'; overall 66% (69% SUI, 54% MUI) 'improved': overall 28% (24% SUI, 42% MUI) 'no change': overall 3% (2% SUI, 4% MUI) 'become worse'; overall 5% (all SUI)	
						Operative care	Mean operation time 30 min (range 25–50)	
						Complications	37.5% overall 26% *de novo* urge symptoms 12% bladder injuries* 11% urinary infection 8% urinary retention 12.5% voiding difficulties < 15 days 3.6% voiding difficulties > 15 days 2.7% haemorrhage 0.9% haematoma	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Tomoe 2005[732]	Case series EL = 3 Prospective	66	F mean age 58 years (40–80) with stress UI (UD in 48%). 5% had mixed UI 24% aged ≥ 65 years; 76% < 65 years Mean parity: 2.3 (1–4) Mean BMI: 23.7 (range 18–32) Exclusions: prior continence surgery, severe DO, overt neurogenic bladder disease, POP	TVT under LA	2 years	IIQ-7 (change from baseline)	–93%, *P* < 0.001 Sig. improvement in all domains also reported (physical activities, travel, social activities, emotional health)	Funding: none declared. Setting: Japan. Total scores for both QOL scales transformed to 100. Outcomes also considered for the % over and below 65 years – no sig. difference found between groups in any domain/score.
						UDI-6 (change from baseline)	–88%, *P* < 0.001 Sig. improvement in all domains also reported (irritative, stress, and obstructive/discomfort symptoms)	
						Satisfaction with surgical outcomes	88%	
						De novo urge UI	12%	
Liapis 2001[801]	Case series EL = 3	68	Women with UD stress UI 74% with Stage I prolapse Mean age: 53.8 ± 8.5 years Mean parity: 2.1± 0.9 Mean BMI: 28.4 ± 2.5 26% with Stage II prolapse Mean age: 54.2 ± 8.1 years Mean parity: 2.1± 1.3 Mean BMI: 27.2 ± 3.3 TVT for Stage I prolapse TVT + colporrhaphy for Stage II prolapse	TVT under epidural anaesthesia	2 years	Objective data	'cure' TVT only: 50 (88%) TVT+ colporrhaphy:16 (88.8%) 'improved' TVT only: 2 (6%) TVT+ colporrhaphy:1 (5.5%) 'failed' TVT only: 3 (4%) TVT+ colporrhaphy:1 (5.5%)	Funding: none declared. Setting: Greece. Objective criteria: 'cure' = post-op pad weight difference of < 1 g. 'improved' = post-op reduction of urine loss to < 50%. Subjective criteria: 'cure' = no loss of urine with exercise, coughing or weight lifting. 'improved' = significant reduction of leakage episodes expressed by patients' satisfaction. All patients had a Foley catheter and vaginal tampon in place for 24 h.
						Subjective data	'cure' TVT only: 45 (90%) TVT+ colporrhaphy: 16 (88.8%) 'improved' TVT only: 2 (4%) TVT+ colporrhaphy: 0 (0%) 'failed' TVT only: 3 (6%) TVT+ colporrhaphy: 2 (11%)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Post-op complications	6% perforated bladder 3% UTI 5% *de novo* instability 9% *de novo* urgency 10% variable degrees of urinary retention after catheter removal – residual urine > 100 ml 0 cystocele relapse 0 TVT rejection	
						Operative care	Mean operation time (TVT only) 28 ± 11 min Hospital stay 2 days (range 1–3)	
Paick 2004[802] (these pts may also be included in cohort with shorter follow-up by same author)[136–138]	Case series EL = 3	60	F mean age 57 years (35–71) with stress UI Exclusions: mixed or urge UI 20% had prior hysterectomy 3% had other continence surgery	TVT under LA (96%) and SA (4%)	At least 2 years	Subjective and objective data	83% cure 12% improved 5% failed	Funding: none declared. Setting: Korea. Subjective and objective criteria: Cure = Absence of subjective complaint + objective leakage on stress test. Improved = patient report of some leakage but overall satisfaction + no urine loss on stress test. Failed = did not meet above cure or improvement criteria.
						Urodynamics	Max. flow rate higher in cure group pre-op (adjusted OR 0.90, 95% CI 0.82 to 0.99) Other parameters: NS	
						Post-op complications	6 (10%) bladder perforations 3 (5%) intermittent catheterisations 11 (18%) voiding problems 2 (3%) *de novo* urge symptoms 0 infection 0 erosion/tape rejection	
Kuuva 2003[803]	Case series EL = 3	51 Prospective	F median age 57 years (38–76) with UD stress UI, who did not require additional surgery 20% had had 2 previous continence procedures; 80%	TVT under LA	median 24 months (24–60)	Objective data	90% cure 6% improved 4% failed	Funding: Grant from the Medical Society of Finland. Setting: Finland. Objective criteria: cure if negative 24 h pad test; improvement if negative pad test
						Subjective data	80% cure 16% improved 4% failed	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			median BMI: 25 (20–30) median duration of symptoms: 10 years (1–37)			Post-op complications	6% bladder perforations 6% voiding difficulty 6% UTI 6% *de novo* urge symptoms without DO	and > 80% reduction in urine leakage. Subjective criteria: cure if ≤ 10 on VAS improvement if ≤ 25 on VAS.
						Operative care	median operating time 25 min (10–40)	Failure: did not meet above cure or improvement criteria.
Schraffordt Koops 2005[804] and 2006 (see below)	Case series EL = 3	809	F mean age 51 years (20–82) with UD stress UI 16% had operative history for incontinence or prolapse Mean parity: 2.4 ± 1.1 47% postmenopausal (34% on HRT) 7% had concomitant surgery	TVT under LA (80%), SA (8%), GA (12%)	Up to 2 years	Intra- and post-op complications	Intra-op 4% bladder perforations 1.2% severe blood loss (> 300 ml) 1 (0.12%) iliac vein laceration needing laparotomy 0% urethral lesion Post-op 3.4% haematoma 0.1% temp rise > 38 C 0.2% tape rejection 0.7% UTI 15% voiding difficulty*	Funding: Foundation for Scientific Research of the Gynecology Associates Tilburg. *catheter reqd for > 24 h. Post-op complications influenced by 'Learning curve' effects. 17% first 10 TVT 29% next 10 TVT 20% > 20 TVT. Sig. association in the second 10 TVT by same surgeon (OR 0.66, 95% CI 1.14 to 3.29).

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Multivariate analysis of risk factors for having intra- or post-operative complications	Intra-operative history of prolapse surgery: OR 2.86, 95% CI 1.15 to 7.11 Women with history of continence surgery or both prolapse and continence surgery: NS General anaesthetic: OR 4.14 to 95% CI 2.01 to 8.53 No sig. association among women with concomitant surgery (overall complication rate in this group 9.5%: ns) Post-op complications 24% in teaching hospital 16% in local hospital (OR 0.55, 95% CI 0.35 to 0.85) Fewer in premenopausal women OR 0.67 to 95% CI 0.46 to 0.99 Spinal anaesthesia OR 0.35, 95% CI 0.13 to 0.92	
						Operative care	median operating time 32.4 min (14–120)	
Schraffordt Koops 2006[805] and 2006[806] and 2005 (see above)	Case series EL = 3	809	As Koops 2005[804]	TVT	At least 2 years	QOL (UDI-6, IIQ-7) by mailed questionnaire N = 634*, but 26 excluded	Change in scores form baseline: IIQ-7 –79% UDI-6 –60%	Funding: none declared. *Excluding pts with prior or undergoing concomitant surgical procedures for stress UI or prolapse. Further exclusions owing to declining to take part further or not completing questionnaire. 77% response rate to questionnaire at 2 years. OR via multivariate analysis.
						Subjective response	95% improved in response to question about leakage from UDI 80% no leakage on direct questioning from doctor 97% no leak observed on cough test during physical exam	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Factors determining success (QOL or cure)	Surgeons' experience (more than 20 procedures per surgeon): For QOL: OR for success 1.9 (95% CI 1.24 to 2.97) For cure: OR for failure 0.55 (95% 0.32 to 0.96)	
Dietz 2004[742]	Case series EL = 3	145 (data for 74% at 2 years)	F mean age 55 years (31–79) with stress UI Mean BMI: 28 (19–43) 47% had concomitant pelvic surgery	TVT (type of anaesthesia unclear)	2 years	Voiding functions	MFR centiles Pre-op: 49.7 (32.5) Post-op: 22.9 (23.6) ($p < 0.001$) Between 1st and last post-op visit (mean of 2 years): MFR centiles 20 (21) vs 25 (24) ($p = 0.021$) Residual urine 82 (117) vs 45 (56) ($p < 0.001$) Reduced 'poor stream' OR 0.77, 95% CI 0.61 to 0.96 Reduced 'straining to void' OR 0.69, CI 0.48 to 0.98 Reduced 'incomplete emptying' OR 0.79, CI 0.65 to 0.96 Reduced 'hesitancy' and 'stop-start voiding':NS Sig. relationship between length of follow-up and reported UTI: 8% UTI at 1 year 18% UTI at 2 years 28% UTI at 3 years 20% at 4 years and 33% at 5 years OR 1.73, CI 1.39 to 2.15	Funding: Johnson and Johnson. Setting: New Zealand. Data available on 108 women at 2 years. MFR = max. flow rate.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Ulmsten 1998[735] Some overlap with Ulmsten 1999[734]	Case series EL = 3	131	F mean age 53 years (35–88) with UD stress UI Mean parity: 2 (0–5) None had prior continence surgery, or signs/symptoms of prolapse Exclusions: DO, ISD	TVT under LA	≥ 12 months	Subjective and objective data combined	91% cure 7% sig. improved 2% failure	Funding: not declared. Setting: Sweden. Subjective cure ≥ 90% improvement QOL (VAS); sig. improvement = between 70–90% improvement in QOL and no UI on stress test, and 'sig.' reduction in leakage on 24 h pad. Objective cure: < 10 g/24 h pad test, negative stress test on coughing. TVT performed by 3 experienced urogynaecologists.
						Complications	1 (0.8%) bladder perforation 1 (0.8%) wound infection 3 (2.4%) short-term urinary retention 1 (0.8%) voiding problem 1 (0.8%) retropubic haematoma 0 tape rejection	
						Operative care	Mean operating time 28 min (19–41) Mean sick leave 2 weeks (10–21 days)	

TVT case series – 3 or more years follow-up

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Debodinance 2002[807]	Case series EL = 3	256	F mean age 57 years (29–96) with stress UI (21% mixed) 10% had prior continence surgery 25% also underwent prolapse surgery	TVT under SA and GA	3 months, 1, 2 and 3 years	Objective data (all patients)	At 3 months (*n* = 251) 90% cure 8% improved 2% failed 1 year (60%) 91% cure 1% improved 1% failed 6.4% recurrent At 2 years (27%) 83% cure 0% improved 10% failed 7.2% recurrent (global 14%) At 3 years (6%) 87% cure 0% improved 13% failed 13% global recurrent	Funding: none declared. Setting: France. Objective criteria data: Cure = completely dry during stress. Improved = occasional leakage. Failed = leakage unchanged or worse. Data available from: 251 women at 3 months 154 women at 1 year 69 women at 2 years 15 women at 3 years.
						Objective data (mixed UI group [21%])	At 3 months (*n* = 52) 75% cure 17% improved 8% failed 1 year (52%) 85% cure 4% improved 4% failed 7.4% recurrent At 2 years (29%) 60% cure 0% improved 20% failed 33% recurrent (global 14%)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Intra- and post-op complications	6% bladder perforation Short-term: 1% haematomas 3% UTI 0.4% urethral wound 0.4% ureteral fistula 13% transient urinary etention 0.4% acute renal failure Long-term: 16% urinary urgency 12% *de novo* urgency 26% objective dysuria 23% subjective dysuria 20% *de novo* dysuria 0 defective healing 0 tape rejection	
						Satisfaction with TVT	64% very satisfied 31% satisfied 3% not satisfied 2% disappointed	
Bunyavejchevin 2005[808]	Case series EL = 3	63	F mean age 52 (35–71), UD stress UI None had previous surgery 33 had genital prolapse 50 menopausal Mean parity: 3.8 (1–4)	TVT under SA and CS	3 years	Objective data	95% cure 5% improved 10% failed	Funding: none declared. Setting: Thailand. CS = conscious sedation. Objective criteria: Cure = no incontinence on stress provocation, no urinary retention/residual urine > 150 ml. Improved = no incontinence on stress provocation. Failed = none of the above.
						Intra- and post-op complications	3% bladder injury 1.6% urinary retention 5% *de novo* DO	
						Operative care	Mean operation time 32.2 ± 10 min Mean hospital stay 1.5 ± 2.0 days	
Rezapour 2001[747–749]	Case series EL = 3 Prospective	163	A) F with recurrent UD stress UI (*n* = 34) Mean age: 58.9 ± 10 years	TVT via sagittal suburethral vaginal incision	4 years (range 3–5)	Objective cure/ improvement (group A)	82% cure** 9% Improved 9% failed (1 had 2 previous failed colposuspensions)	Funding: none declared. Setting: Sweden. TVT performed by experienced

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			Mean parity: 2 (0–4) 33% had < 2 previous operations, 10% had < 5 previous operations (16 Burch colposuspension, 7 MMK , 10 paraurethral bulking injections, 7 anterior repairs, 11 different sling procedures)	under LA Tape not fixed		Post-op complications (group A)	3% uneventful bladder perforation (previously undergone MMK 3 times before TVT) 41% prophylactic suprapubic bladder drainage (previously experienced post-op voiding difficulties after incontinence operations)	urogynaecologists. Cure if urinary leakage < 10 g/24 h pad test, if no leakage during a cough test, if patient satisfaction > 90% according to 'QOL' evaluation. 'Improved' = if did not leak on cough provocation and had a QOL improved > 75% < 90%. 'Failed' = did not meet the above criteria. QOL reported to be assessed but not stated how. Routine post-op ultrasonography. *5 in women > 70 years with a urethral pressure of < 10 cmH_2O and an immobile urethra). **overall cure rate 81%.
						Operative care (group A)	Mean hospital stay 4 days (range 1–6)	
			B) F with ISD (MUCP < 20), *n* = 49. Mean age: 66.1 ± 11 years Mean parity: 2 (0–5) (8 with immobile urethra; no cystocele or rectocele diagnosed) All postmenopausal women were treated with systemic or local oestrogen therapy for 3 months before TVT			Objective cure/ improvement (group B)	74% cure** 12% improved 14% failed*	
						Post-op complications (group B)	2% uneventful bladder perforation 10% haematoma 22% temporary voiding problems	
						Operative care (group B)	Mean operation time 35 ± 12 min Hospital stay 1 day	
			C) Women with mixed UI (*n* = 80) Mean age: 59.2 ± 11 years Mean parity: 2 (0–4) (Urge component:			Objective cure/ improvement (group C)	85% cure** 4% improved 11% failed	
						Urgency without incontinence (group C)	20 (25% of 'cure' or 'improved' women)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			premature voiding reflex or urethral relaxation) 49 postmenopausal women were treated with systemic or local oestrogen therapy			Post-op complications (group C)	1.3% bladder perforation 18% voiding problems 8% haematoma (1 laparotomy performed to exclude vessel injury – patient was on anti-coagulant therapy)	
Tsivan 2004[809]	Case series EL = 3 retrospective	55	F mean age 63 years (37–83), with UD stress UI 76% had concomitant procedures (hysterectomy, colporrhaphy, vaginal vault suspension)	TVT under SA (67%) and GA (33%)	Mean time 55 months (48-65)	Subjective cure	79%	Funding: none declared. Setting: Israel. Operations by experienced surgeons well trained in vaginal surgery. 3 loss to follow-up. Criteria for 'success' = complete continence and freedom from pad protection.
						Post-op complications	6% bladder perforations 2% urethral injury 2% UTI 36% short-term voiding difficulties 12% *de novo* urgency 4% vaginal erosion 2% bladder erosion 4% obstructed urethra requiring urethrolysis	
						Operative care	Mean operation time 28 min Post-op hospital stay 2.7 days (1–8)	
Glavind 2004[745]	Case series EL = 3	84 (81% responded to queationnaire)	Women with SUI Pre-op: 79% sexually active 26 (49%) had incontinence during intercourse 1 stated incontinence as reason for not being sexually active	TVT or IVS	Within a period of 4.5 years	Post-op sexual function	19 cure of incontinence during intercourse: 10/19 (50%) had an improved sexual life 7% reduced libido 0 *de novo* incontinence during intercourse	Funding: none declared. Setting: Denmark. Subjective criteria assessed by retrospective questionnaire.
Ulmsten 1999[734] 10 of these patients included in	Case series EL = 3	50	F mean age 57 (SD 11) years, UD stress UI	TVT under LA	3 years	Subjective and objective data combined	86% cure 12% improved 2% failed	Funding: none declared. cure = negative pad-test (< 10 g/24 h); no

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Ulmsten 1998[735] series			None had prior continence surgery All postmenopausal women were taking systemic or local oestrogen therapy Exclusions: Urge UI, prolapse			Post-op complications	4% women needed repeated catheterisation 2–3 days 6% women needed indwelling catheter for up to 12 days 0 severe bleeding (> 300 ml) 0 PVR > 100 ml 0 defective healing 0 tape rejection	incontinence on stress provocation test, and patient satisfaction > 90% according to QOL evaluation (VAS); no voiding problems (PVR > 100 ml). 'Significantly improved' = no incontinence on stress provocation; had a QOL improved > 75% < 90%; no post-op urinary retention/ urge incontinence. 'Failed' = did not meet the above criteria.
						Operative care	Mean operation time 29 min (range 16–47)	
Olsson 1999 [952]	Case series EL = 3	51	F mean age: 53 years (34–80), UD stress UI Mean parity: 2 (0–5) 28 post menopausal using HRT or local oestrogen 25% previous pelvic surgery 20% also underwent prolapse repair	TVT under LA	3 years	Objective and subjective data combined	90% cure 6% improved 4% failed	Funding: none declared. Subjective cure ≥ 90% improvement QOL (VAS); sig. improvement = between 70–90% improvement in QOL and no UI on stress test, and 'sig.' reduction in leakage on 24 h pad. Objective cure: < 10 g/24 h pad test, negative stress test on coughing.
						Post-op complications	2% bladder perforation 8% temporary urge symptoms 2% healing defect of vaginal wall 2% cystitis 2% recurrent cystitis 0 severe bleeding (> 300 ml), PVR > 100 ml, or defective healing or tape rejection	
						Operative care	Mean operation: 45 min (20–60) Mean sick leave: 21 days (7–30) Mean hospital stay 2 days	
Nilsson 2001[810] 5 year follow-up of Ulmsten 1998[735]	Case series EL = 3	90 prospective	median age at follow-up: 57 years (40–91)	TVT under LA	median time 56 months (48–70)	Objective and subjective data combined	85% cure 11% improved 5% failed	Funding: None declared. Setting: Sweden. TVT performed by

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			28% also had symptoms of urgency			Post-op complications	3% retropubic haematoma 1% bladder perforation 3% intra-operative bleeding of > 200 ml 4% initial post-op voiding difficulty 7% UTI 1% wound infection 1% recurrent UTI 5% *de novo* urge symptoms 0 tape rejection 56% of women with pre-op urge symptoms were relieved of them post-op	experienced urogynaecologists. Objective and subjective criteria: Cure = negative 24 h pad test, cough stress test, QOL improved ≥ 90%. Improved = > 50% reduction in pad test, < 15 g loss. Failed = did not meet the above criteria. 5 gave subjective data only.
						Operative care	Mean operation time 30 min (15–55) Post-op hospital stay 2 days (1–5)	
Nilsson 2004[811] 7 year follow-up of Ulmsten 1998[735]	Case series EL = 3 Prospective	90 (71% fully evaluated prospective	median age at follow-up: 60 years (42–94)	TVT under LA	Mean time 91.1 months (7.6 years) (78–100)	Objective and subjective data combined	81% cure (84% negative pad test, 95% negative stress test)	Funding: None declared. Setting: Sweden. Objective criteria: 24 h pad test, cough stress test, 2 day voiding diary. Subjective criteria QOL by VAS. Questionnaire on 'cure' data. 10 lost to follow-up. 16 gave subjective data only. Medical status of 18 urge symptoms: 4 diabetes
						Subjective data	81% cure 16% improved 3% failed *Change in continence status since 5 year follow-up:* 87.5% unchanged 5% improved 7.5% worse 84% claiming dry on stress 84% VAS score < 10 (on 0–100 scale)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Post TVT complications	23% urge symptoms 8% asymptomatic pelvic prolapse 8% UTI 6%) *de novo* urge symptoms 0 voiding difficulty or tape rejection	4 cardiovascular disease 3 asthma 1 bladder cancer 1 anal incontinence 5 *de novo* urge unrelated to any disease.
Holmgren 2005[812]	Case series EL = 3	692	Women with stress or mixed UI SUI (*n* = 580 [84%]) Mean age: 61 years, mean parity:2.4. BMI: 27; 55% oestrogen treatment. 6% prolapse surgery, 2% radiation for gynae cancer, 9% chronic bronchitis, 22% recurrent UTI, 5% chronic constipation MUI (*n* = 112 [16%]); mean age: 67 years, mean parity:2.3, BMI: 30; 69% oestrogen treatment 10% prolapse surgery, 5% radiation for gynae cancer, 10% chronic bronchitis, 26% recurrent UTI, 11% chronic constipation	TVT under LA	2–8 years Stress UI: 16% with 2 years follow-up, 20% with 3, 19% with 4, 18% with 5, 27% with 6–8 years Mixed UI: 26% with 2 years follow-up, 29% with 3, 19% with 4, 15% with 5, 12% with 6–8 years	Subjective data	SUI group: 80–90% 'cure' and 'almost cure' from 2–8 years 8.2% nocturnal incontinence MUI group: 60% 'cure' up to 3 years 30% 'cure' at 6–8 years (*P* = 0.02) 27.3% nocturnal incontinence	Funding: none declared. Setting: Sweden. Operated by 10 surgeons. Questionnaire (unspecified) on SUI and urgency incontinence.
						Pre- and post-op complications	SUI group (*n* = 580): 3% intra-op complications 9% post-op complications 24.5 ml post-op residual urine 0.9 day hospital care 16 days sick leave 9% subsequent tape correction MUI group (*n* = 112): 2% intra-op complications 4% post-op complications 20 ml post-op residual urine 1 day hospital care 14 days sick leave 3.6% subsequent tape correction	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Cure rates according to no. of TVT procedures performed by surgeons	250 TVT performed: 87% cure 103 TVT: 79% cure 81 TVT: 85% cure 57 TVT: 86% cure 40 TVT: 85% cure 18 TVT: 72% cure 15 TVT: 87% cure 11 TVT: 91% cure	

UK surgeons' experience of TVT

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Duckett 2004[817]	Survey EL = 3	426 surgeons*	Surgeons who performed 7336 TVT (40% gen gynaecologists 31% urogynaecologists 3% subspecialists in urogynae 25% urologists)	NA	NA	Continence surgery performed	7336 (45%) TVT 4430 (27%) Burch colposuspension	Funding: none declared. Setting: UK, data collected for 2001. 81% response rate.
						Suggested criteria for competence	46% suggested performing 10–20 cases under supervision 43% suggested 20–50 cases required to gain competence, depending on previous experience	
						TVT operation by group	44% performing ≥ 10 a year 91% gynaecologists and 87% of urologists performed ≥ 25 TVTs a year	
						Use of prophylactic antibiotics	> 87% 62% intra-operative 22% intra- and post-operative 3% post-operative	
						Anaesthesia (type used by surgeons)	Overall: 25% LA, 53% SA, 22% GA Urologists: 50% GA Sp interest urogynaecologist: 51% SA Gen gynaecologists: 63% SA	
						Intra- and post-op complications	44% noted bladder perforations (*n* = 1–5 in 90% of perforations)	
						Noted (experienced)	37% *de novo* DO 28% voiding abnormality > 6 weeks	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Markers for recovery	'Off work'	
							20% recommended 2 weeks off work	
							30% 2–4 weeks	
							35% 4–6 weeks	
							15% > 6 weeks off work	
							'Driving'	
							44% suggested driving within 2 weeks of surgery	
							37% no driving between 2–4 weeks	
							18% 4–6 weeks	
							'Sexual intercourse'	
							18% recommend abstinence for ≥ 2 weeks	
							40% 2–6 weeks	
							42% > 6 weeks	
						TVT + Concomitant prolapse surgery	69% (34% of urologist, 76% of gynaecologists)	
						Follow-up of patients	17% follow-up at 6 weeks	
							19% at 3 months	
							21% at 6 months	
							17% at 1 year	
							4% > 1 year	
							4% no follow-up	
							2% follow-up by nurses	
							1% by junior doctors	
							6% by other health professional	
							81% surgeons willing to audit their outcome data	

TVT registry data

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Kuuva 2002[813]	Registry data EL = 3 Nationwide survey	-	1455 TVT operations (40 included ≥ 1 or several other concomitant operations)	TVT	2 weeks to 2 months	Intra- and post-op complications	*Common:* 7.6% minor post-op voiding difficulty 4.1% UTI 3.8% bladder puncture 2.3% urinary retention from 6 h to 3 months 1.9% haemorrhage (> 200 ml) 1.9% retropubic haematoma *Uncommon or rare:* 0.5% haematoma outside retropubic area 0.8% wound infection 0.7% defect healing of vaginal incision 0.3% *de novo* urge symptoms 0.3% worsening of pre-op urge 0.14% dysuria 0.2% pain in gluteal/thigh muscle region 0.07% vesicovaginal fistula 0.07% venous thrombosis 0.07% seroma formation around tape 0.07% injury to epigastric vessel 0.07% injury of obturator nerve 0.07% vaginal haematoma 0.07% urethral lesion	Funding: none declared. Setting: Finland.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Tamussino 2001[814] (55 units) An earlier report of 29 units also identified: Tamussino 2001[815] Also: Kolle 2005[816] (*n* = 5578)	Registry data EL = 3	2795	Women who had undergone TVT 28% had previous surgery for incontinence 1640 (59%) TVT as isolated procedures, 1155 (41%) in conjunction with other gynae procedures	TVT under LA (28%) EA (47%) GA (24%)	3 years (1998–2001)	Intra- and post-op complications	2.7% bladder perforations (sig. higher in women with previous surgery for prolapse) 2.3% increased bleeding 17% UTI 2.6% re-operations 0.4% loosening of tape 0.5% division of tape 0.1% removal of tape 0.3% replacement of suprapubic catheter 0.1% increase tension of tape 0.7% evacuation of haematoma 0.14% intervention to control bleeding 0.04% laparotomy for small bowel perforation 0.04% intra-urethral injection	Funding: none declared. Setting: 55 centres in Austria.
						Bladder drainage	17% intermittent catheterisation 61% urethral Foley 19% suprapubic catheter	
						Operative care	median operation time TVT only (*n* = 1640) 30 min (range 10–120) TVT in combination (*n* = 1155) 81 min (range 15–390) Post-op stay median 5 days (0–46)	
Kolle 2005[816] (*n* = 5578) Related to Tamussino 2001[814]	Case series EL = 3	5578	Data from Austrian Vaginal Tape Registry	Tension-free vaginal tape procedure*	NA	Bleeding complications	Incidence 2.7% 1.9% intraoperative 0.8% reintervention or conversion for bleeding or haematoma 0.3% received blood transfusion	Funding: none declared. *95% Gynecare TVT. bleeding considered arterial in 12% and venous or unknown in 88%.

Cohort studies comparing outcomes of TVT by patient age or weight, or according to concomitant surgery

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Pugsley 2005[818] UK study	Cohort EL = 2–	226 (20 [9%] had no details of post-discharge findings)	F stress UI; UD diagnosis available for 93%, of whom 86% had pure stress UI, 3% DO, 10% mixed UI. Median age 58 years (24–91) in TVT grp; 54 (32–76) in colposuspension group	Tension-free vaginal tape (*n* = 123; 19% aged ≥ 70 years)*	Colposuspension (*n* = 103; 10% aged ≥ 70 years)*	Median 91 days (19–731 [2 years]) In TVT grp: median 100 (23–492) In colpo grp 74 (19–731)	Subjective cure and improvement	TVT: overall 89% (100/112) in pts ≥ 70 years 82% (9/11) in pts < 70 years 90% (75/83) OR for results by age: 0.29 (95% CI 0.08 to 1.01) Colposuspension: overall 89% in pts ≥ 70 years 77% (17/22) in pts < 70 years 92% (83/90) OR for results by age: 0.48 (95% CI 0.09 to 2.62)	Funding: none declared. *with other procedures (mainly prolapse repair) in 7% of TVT group; and with others, mainly hysterectomy, in 41% of colposuspension grp. [EL = 2–] Retrospective review of cases from theatre records. Whether groups similar at baseline in all other characteristics apart from the intervention not clear. The authors also compared complications rates from the 2 interventions – data not reproduced here as the aim of the study was to focus on outcomes according to age 7 unclear whether groups similar at baseline.. **% difference not odds ratio; used if one result = zero. Proven UTI = positive culture of 10^5 colony forming units/ml. recurrent UTI = 3 or more in months 0–3.
							Early complications (OR for age ≥ 70 years vs < 70 years [95% CI])**	TVT: wound infection** –3.0 (–10.0, 4.0) haematoma** 4.3 (0.3, 8.4) proven UTI 1.73 (0.42, 7.08) post-op haematuria** –3.0 (–10.0, 4.0) voiding difficulty before discharge 2.04 (0.64, 6.50) readmission for any reason 2.35 (0.54, 10.20) Bladder injury/perforation** 4.0 (–4.0, +12.0) Colposuspension : wound infection 0.67 (0.08, 4.86) haematoma 1.43 (0.16, 13.14) proven UTI 11.33 (2.61, 49.28) post-op haematuria 1.74 (0.18, 16.42) voiding difficulty before discharge 1.82 (0.49, 6.80) readmission for any reason 2.78 (0.71, 10.78) Bladder injury/perforation** –3.0 (–13.8, +7.3)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Late complications (OR for age ≥ 70 years vs < 70 years [95% CI])**	TVT: ISC at any time 1.40 (0.26, 7.46) ISC at latest review 4.24 (0.25, 70.56) new irritative symptoms 1.86 (0.73, 4.71) repeat UD 3.91 (1.11, 13.76) recurrent proven UTI 4.22 (1.03, 17.26) division of tape 29.12 (3.2, 264.86) Colposuspension: ISC at any time 2.41 (0.43, 13.43) ISC at latest review 9.1** (3.0, 15.2) new irritative symptoms 1.83 (0.51, 6.53) repeat UD 2.41 (0.43, 13.43) recurrent proven UTI** –1.2 (–7.2, 5.0)	
Karantanis 2004[819] UK study	Case–control EL = 2–	68*	F with UD stress UI. 29% had prior continence surgery Exclusions: UD mixed UI, flow rates < 15 ml/s and/or PVR > 100 ml; recurrent UTI, concomitant prolapse surgery	Pts aged ≥ 65 years who underwent tension-free vaginal tape	Pts aged < 65 years who underwent tension-free vaginal tape	Median 12 months (6–18) for older women; 16 (12–23) for younger	Subjective cure rate	45% vs 73% *P* = 0.05	Funding: none declared. *from 109 cases, who were case-matched according to primary or subsequent surgery, BMI, and mode of anaesthesia. Chart review of pts undertaken. **genitourinary treatment satisfaction score for continence surgery; 2 components; outcome satisfaction score, and care satisfaction score, both scores between 0 and 16, higher score indicating better satisfaction.
							GUTTS questionnaire**	Outcome scores: 90% vs 100%, *P* = 0.003 Care satisfaction scores: 87% vs 97%, *P* = NS Total scores: 87% vs 95%, *P* = 0.03	
							Urinary symptoms (at 6 weeks)	Subjective cure 65% vs 79% persistent SUI 18% vs 3% persistent urge UI 9% vs 6% *de novo* urge 3% vs 3% *P* = NS for all comparisons	
							Hospital parameters	Hosp stay median 1 vs 1 days (range 1–2) UTI 18% vs 12% CISC or suprapubic catheterisation < 6 weeks 0% vs 6% Voiding difficulty 3% vs 15% *P* = NS	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Gordon 2005[820]	Cohort EL = 2–	460	F with UD stress UI (74%) or mixed UI (26%)* 34% aged ≥ 70 (mean age 75 years) 66% aged < 70 years mean 57 (35–69) 20% vs 15% prior hysterectomy 3% vs 5% prior continence surgery 84% vs 67% underwent prolapse repair	Pts aged ≥ 70 years who underwent tension-free vaginal tape	Pts aged < 70 years who underwent tension-free vaginal tape	Mean 26 (SD 13) months, range 3–67	Persistent UI (*n* = 331; 72% of pts) Hospital parameters Complications	Stress UI 7% vs 6% Urge UI 75% vs 76% (of *n* = 28 vs 34) Mean hosp stay 5.6 (SD 3.2) vs 4.3 (SD 2.4) days 14% vs 9% UTI 1.3 vs 4.9% bladder perforation, *P* < 0.05 0 vs 0.3% (*n* = 1) urethral perforation 1.9% vs 1% vaginal erosion (treated with tape excision)	Funding: none declared. *31% vs 23% mixed in older vs younger pts [EL = 2–] owing to possible confounding. 313 (68%) of the pts were a subset of F previously studied for TVT outcomes (Levin 2004[770]).
Rafii 2003[821]	Cohort EL = 2–	187	F mean age 55 with UD stress UI (56 vs 73% vs 79%) or mixed UI (44 vs 27% vs 23%) 10% had prior continence surgery 37% concomitant vaginal hysterectomy Exclusions: neurological disease, bladder instability	TVT in pts with BMI > 30 (*n* = 39)	TVT in pts with BMI 26–30 (*n* = 62) TVT in pts with BMI 20–25 (*n* = 86)	Mean 27 months (6–38)	Subjective cure/ improvement Objective cure Complications (*P* = NS unless stated)	72 vs 72% vs 74% cure 13 vs 20% vs 27% improved 15 vs 9% vs 5% failed *P* = NS for comparisons 82 vs 89% vs 93%, *P* = NS Intra- or early post-op: 3 vs 10% vs 13% bladder injury 3 vs 3% vs 5% haemorrhage 8 vs 8% vs 9% UTI 5 vs 5% vs 5% retention Late (> 6 weeks): 26 vs 13% vs 15% *de novo* urgency 18 vs 6% vs 3% urge UI, *P* = 0.02 BMI > 30 grp vs others	Funding: none declared. Procedures undertaken June 98 to Feb 2001, France. Subjective cure assessed by CONTILIFE questionnaire. Objective cure = no UI on UD, negative stress test, no retention, PVR ≤ 150 ml). Sig. more F in BMI > 30 grp had urge symptoms at baseline, 44 vs 26% vs 17%, *P* = 0.01.
Lovatsis 2003[822]	Case–control EL = 2–	70	F mean age 53 years with UD stress UI 11% prior	TVT in pts with BMI > 35 (*n* = 35)	TVT in pts with BMI ≤ 30 (*n* = 35)	6–24 months	Cure (subjective or objective)*	89% vs 91% *P* = NS	Funding: none declared. Procedures undertaken Nov 99 to July 2001, Canada, were 1st

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			continence surgery 11% concomitant surgery Exclusions: MUCP ≤ 20				Complications	0% vs 14% bladder perforation *P* = 0.03 (all cases fell within 1st 65 procedures undertaken by 1 surgeon) 14% vs 23% required catheterisation Operating time 49 vs 35 min *P* < 0.05	procedures undertaken by surgeon (159 in total, 43 in F with BMI > 35). Logistic regression analysis said to be used. *by telephone interview or negative stress test.
Rafii 2004[823]	Cohort EL = 2–	186	Believed to be the same pts as included in Rafii 2003[821] % with mixed UI: 35 vs 20% vs 24% 10 vs 5% vs 13% prior continence surgery	TVT (*n* = 100)	TVT + hysterectomy (*n* = 40) TVT + pelvic floor repair (*n* = 46)*	Mean 25 months	Subjective cure/ improvement	72 vs 73% vs 67% cure 20 vs 25% vs 22% improved 7 vs 3% vs 11% failed *P* = NS for comparisons	Funding: none declared. *colporrhaphy or vagina vault fixation. UI severity on VAS sig. higher in TVT only grp (mean scores 6.8 vs 5.4 vs 5.2, *P* < 0.0001). Procedures undertaken June 98 to Feb 2001, France.
							Objective cure (VAS)	93 vs 98% vs 93%, *P* = NS	
							Complications (*P* = NS unless stated)	Intra- or early post-op: 5 vs 18% vs 13% bladder injury (*P* = 0.05 TVT alone vs others) Late (> 6 weeks): 34 vs 15% vs 30% *de novo* urgency 7 vs 13% vs 11% using ISC	
Meltomaa 2004[824]	Cohort EL = 2–	150	F mean age 55 with stress or mixed (41%) UI symptoms (52% underwent UD). 44% vs 60% prior gynae surgery, 13% vs 7% prior continence surgery, 11% vs 8% neurological disease	TVT +vaginal surgery* (*n* = 75)	TVT (*n* = 75)	3 years (71% evaluated by mailed questionnaire, others in clinic)	Subjective cure	87% vs 92%	Funding: none declared. Procedures Aug 98 to June 2000 by experienced urogynaecologists, all under local anaesthetic with concomitant surgery by general afterwards. * 65% vaginal hysterectomy, 20% colporrhaphy, 15% sacrospinal fixation.
							Complications	20% vs 9% transient retention *P* = 0.005 4% vs 8% *de novo* urgency *P* = NS 13% vs 8% UTI *P* = NS 13% vs 1% infection (not UTI), *P* = 0.001 4% vs 3% tape transection	
Rardin 2005[825]	Cohort EL = 2–	175	F with UD stress UI resulting from ISD Mean ages 61 vs 72, *P* < 0.0001	TVT in patients with urethral hypermobility (*n* = 124)	TVT in patients without urethral	11.9 (SD 7.8) months	Continence status	86% vs 82% cured 8% vs 6% improved 4% vs 6% failed, *P* = NS (2% vs 6% tapes taken down)	Funding: none declared. Retrospective review of cases done Jan 1999 to Jan 2002.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			No sig. differences in % undergoing concomitant surgery (57% vs 59%), prior continence surgery (41% vs 49%), or DO (11% vs 14%), or in urodynamic parameters or residual urine % undergoing concomitant colporrhaphy 20% vs 43% posterior *P* = 0.0018, 37% vs 12% anterior, *P* = 0.0009		hypermobility (*n* = 51)		Complications (*P* = NS for all comparisons)	5.6 vs 5.9% bladder perforation 0.8% vs 2% ureteral injury 1.6% vs 0% haematoma/abcess 5% vs 4% retention 2.4% vs 4% incomplete emptying 4 vs 5.9% *de novo* urge UI 23% vs 24% *de novo* overactive bladder	Hypermobility = deflection of ≥ 30° from horizontal on maximal Valsalva strain. Cure: no leakage reported by patient or negative cough stress test). Improvement: pt reporting improvement or *de novo* urge UI in the absence of stress UI.

Suprapubic arc sling

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Deval 2003[826]	Case series EL = 3	104	F mean age 59 years, stress UI owing to hypermobility (Q-tip angle > 30°), and bladder capacity ≥ 250 ml. Mean severity score on VAS of 0 to 10 = 6.4 81% UD stress UI, 19% mixed UI. 12% had prior continence surgery exclusions: drug tx with antidepressants,	Suprapubic arc sling (SPARC)*	11.9 months (SD 1.9; range 8–20)	Objective cure (no UI on UD or stress test, and no retention [PVR < 150 ml])	90% cure 10% failure	Funding: none declared. *with other procedures in 12%: vaginal hysterectomy in 6%, posterior colporrhaphy in 6%. local anaesthesia used in 15%, 37% spinal, 48% general. *9/11 diagnosed during cystoscopy, 2 during bladder filling). ** all needing 'tape section'.
						Subjective cure (based on results for KHQ and BFLUTS QOL questionnaires)	69% cure 25% improved 6% failed	
						Hospital parameters (mean, SD, range)	operating time 19 (SD 6) mins (9–40) hosp stay 2.2 (SD 1.5) days (1–9) duration catheterisation 1.3 (1–10)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			adrenergic or anticholinergics drugs; grade 3 or 4 cystoceles or other vaginal support defects			Complications	11% bladder injury* within 15 days: 9% UTI 3% retention** 11% voiding difficulties those occurring after 15 days: 12% *de novo* urge symptoms	
Hodroff 2005[828]	Case series EL = 3	445	F mean age 60 years, with stress UI. 67% underwent urodynamic evaluation 22% had concomitant prolapse repair and/or hysterectomy	SPARC (no details of procedure)	Mean 15 months	QOL (UDI-6, IIQ-7), mailed questionnaire follow-up; 46% response rate	Mean scores: UDI-6: 26.04 IIQ: 12.75	Funding: none declared; lead author and another paid consultants to American Medical Systems.
						satisfaction	91% would repeat procedure 84% would recommend to friend	Retrospective review of cases. 83% subjective cure rate at 4 months (clinic visit).
						complications	6.7% bladder perforation *n* = 1 hosp admission for rectus haematoma *n* = 1 abdominal pain from a small bowel perforation 6.1% *de novo* urge symptoms 4.3% sling release owing to voiding dysfunction	No details of procedure.

Intravaginal slingplasty

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Bafghi 2005[829]	Case series EL = 3	149	F median age 64 years (36–91), UD stress UI owing to ISD (MUCP < 30 cmH_2O), or urethral hypermobility	Intravaginal slingplasty (IVS)	Not stated - time of presentation of complication up to 17 months	Tape infection	7% (11 cases) Presenting symptoms: vaginal discharge (6/11), vaginal or abdominal fistula 5/11 Time of presentation ranged from 4 to 17 months (median 9) Management: 10/11 failed to respond to antibiotics so surgery (uni- or bi-lateral tape removal) undertaken in 10/11 pts; the problem resolved in the remaining pt at 3 months	Funding: none declared. Retrospective review of cases. None of the pts underwent a concomitant prolapse repair procedure. Procedure under cystoscopic monitoring.
Ijland 2005[830]	Case series EL = 3	49 (of 52 treated)	F median age 58 years (33–93) with 'proven' stress incontinence. 71% prior hysterectomy 12% prior continence surgery	Intravaginal slingplasty (anterior IVS)	Median 18 months (12–32)	Cure	86% (14% failure)	Funding: in part by Tyco Healthcare Netherlands. Retrospective analysis of cases with telephone follow-up using semi-structured questionnaire. Procedure done between Dec 1999 and July 2001.
						Complications	0 erosion, infection or rejection 0 bladder or bowel perforation 2% (*n* = 1) reqd blood transfusion 2% haematoma 18% reqd ISC (up to 2 days) 10% had 'occasional urge UI' with continuous voiding difficulties	
Baessler 2005[831]	Case series EL = 3	19	F treated with IVS who were referred because of complications following anterior (*n* = 11) and/or posterior intravaginal slingplasty (*n* = 13) Median age 51 years (35–71) Three underwent concomitant posterior	IVS (6 anterior, 8 posterior, 5 both anterior and posterior)	Median time to symptoms 1 month (up to 12)	Main indications for removal	Of the 11 anterior intravaginal slings: 6 intractable mesh infection 1 retropubic abscess with cutaneous sinus 1 vesico-vaginal fistula 1 intravesical mesh and pain syndrome 2 voiding difficulties and pain syndrome Of the 13 posterior intravaginal slings: 3 intractable mesh infection 10 pain syndrome and dyspareunia	Funding: none declared. Pts referred to author's centre between April 2001 and April 2004. Surgery to remove mesh after median 24 months (10 weeks to 36 months).

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			bridge repair and 1 had second posterior IVS inserted for recurrent prolapse			Outcome	At 6 weeks to 6 months, in all women genital pain, chronic vaginal discharge and bleeding, voiding and defecation difficulties had been 'markedly alleviated (5) or had ceased (14)' 12 of 17 sexually active women (71%) resumed sexual intercourse without difficulties 10 women required subsequent surgery for stress UI and POP	
Siegel 2005[832]	Case series EL = 3	35	F mean age 58 years (54–66) with anatomical stress UI	Intravaginal slingplasty (IVS)	Mean time to presenting symptoms 9 months (range 2–15)	Vaginal mesh extrusion	17% (*n* = 6) defective vaginal healing manifested by extrusion of the sling material Symptoms: intermittent serosanguineous vaginal discharge (*n* = 5*) pelvic pain (3) dyspareunia (3) All patients required surgical removal of the sling material. No urethral erosions were noted	Funding: none declared. Retrospective chart review of cases from November 2002 to September 2003. *pelvic abscess found in one.

Safyre

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Palma 2005[833]	Case series EL = 3	126 (140 procedures)	F mean age 63 (40–71), stress UI. 49% had cystocele, and 10% rectocele 60% had failed prior continence surgery Exclusions: DO, max. flow	Polypropylene mesh sling (Safyre)	Mean 18 months (12–36)	Subjective cure/ improvement/ failure* Hospital parameters	92% cure 2% improved 6% failure Op time 25 min (unclear whether mean value) Hospital stay 24 (12–36) h	Funding: none declared. Cystoscopy during procedure *cure = dry, improvement = leakage < once every 2 weeks, failure = leakage > once/week.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			rate < 15 ml/s and/or PVR > 20% of volume voided.			Complications	2% bladder perforation 3% retention > 4 weeks after surgery, reqd loosening of sling tension 21% transient *de novo* urgency 5% vaginal erosion of tape (with pain, discharge, bleeding, dyspareunia, dysuria, recurrent UTI): tape trimmed in 4, and covered by advanced vaginal flap in 2 5% reqd tightening of tape No cases of intra-op bleeding, or urethral or vaginal perforation	

Safyre – controlled trial comparing different methods of inserting the sling

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Palma 2005[834]	Cohort EL = 2–	226	F mean age ~62 years with UD stress UI 3% concomitant Kelly pIlcation for grade II cystocele 60% vs 65% had prior failed continence surgery, 28% vs 46% prior prolapse surgery, 38% vs 37% prior hysterectomy	Safyre sling (transvaginal approach) *n* = 126	Safyre (transobturator approach) *n* = 100	Mean 18 vs 14 months	Subjective cure	92.1% vs 94% 2.4% vs 2% 'significant improvement' 5.5% vs 4% failure	Funding: none declared. [EL = 2–] Differences in duration of follow-up. Cure = absence of UI; improved = leakage < every 2 weeks; failure = leakage > once a week.
							Operative care	mean operative time 25 vs 15 min $P < 0.05$	
							Complications	9.5% vs 0% bladder injury 20.6% vs 10% transient irritative voiding symptoms 3.1% vs 0% retention 3.1% vs 1% sling infection 4.7% vs 6% reqd sling adjustment (tightening)	

Transobturator tape

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
de Leval 2003[835]	Case series EL = 3	107	F mean age 62 years 929–88), stress UI 16% had prior surgery for UI and/or prolapse	Transobturator tape inside-out, using a non-absorbable mono-filament polypropylene tape*	1 month	Hospital parameters (mean)	Operating time 14 min (7–20) Hospital stay 1.8 days (0.5–8)	Funding: none declared. *31% also underwent prolapse surgical correction.
						Complications	None intra-operatively Immediate post-operative: 16% pain/discomfort in thigh folds 2% pain associated with hip arthralgia lasting 1 week At 1 month: 1% vaginal erosion 3% complete urinary retention (tape released) 1% superficial vein thrombosis with secondary development of abscess that reqd drainage	
Costa 2004[836]	Case series EL = 3	183	F mean age 56 years (29–87), stress UI associated with hypermobility. 53% had pure stress UI, 19% stress UI with urgency, 27% had mixed UI. 12% had DO 12% had prior prolapse surgery, 26% prior hysterectomy, 14% prior continence surgery	Transobturator tape (Uratape)*	Mean 7 months (1–21)	Cure or improvement (cure = no subjective leakage, % negative cough stress test; improvement = reduction of SUI)	At < 3 months (*n* = 176): 86% cured 8% improved 6% failed or missing data At ≥ 6 months (*n* = 130): 83% cured 5% improved 12% failed or missing data	Funding: none declared. Mentor-Porges co provided technical support for the registry. 7 centres, which all used the same case report form; pts operated on between Oct 2001 and March 2003. 31% procedures under spinal anaesthesia, 69% under general. *combined with other procedures in 14% (colposuspension, rectocele repair, needle suspension or hysterectomy). Cystoscopy performed at the beginning of their experience, but not continued.
						Complications	0.5% bladder perforation 1% urethral perforation 0.5% lateral vaginal perforation (sulcus) 4% transient voiding disorders At 1 year, 1% had voiding difficulties with residuals ≥ 100 ml on urodynamics) 5% *de novo* urgency	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Cindolo 2003[837]	Case series EL = 3	80 (93% of 86 treated)	F mean age 56 (39–79) with SUI with urethral hypermobility without severe urogenital prolapse. 28% had mixed UI 15% had prior hysterectomy. 65% had 1st grade cystocele, 8% 1st grade vaginal vault prolapse	Transobturator tape (Uratape)	Mean 4 months (1–8)	Cure or improvement*	*Subjective:* 82% cure 15% improved 3% failed *Objective:* 80% cure 12% improved 8% failed	Funding: none declared Spinal anaesthesia used. No cystoscopy. *objective and subjective rates given for same definition; cure = resolution of SUI symptoms, negative cough stress test, no new symptoms or side effects). Improvement = persistent SUI symptoms but reduced leakage episodes; positive full bladder cough stress test or SUI confirmed by urodynamics).
						Hospital parameters (mean)	Operating time 16 min (11–36) Hospital stay 1.1 (1–6) days	
						Complications	1 (1%) bladder laceration (treated intraoperatively) 1% post-op retention, resolved after 4 weeks 10% urgency/frequency 2.5% *de novo* urgency 1% vaginal erosion with inguinal abscess (treated without sling removal)	
Delorme 2004[838]	Case series EL = 3	32 (21% of the 150 treated, who had min 1 year follow-up)	F mean age 64 years (50–81), stress UI without associated prolapse. 44% had pure stress UI, 56% mixed UI. 19% had DO, 16% ISD (UCP < 20 cmH_2O). 16% had prior continence surgery, and 16% prior hysterectomy	Transobturator tape (Uratape)	Mean 17 months (13–29)	Cure or improvement*	91% cured 9% improved	Funding: none declared. *cure = wearing no protection, no stress leakage, and negative cough stress test with full bladder; improvement; using less protection and self-reported improvement. One surgeon. Cystoscopy not used. Spinal or general anaesthesia used.
						Complications	16% obstructive voiding disorders (max. flow rate < 15 ml/s, and/or PVR > 20% vol. voided); 1/5 pts reqd self-catheterisation for 1 months; pt has persisting obstructive symptoms 14% (2/14) *de novo* urgency No cases of vaginal or urethral erosion	
Krauth 2005[839]	Case series EL = 3	604 (131 with 1 year follow-	F mean age 57 years, stress UI (pure in 47%, 53% mixed)	Transobturator tape (I-STOP)*	1 year for 22% 1–3 months for all	Satisfaction and *de novo* urinary symptoms at 1 year (*n* = 131)	86% satisfied 14% not satisfied 1.5% *de novo* dysuria and urgency 3% re-operation	Funding: none declared. Retrospective study. *8% also underwent prolapse surgery or hysterectomy. 6 centres; 7 surgeons (3 urologists, 4

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
		up)				Hospital parameters	72% general anaesthetic length of operation < 15 min (75%), < 30 min (90%) hospital stay < 25 h (67%), < 48 h (92%) catheterisation: none (30%), < 12 h (48%), < 24 h (65%)	gynaecologists).
						Complications	Intra-operative: 3 (0.5%) bladder perforation 0.33% vaginal perforation 0.83% haemorrhage 0.33% haematoma 0.16% (*n* = 1) immediate section of tape Post-operative: 1.5% transient retention 2.3% transient perineal pain 1.3% transient dysuria 2.5% UTI 0.3% cicatrisation faults *De novo* symptoms after 1–3 months (*n* = 572 [95%]): 0.35% dysuria and urgency 2.8% dysuria 1.6% urgency 0.3% dyspareunia 0.2% perineal pain	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Domingo 2005[845]	Case series EL = 3	65	F UD stress UI. Median age of those with vaginal erosion of tape 54 years (40–77)	Transobturator tape (43 Uratape, 21 Obtape)	unclear	Vaginal erosion	14% (*n* = 9; 5 uratape, 4 obtape) Presenting symptoms: persistent vaginal discharge; 5 also had vaginal pain, 1 fever, 1 right labia major pain and oedema with purulent vaginal flow Time of presentation: mean 9 months (2–19) Management: conservative (tape trimming) attempted in 3; successful in 1; tape removed in all others	Funding: none declared Obtape = same as Uratape with a 15 mm central silicone coated section. 4 surgeons undertook procedure.
Lukban 2005[840]	Case series EL = 3	47 (of 58 treated)	F mean age 56 years (SD 13) with UD stress UI. 55% had mixed UI 60% had prior hysterectomy Of those who completed questionnaire (*n* = 47): 30% had prior continence surgery, 68% underwent concomitant surgery	TOT (Monarc)	Mean 8.5 months (3–15)	QOL (IIQ) Satisfaction Complications	–73% change in mean score, *P* < 0.001 96% completely or somewhat 89% stated leakage better or much better 72% no leakage or 'a drop or two' (all considered cured) 2.1% (*n* = 1) 'moderate difficulty' with voiding No intraoperative (trauma to bladder urethra, ureter; haematoma or major vascular injury)	Funding: none declared. Retrospective chart review with mailed questionnaire follow-up.
Naidu 2005[841]	Case series EL = 3	91 (of 96 treated)	F mean age 56 years (32–88) with UD stress UI. All had failed conservative treatment 19% had prior continence	TOT (Monarc)	Median 7 weeks (range 5–15)	Continence status* Satisfaction	55% completely dry 33% 'substantially continent' 81% satisfied 11% not satisfied 8% not sure	Funding: none declared. Cases done March 2003 to March 2004. *to be evaluated fully at 1 year.

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			surgery 44% underwent concomitant surgery			Complications	2.2% vaginal fornicial puncture 1.1% urethral puncture 0 bladder perforation 7.7% catheterisation > 24 h 13% vaginal packing for > 24 h 8.8% UTI 6.6% catheterisation > 2 days 2.2% sling adjustment 12% sling protrusion/delayed healing 3.3% wound infections	
Spinosa 2005[842]	Case series EL = 3	117	F mean age 55 years (37–82) with stress UI. 19% had associated urgency 36% underwent concomitant surgery	TOT out-in (Obtape)	Median 16 months (7–22)	Satisfaction (subjective cure)	92% complete 4% partial (improved) 4% unchanged	Funding: none declared. Cases done Feb 2003 to April 2004.
						Complications	2.6% de novo dysuria 0.9% (*n* = 1) haemorrhage > 300 ml 1.7% de novo urgency 2.6% tape erosion 0 urethral injury 0 bladder perforation	
Deval 2006[843]	Case series EL = 3	129	F mean age 57 years with stress UI associated with urethral hypermobility; 40% had mixed UI. 25% prior hysterectomy 15% prior continence surgery 21% concomitant surgery Exclusions: DO	TOT (Obtape), under GA in 85%	Mean 17 months (SD 4.7, range 8–28)	Objective cure	90%	Funding: none declared. Objective cure = no SUI on clinical or urodynamic investigations, negative stress provocation test, and no urinary retention (PVR ≥ 150 ml). Subjective cure assessed using the KHQ and BFLUTS questionnaires. Procedure under general anaesthetic in 84%, and spinal in 16%.
						Subjective cure	78%	
						Complications	0.8% vaginal perforation 0 bowel, nerve, bladder, ureteral, or vascular injuries 1.6% urinary retention 5.4% voiding difficulties 5.4% UTI 9.3% de novo urgency 6.2% vaginal erosion (0.8% vaginal extrusion) 1.6% obturator abcess 4.6% tape ablation	
Roumeguere 2005[844]	Case series	120	F mean age 58 years (31–86) with UD stress	TOT (Uratape or Obtape; 60	12–30 months	QOL at 1 year (CONTILIFE), *n* = 100	Global satisfaction 78%	Funding: none declared. Data also reported for each tape in

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		UI (30% mixed) 4% had prior continence surgery 8% had concomitant surgery	pts each)		Continence status at 1 year	80% dry 12% improved 8% failed	paper. Mailed questionnaire follow-up; 100 responded.
						Complications	0.8% (*n* = 1) bladder perforation 2.5% urethral perforations* 10.8% lateral vaginal injuries 1.7% transient retention 9.2% voiding difficulties during first week 4.25 UTI 2.5% vaginal erosions 2.5% de novo urgency	*tape removed and new uratape inserted after 3 months.

Controlled trials comparing different routes or methods of inserting TOT

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
David-Montefiore 2005[847]	RCT EL = 1+	88	F mean age 53–57 years with stress UI (13% mixed UI) About 7% had prior continence surgery 24% had prior hysterectomy	I-STOP (retropubic, *n* = 42)	I-STOP (transobturator, *n* = 46)	1 month	Operative care	Mean operating time (SD): 21 (9.5) vs 17 (6.6) mins, *P* = 0.03 Mean hospital stay: 1.8 (1.7) vs 1.4 (0.5) days, *P* = NS Mean duration catheterisation: 1 (1) vs 0.8 (0.5) days, *P* = NS	Funding: none declared. Urgency at baseline 60% vs 39%, *P* = NS. Urethral closure pressure 46 vs 60 cmH_2O, *P* = 0.02 Post-op pain scores 2 (scale 0–7) vs 0.8 (scale 0–6), *P* = 0.0005. Surgeon had 'lengthy experience' of retropubic route, and ≥ 30 procedures by transobturator route. Surgery undertaken between March 04 and May 05.
							Complications (%), *P* = NS between grps unless otherwise stated	4.8 vs 8.7 *de novo* urgency 9.5 vs 0 bladder injury, *P* = 0.03 0 vs 10.9 vaginal injury, *P* = 0.03 4.8 vs 0 haemorrhage > 200 ml 4.8 vs 0 retropubic haematoma 2.4 vs 0 pelvic abscess	
							Subjective cure at 1 month	92.9 vs 93.5% (4.8 vs 2.2 improved, 2.4 vs 4.3 failed)	
							QOL (change in mean scores)	UDI: –92 vs –91% IIQ: –98 vs –76%	
Debodinance 2006[846]	Cohort EL = 2+	100	F mean age ~54 years, SUI (8% vs 0% mixed UI; 12% vs 10% had urgency).	TOT outside-in (Monarc)	TOT inside-out (TVT-O)	12 months	Objective cure (dry during exertion on UD assessment)	90% vs 94%, *P* = NS	Funding: Single surgeon. Procedures under LA.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			12% vs 10% had prior continence surgery No concomitant surgery				Satisfaction (very or 'satisfied)	98% vs 100%, *P* = NS	
							CComplications	No significant difference in peri-op, early post-op, or late post-op complications	

Slings made of polypropylene (Prolene or Marlex mesh) – controlled trials

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Kuo 2001[848]	Quasi-RCT (every other pt) EL = 1–	50	F mean age 57 or 59 years with stress UI (mixed UI in 13% vs 19%) Exclusions: SUI with cystocele or uterine prolapse as this reqd concomitant surgery	Rectus fascial sling (*n* = 24)	Polypropylene mesh sling* (*n* = 26)	Median 24 months (19–35) vs 23 (13–33)	Cure (negative stress test)	96% vs 100%	Funding: none declared. *self-fashioned, by cutting a 30×30 cm mesh into 15 strips of 2×30 cm. Further publications by same author seem to be related and were not considered separately owing to probable duplication of data. Kuo 2005[953] and Kuo 2001.[954–956]
							Satisfaction	92% vs 92%	
							Hospital parameters	Mean op time 47 (6) vs 35 (10), *P* < 0.005 Hosp stay 8.5 (2) vs 4.5 (2), *P* < 0.005	
							Complications (*P* = NS unless otherwise stated)	8.4% vs 0% haematoma 4.2% vs 8% persistent dysuria 8.3 vs 3.8% *de novo* urgency or DO % voiding after removing catheter 67% vs 92%, *P* < 0.05: 25% vs 8% voiding delayed 1–2 weeks 4% vs 0% delayed 3 months 4% vs 0% reqd urethrolysis	

Slings made of polypropylene (Prolene or Marlex mesh) – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Spence-Jones	Case	143	F mean age 66 years (29–	Polypropylene	Median 1 year	Subjective cure	99%	Funding: none declared.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
1994[849]	series EL = 3		85) with stress or mixed UI (35% mixed) Only 49% had stress leakage on examination 45% had prior hysterectomy, 25% prior continence surgery Concomitant surgery undertaken: 100% anterior repair, 48% vaginal hysterectomy, 15% enterocele repair, 84% posterior repair, 26% salpingo-oophorectomy, 21% sacrospinous vault fixation	mesh (Marlex)	(6 weeks to 4 years)	Complications	31% reqd blood transfusion 0.7% (*n* = 1) bladder injury 0.7% DVT 10% fever > 38.5˚ on 2 occasions 20% UTI 0.7% haematoma (resolved) 12% discharged using CISC 2.8% reqd CISC at 1 year 0.7% osteomyelitis (resolved) 0.7% osteitis pubis (suprapubic sutures cut and removed) 3% mesh exposure (excised) 1.3% persistent abdominal sinus 9% *de novo* DO 12% developed recurrent prolapse (median time 1 year (6 months to 2 years)	Urodynamic data at 6 weeks also reported – data not reproduced here. Investigates whether peak flow rate predicts outcome.
Bryans 1979[850]	Case series EL = 3	69	F mean age 54 years (29–79), recurrent SUI (29% mixed) in whom scarring and loss of vaginal and urethral mobility had made open colposuspension technically impractical 37% operated on by suprapubic approach. Mean 1.7 procedure per pt	Polypropylene mesh (Marlex)	6 months to 8 years 68% > 2 years, 30% > 4, 18% > 6	Subjective cure/ improvement	74% cured 4% improved 22% failed In F with pure stress UI: 90% cured 10% failed In F with mixed UI: 35% cured 15% improved 50% failed	Funding: none declared. Annual questionnaire sent to women to gather follow-up data.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Complications	22% voiding difficulty (requiring change to pts voiding position) 6% voiding delay > 21 days (ISC in ¾ for 3–6 months) 7% non-healing of vaginal wall (exposed sling part removed in 2/5) 6% wound infection post-op 1.4% (*n* = 1) sinus tract thro anterior vaginal wall 1.4% 'small bleb' on abdominal incision at 5 years 3% enterocele requiring surgical repair 0 fistulas	
Demirci 2005[851]	Case series EL = 3	81	F mean age 54 years (30–76). 90% had UD stress UI; the remaining 10% who had negative stress test also had prolapse. 9% had ISD, 47% urgency (21% of whom had DO) 57% underwent other procedures (abdominal or vaginal) 11% prior continence surgery	Mid-urethral self-fashioned polypropylene sling (into 1×7.5 cm tapes)	Mean 22 months	Objective cure (≤ 2 g on 1 h pad test). *n* = 73	96%	Funding: none declared. I-QOL scores also reported but only for pts who had only the sling (*n* = 35); mean scores improved by 71% *P* < 0.001.
						Complications	4% bleeding > 300 ml (1 retropubic haematoma, 1 reqd laparotomy for ligating blood vessels, 1 reqd blood transfusion) 2% wound infection 4% persistent urinary retention (reqd catheterisation > 30 days) 4% reqd sling release 5% UTI 19% persistent urgency 12% *de novo* urge (2% *de novo* DO) 0 bladder injury 0 urethral injury	
Constantini 2005[852]	Case series	40 (39 followed-up; 1	F mean age 57 years (37–73), with stress UI (62% mixed) related to ISD	Polypropylene mesh (Marlex)	Mean 58 months (12–92)	Cure (based on pad usage)	77% cure (no pads/day) 15% improved (1 pad/day) 8% failed (≥ 2 pads/day)	Funding: none declared. Consecutive pts.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3	died)	28% had prior hysterectomy, 15% prior continence surgery Concomitant cystocele repair in 8%			'surgical cure'	56% cure (dry and no persisting post-op complications) 33% improved (mild UI, no regular pad protection) 10% failed (SUI dry but *de novo* urgency or urge UI)	*11% of 28 who had repeat urodynamics had DO.
						Patient satisfaction	77% satisfied and would repeat the operation	
						Complications	5% vaginal haematoma 8% suprapubic pain (resolved by month 2) 10% suprapubic haematoma 8% mesh-related problems (1 vaginal wall erosion, treated with vaginal wall repair; 2 reqd sling removal owing to erosion or dyspareunia) 21% voiding dysfunction (PVR > 20% total bladder vol.; none self-catheterised for > 3 months) 46% urgency* 2.5% developed cystocele 5% developed rectocele	
Laurikainen 2004[853]	Case series EL = 3	217	F median age 56 years (24–90), stress (76%) or mixed (24%) UI 56% using HRT or oestrogen 12% underwent	Polypropylene mesh*	Mean 23 (SD 11) months (3–36)	Cure (negative stress test and no symptoms)	87% cure 13% minimal or no improvement	Funding: none declared. Retrospective review of cases treated January 1997 to Aptil 2001. 2 surgeons.
						Operative data	Mean hosp stay 3 days (1–12) Sick leave 16 days (2–34) Operating time 25 min (15–45)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			concomitant prolapse surgery, 2% hysterectomy Prior surgery: 14% continence, 44% hysterectomy, 10% cytocele repair, 11% rectocele repair, 11% 'various' gynae laparotomies			Complications	7% UTI (resolved) 1.4% wound infection (resolved) 1.4% intra-op haematoma 1% bladder perforation 0.5% urethral perforation 16% *de novo* urge UI 18% retention 19% underwent Hegar dilation during hosp stay 3% suburethral vaginal erosion at sling site 2% underwent repeat procedure 0 bowel injury 0 mesh rejection 0 major vessel complications	*not TVT – Study rejected from Finland National Registry of TVT for this reason. Follow-up by telephone – the 11% who did not respond, were contacted by telephone. 1% lost to follow-up. Cure also analysed according to sub-groups; prior surgery/ hysterectomy – data not reproduced here.
Rodriguez 2003[854] 5 year follow-up of some patients published: Rutman 2006[857] (see below)	Case series EL = 3	301	F mean age 59 (41–83) years with stress UI 46% had prior continence surgery, 57% prior hysterectomy 55% underwent concomitant prolapse surgery	'mid distal suburethral sling' made of polypropylene mesh temporarily suspended using absorbable sutures	Mean 10 months (1–23) Further follow-up (questionnaire) of 92 (31%) for ≥ 12 months (mean 16, range 12–23); 83% response rate (*n* = 83%)	Subjective cure or failure	Cure: 69% no leakage 84% none or < 1×/week On UDI: 86% rarely or never bothered by SUI symptoms Failure: 11% (< 50% improvement, positive Marshall test; or pt reported severe symptoms of, or bother from SUI on questionnaire)	Funding: none declared. Earlier publication with fewer pts of same series published, de Almeida.[957] Procedure undertaken between Nov 99 and Feb 02. Separate report of 10% of the grp also published, with results for Female Sexual Function Index; half the F were sexually active, no sig. changes from baseline reported.[958]
						Objective cure	92% (negative stress test in lithotomy position and on standing)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						Complications	0 urethral erosion 0 permanent retention 1% prolonged voiding dysfunction requiring ISC for 3 months max. 0.33% (*n* = 1) vaginal erosion of mesh requiring removal 7% *de novo* urge UI 0.33% pelvic haematoma 0.33% pelvic bleed from suprapubic tube placement 1% hospital readmission (0.33% needed transfusion, 0.66% small bowel obstruction) 2% cystocele 0.33% enterocele 0.66% vaginal pain 0.33% urinary obstruction 0.66% suprapubic pain	
Rutman 2006[857] 5 year follow-up of Rodriguez 2003[854]	Case series EL = 3	68	F mean age 62 years (29–86) with UD stress UI; 54% mixed UI 52% prior continence surgery 36% concomitant prolapse surgery	Self-fashioned polypropylene sling	Minimum 5 years	Continence status	72% no symptoms of SUI 74% never being bothered by SUI 21% SUI leakage < once per week 90% had ≥ 50% improvement	Funding: none declared. Cases lost to followup were defined as treatment failures. Pre-existing urgency resolved in 51%.
						Complications	0 sling removal because of pain, infection, or mesh erosion 7.2% *de novo* urgency*	
Iglesias 2003[855]	Case series EL = 3	21	F mean age 64 years (53–78) with UD stress or mixed UI (90% SUI, 10% MUI) 62% had prior continence surgery 52% had ISD (MUCP < 20 or VLPP < 60)	Polypropylene sling with REMEEX* prosthesis	Mean 12 months (6–25)	Objective cure	62% (< 2 g on 1 h pad test) [28% had < 10 g]	Funding: none declared. *placed in the suprapubic incision with handle left external to body, which allows adjustment of sling post-operatively.
						Operating time	32 (25–45) mins	
						Satisfaction	91% very	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			19% had additional procedure to correct prolapse			Complications	5% (*n* = 1) *de novo* DO 0 intra-op complications 1.3 mean days catheterisation (1–2) 48% reqd immediate post-op adjustment of sling	
Martinez 2003[856]	Case series EL = 3	29	F mean age 62 years, stress UI associated with prolapse which reqd surgical correction (1 pt did not have stress UI). UD findings (in 80%): 93% pure stress UI, 7% mixed; the remaining 20% had a positive stress test	Polypropylene sling with REMEEX* prosthesis	Mean 8 months (3 months to 2 years)	Subjective assessment	93% cured 7% much better 0 slightly better or worse	Funding: none declared. *placed in the suprapubic incision with handle left external to body, which allows adjustment of sling post-operatively.
						Hospital parameters (mean)	Op time 119 min (60–310) Hosp stay 5 (3–13) days	
						Complications	14% urgency 14% seroma 7% recurrent SUI at 3 months (both had new external handle fitted, sling readjusted and cured) 3% UTI 3% vaginal haematoma 3% reqd blood transfusion No urethral or bladder lesions	

Slings made of silicone – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Korda 1989[858]	Case series EL = 3	54 (53 analysed)	F mean age 54 years (34–77), with UD stress (83%) or mixed UI (17%) Decision to used sling made intra-op in 54% of pts when colposuspension not technically feasible	Silicone sling (reinforced with woven polyethylene)	15 months (4–30)	Subjective cure or improvement	79% cured 4% improved 17% failed	Funding: Surgery undertaken between Sept 1985 and Dec 1987.
						Complications	6% reqd blood transfusion 11% voiding difficulty 15% *de novo* DO (2/8 with urge UI) 4% developed sinus (sling removed in 1, excised and left in situ in 1) 4% developed enterocele 4% PE	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Duckett 2000[860] UK study	Case series EL = 3	7	No baseline data; all 7 cured of stress UI but developed sinus	Silicone sling	–	Sinus formation	*n* = 7 All abdominal (1 abdominal/vaginal) Slings removed in 5 at 3–16 months after insertion (slings had not become incorporated into the tissues) 1/5 developed UI immediately on sling removal	Funding: none declared. Reported to be part of series of 40 women undergoing procedure.
Stanton 1985[859]	Case series EL = 3	30	F mean age 53 years (SD 13) with stress or mixed (60%) UI. 77% had prior continence surgery (mean 1.4 procedures per pt)	Silicone sling (reinforced with woven polyethylene; 1×20 cm)	3 months And 1 year (*n* = 22 [73%])	Subjective cure	83% at 3 months 95% at 1 year (of *n* = 22)	Funding: none declared. One author supported by Wellcome Trust Research Grant, and a grant from St George's Hospital Trustees. *resolved in 3/7; sling released in 4/7.
						Objective cure (pad test, unclear which)	83% at 3 months 95% at 1 year (of *n* = 22)	
						Complications	27% *de novo* DO 23% voiding difficulty (peak flow rate < 15 ml/s)* Intra-op: 7% (*n* = 2) vaginal entry 7% bladder or urethral entry (1 developed urethrovaginal fistula, and sling removed)	

Polytetrafluoroethylene controlled trials

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Barbalias 1997[861]	RCT EL = 1–	48	F median age ~45 (36–52), stress UI 17% DO, 92% had prior continence surgery. 52% hysterectomy	Goretex (*n* = 16)	Rectus fascial sling (*n* = 32)	6 months and 30 months	Subjective cure or improvement (combined)	At 6 months: 88% vs 81% At 30 months: rate 'practically equal in goretex group'; UI recurred in 34% of rectus fascial sling grp	Funding: none declared. [EL = 1–] No baseline data reported per treatment group, no analysis of results. Included in Cochrane review of suburethral slings.[876]
							Complications	None in rectus fascial grp In goretex grp: 13% urethral erosion; tape removed 19% recurrent UTI and occasional irritative symptoms 13% *de novo* DO	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Choe 2000[862]	Quasi-RCT (every other pt) EL = 1–	40	F mean age 56 vs 63 years (29–87), with stress or mixed UI (60% vs 65% had mixed) 65% vs 85% had prior continence surgery 70% vs 90% also had surgery for co-existing prolapse	Polytetrafluoroethylene sling (MycroMesh) soaked in antibiotic *n* = 20	Vaginal wall sling *n* = 20	Mean 22 months (12–27)	Cure (combined subjective and objective)	95% vs 75%	Funding: none declared. cure = no urine loss demonstrated and none reported during physical activities.
							Subjective assessment	100% vs 80% better 0% vs 10% same 0% vs 10% worse Would have surgery again: 100% vs 80% yes 0% vs 10% maybe 0% vs 10% no	
							Operative parameters	time to hosp discharge 20 (6–29) vs 24 (14–53) h time to resume normal activities 3.5 (2–4) weeks both grps	
							Complications	Immediate post-op: 20% vs 10% and wound infection 5% vs 0% UTI 0% vs 5% bleeding 5% vs 5% vaginitis 13% vs 14% transient *de novo* urge UI (resolved at 3 months)	

Slings made of polytetrafluoroethylene – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Errando 1996[863]	Case	33	F mean age 54 years (34–	PTFE soft	Mean	Subjective cure	72% (continent without retention)	Funding: none declared.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	series EL = 3		79) with recurrent SUI after mean 1.5 surgical interventions. 64% pure stress UI, 36% mixed. 37% had 'associated rest UI'. none had bladder instability	tissue patch suburethral sling (2×30 cm)	13 months (3–33)	Complications	12% urge UI 6% recurrent stress UI 9% retention requiring surgery 48% discharged from hospital requiring ISC or suprapubic drainage 12% voiding dysfunction persisting > 3 months 3% (*n* = 1) ISC for > 1 year 15% superficial wound infection 3% abscess requiring surgical revision 3% removal owing to *Staph aureus* infection at 2 months 0 intolerance to sling 0 vaginal wound infection	Procedures undertaken between Oct 90 and May 1993 and were first experience of this sling for surgeon.
Choe 1999[864] Staskin 1997[865]	Case series EL = 3	90 (64% of 141 treated)*	F mean age 54 (32–86) years with UD stress (47%) or mixed (53%) UI. 34% had urethral hypermobility, 17% ISD, 49% both. 48% had prior continence surgery, 42% prior hysterectomy	PTFE soft tissue patch suburethral sling (size individually tailored)	51 months (27–84 [2–7 years])	Subjective cure	89% of stress UI (urge UI resolved in 64%)	Funding: none declared. Procedure undertaken between Dec 1989 and June 1994 in consecutive women *the 90 for whom complete data were available; post-op review conducted annually for 3 years then every 3 years. 31% were lost to follow-up and 6% did not respond to telephone survey. Time to resume normal activities 3.1 weeks (range 1–12).
						Satisfaction	82% 'better' 9% same as pre-op 9% worse Would repeat same procedure: 81% yes 14% no 5% maybe	
						Complications	10% *de novo* urge UI 2% urethral obstruction reqd sling 'incision' 8% reqd CISC for retention for 3 months (2/7 reqd soling incision) Overall 4% reqd incision for retention 6% reqd sling excision for persistent non-healing of vaginal incision (at mean 8 months) 0 bladder erosion 0 urethral erosion	
Barbalias 1997[866]	Case series	24	F mean age 55 years (36–70), UD stress UI. 17% had	PTFE suburethral	30 months (UD	Subjective cure/ improvement	83% cured (dry) 17% improved	Funding: none declared. Uroflowmetry and urethral

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		DO 92% prior continence surgery 42% prior hysterectomy	sling (1.5 x 12 cm)	evaluation); pts with urethral erosion followed up to 3.5 years	Complications	8% *de novo* DO* 8% urethral erosion (sling removed at 3.5 years) 21% irritative symptoms and recurrent UTI (but continent)	pressure profilometry data also reported – not reproduced here. *of 17% (*n* = 4) with DO pre-op, this improved in 1, persisted in 2, cured in 1.
Yamada1998[867]	Case series EL = 3	39 (81% of the 48 treated)	F mean age 61 years (40–83) with UD stress UI who had undergone procedure and had follow-up data of 2 years, without urine leakage Exclusions: moderate-severe cystocele Follow-up by mailed questionnaire for purpose of study	PTFE patch sling (15×30 mm)	> 24 months Mean 66 months (SD29) in those reporting cure	Subjective cure (mailed questionnaire)	84% cure (no leakage and no protection worn) 11% improved (using 1 or 2 pads/day) 5% same or worse	Funding: none declared. Posterior urethrovesical angle, pad test and uroflowmetry also undertaken in varying numbers of pts – data not reproduced here. Yamada 2001[959] compared results of the same intervention (and probably the same pts) with Gittes needle procedure; limited details given in report therefore not considered further.
						Satisfaction	82%	
						Complications	8% transient retention 3% (*n* = 1) sling infection (removed) 16% slight pelvic pain 37% always or occasional strain to void 37% pollakiuria (frequency)	
Weinberger 1996[868] and Weinberger 1995[869] (predominantly urodynamic follow-up)	Case series EL = 3	98 (91% of 108 treated, who could be contacted) 62 had UD follow-up	F mean age 60 years (29–86) with UD stress UI 64% were taking HRT 56% had prior continence surgery 26% had concomitant prolapse surgery Telephone follow-up of 98 pts, and UD follow-up of 62	PTFE suburethral sling (0.8 to 1.5 x 20 cm with elliptical central part 3×2.5 cm)	Mean 38 months (12–75)	Subjective cure (*n* = 98)	76%	Funding: none declared. Procedure done between Jan 1986 and May 1991.
						Objective cure (urodynamics; no definition of cure) *n* = 62[869]	61%	
						Complications (*n* = 98)	22% ongoing voiding difficulty 8% continued self-catheterisation 30% had complete/partial sling removal or revision; 21% owing to reactions to sling (10 sinus formation, 4 granulation tissue, 4 abdominal wound abscess, 3 erosions vaginal mucosa); 9% owing to urinary retention 1% sling removed owing to persistent pain 40% wound complications (no details)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Bent 1993[870]	Case series EL = 3	115	F with documented tissue reaction (granulation tissue) or infection of incision sites, or who had sling removed No further details of patients	PTFE sling (0.8 to1.5 x 20 cm with elliptical central part 3×2.5 cm)	-	Sling reactions or sling removal	21% (*n* = 24) reaction to sling material. Site of reactions vagina (18), abdomen (8) Onset: by month 1 (5), 1–3 months (12), > 3 months (7) Treatment: excision and cautery of tissue (16), incl. 9 who had sling trimmed. Sling removed in 23 (< 6 months in 7, 6–12 months in 10, 13–31 months in 6,) 2% had sling removed owing to pain or retention	Funding: none declared. Retrospective review of cases to follow-up those with documented tissue reaction (granulation tissue) or infection of incision sites, or who had sling removed.
Petros 1996[871]	Case series EL = 3	54	F mean age 50 years (26–79) with symptoms of UI; 10% pure stress, 90% mixed. 50% had DO 37% had prior hysterectomy, 26% prior continence surgery Concomitant surgery undertaken in 78% (prolapse repair)	PTFE 4 mm tape inserted using IVS tunneller	Mean 15 months (9–24)	Subjective cure Objective cure* Complications	85% 89% 6% tape rejection (at 3–6 months; tape removed) 2% (*n* = 1) developed haematometra and needed dilatation of cervix 0 *de novo* urge UI 0 reqd catheterisation	Funding: none declared. *< 0.3 g on pad test following provocation testing.

Slings made of polyester (Mersilene) – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Guner 1994[872]	Case series EL = 3	24	F mean age 34 (26–52) with socially disabling (75%) or recurrent (25%) stress UI Exclusions: DO	Polyester graft mesh (Mersilene)	Mean 24 months (4–31)	Subjective cure (no leakage during any activity)	96%	Funding: none declared. Procedures done from Aug 89 to Dec 91.
						Complications	13% cellulitis on suprapubic incision line (responded to antibiotics) 33% transient retention (PVR > 100 ml) 4% (*n* = 1) Nocturia and mild urgency at 45 day review, resolved 4% urge UI (with DO) 0 urethral necrosis 0 graft rejection 0 sinus formation 0 urethral injury 0 bladder injury	
Young 2001[873]	Case series EL = 3	200	F mean age 56 (31–85) with stress UI. 31% ISD (MUCP < 20), 34% recurrent SUI, 35% chronically raised intra-abdominal pressure e.g. owing to chronic cough,	Polyester graft mesh (Mersilene)	≥ 4 months in 88% (*n* = 176) mean 12.6 months (5–23) in	Objective cure (negative stress test during urodynamics)	95% at 12 months (*n* = 127) 94% at 5 years (*n* = 52)	Funding: none declared. Procedures undertaken between March 90 and Feb 2000. Urodynamic changes also reported – data not reproduced here.
						Subjective cure	95% at 12 months 90% at 5 years	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			BMI > 30, occupational heavy lifting 50% had prior continence surgery 55% had concomitant surgery 69% of the 127 followed up for mean 12 months had urgency or urge UI Exclusions: urethral hypermobility and a normal MUCP, perceived inability to learn self-catheterisation, prior vulvectomy		127 (64%) mean 63 months (20–107) in 52 (26%)	Complications	Intra-op: 9% fever 4% UTI 2% superficial wound infection 3% atelectasis 40% discharged using CISC 4% discharged with indwelling catheters (94% voiding normally at 6 weeks) Long-term: 1.5% retention > 1 year 4% vaginal or inguinal sling erosion (0.5% sling removed) 1% refractory DO 15% *de novo* DO (of *n* = 52) 2% recurrent UTI 1.5% reqd surgical release for retention > 3 months 2.5% superficial groin seroma or abscess 2.5% dyspareunia 0.5% entrapped inguinal nerve* 0.5% cystotomy* 0.5% thigh numbness* 0.5% groin pain*	*treated successfully.
Kersey 1988[874]	Case series EL = 3	100	F, age not stated, stress UI Exclusions: 'gross' DO (> 30 cmH_2O rise in filling pressure)	Polyester graft mesh (Mersilene)	25% 6–12 months 23% 1–2 years 18% 2–3 years 13% 3–4 years 19% 4–5 years	Subjective cure/ improvement	78% cure 17% improved ('no longer troublesome')	Funding: none declared. Very limited baseline data. Sling used modified since Kersey 1983[875] case series by anchoring using prolene sutures. 87% attended follow-up for this study; data for others taken from notes. Procedures undertaken between 1981–1986
						Complications	2% haemorrhage 25% retention (delayed hosp discharge to > 10 days) 15% late voiding difficulty 11% wound haematoma/infection 2% exposure of prolene sutures 1% PE	
Kersey 1983[875]	Case series EL = 3	105	F, age not stated, stress UI with objective demonstration of abnormal urethro-vesical junction descent	Polyester graft mesh (Mersilene)	Minimum 6 months to 9 years	Subjective cure/ improvement	50% cure 25% improved (no longer troublesome) 14% failure	Funding: none declared. Very limited baseline data. Procedures undertaken between

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			54% had prior continence surgery			Complications	2% vesico-vaginal fistulas, both repaired 1% PE 20% reqd catheterisation > day 5 7% minor abdominal wound complications 3% partial dehiscence of vaginal incision with exposure of part of sling; resolved by trimming	1972–1981. 88% independently reviewed by 2 gynaecologists; 12% not available for review (case notes used in 2).

Traditional slings – comparative studies

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
Viseshsindh 2003[877]	RCT EL = 1–	26	F mean age ~51 years (SD ~2), with "anatomical incontinence or ISD". 5 (19%) had ISD. Median duration of UI 1 year (rectus fascia) or 2 years (vaginal wall sling) Exclusions: other genitourinary abnormalities, DO	Rectus fascial sling (*n* = 15)	Vaginal wall sling (*n* = 11)	Median 7 months (3–12)	Subjective cure	93% vs 100%	Funding: none declared. Included in Cochrane review of suburethral slings.[876] One surgeon performed procedures. [EL = 1–] lack of details re randomisation, analysis of results.
							Satisfaction	40 vs73% very satisfied 40% vs 27% satisfied 13% vs 0% no change 7% vs 0% dissatisfied	
							QOL (SEAPI)	Median scores 2 vs 1, *P* = 0.02	
							Hospital parameters	Mean operating time 98 (SD 17) vs 64 (SD 8) mins Median hospital stay 6.8 vs 6.5 days	
							Complications	13% vs 18% temporary CISC 13% vs 9% *de novo* urge UI others (not stated by tx grp): 4% (*n* = 1) prolonged vaginal packing 4% suprapubic wound infection 8% recurrent stress UI 12% prolonged initiation of voiding 0 permanent retention	
Kaplan 1996[878]	Cohort	79	F mean age 58 (SD 8) vs 61 (8) with stress	Rectus fascial sling	Vaginal wall sling (*n* = 36)	Mean 21 months	Failure (persistent SUI)	5% vs 3%	Funding: none declared. Retrospective review of

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 2–		UI owing to ISD; non – neurogenic and secondary to failed continence surgery (mean 1.6 vs 1.3 procedures per pt) 38% DO	(*n* = 43)		(6–51)	Satisfaction (mean score on 1–5 scale, very sat to very dissat)	1.9 vs 1.3, *P* < 0.05 89% vs 94% satisfied or very satisfied 7% vs 6% no change 5% vs 0% dissatisfied	consecutive pts treated by 1 surgeon.
							Operative parameters (Mean [SD])	Op time 84 (18) vs 42 (13) mins, *P* < 0.001 Hosp stay 3.7 (2) vs 1.4 (1) day, *P* < 0.001 Return to work 28 (8) vs 18 (3) days, *P* < 0.002	
							Complications	12% vs 3% voiding dysfunction at 1 months 2% vs 0% persisting ISC > 3 months, *P* < 0.03 14% vs 3% superficial wound infection 6% vs 8% persisting urgency at 6 months 14% vs 8% *de novo* DO	
Rodrigues 2004[879]	'Cohort' EL = 2–	232	F with UD stress UI. Median age 47 vs 49 years; mean no. surgeries 1.8 vs 2.2 per pt	Fascial sling (*n* = 128)	Vaginal wall sling (*n* = 104)	70 vs 45 months	Subjective outcomes	Success (not defined): 94% vs 80% Cure (no UI under stress, no voiding difficulty, no symptoms at filling): 73% vs 62% Improved (still using pads but satisfied): 13% vs 17%	Funding: none declared. [EL = 2–] Difference in duration of follow-up between grps, and limited baseline data.
							Time to return to normal activities	Mean 9.3 (SD 1.2) vs 5.3 (0.2) days	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Complications	Urgency or urge UI or nocturia: 5% vs 8% 3.7 vs 3.8% bladder or urethral perforations 0.8% (*n* = 1) vs 0 persistent pain in incisional area 42% seroma formation at donation site, 2 (4%) of which reqd drainage 2 vs 12.5% developed rectocele 11% vs 9% urethral obstruction and voiding difficulty	
Lucas 2000[880]	RCT EL = 1+	168 (3 found not to have UD SUI therefore excluded)	F median age 1 years (31–73), UD stress UI. 77% had nocturia, 82% urge UI, 73% had bladder hypermobility 89% had prior surgery. 43% had associated prolapse (34% central cystocele, 20% lateral weakness, 17% vault prolapse, 22% rectocele) Exclusions; evidence of neurological disease, hypocompliance or DO on UD	Standard repair using fascial sling, ~20 cm long (*n* = 81; 75 rectus, 6 abdominal)	Sling on a string, ~8–10 cm long, mounted on each end with nylon thread (*n* = 84; rectus 83, abdominal 1)	1 year	Symptoms	Stress UI 16% vs 16% Urge UI 46% vs 38% (*de novo* 7% vs 2%* Nocturia 67% vs 50%	Funding: Welsh Office. 3 centres. concomitant procedures in 26% vs 21%. Baseline UDI scores significantly worse in std repair group (181 vs 157, *P* = 0.003), hence individual pt changes rather than raw data used in analysis of all outcomes where pts QOL on recruitment may have had an impact. *58% vs 61% of those with pre-op urge UI were cured. ** listing those specific to urinary tract or to procedure. Pain scores at 24 h and between day 4–5 post-op not
							Satisfaction	78% vs 76%	
							QOL (score change from baseline)	UDI: –128 vs –101 (95% CI for mean difference 1.12 to 52.99), *P* = 0.04 IIQ: –168 vs –127 (95% CI for mean difference –4.32 to 85.96, *P* = NS)	
							Hosp parameters	Operating time (without other procedures): median 58 (38–94) vs 49 (25–90) Time to successful void: median 3 days post-op both grps Hosp stay: post-op median 6 (4–17) vs 6 (3–23), *P* = NS; total duration 8 (4–19) vs 8 (4–25)	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
							Complications	Intra- /immediate post-op:** 3% vs 1% UTI 1% vs 3% bladder injury or trauma 1% vs 0% unable to void 2% vs 2% haematoma Readmission rates (any reasons): 24% vs 11% for 0–3 months 7% vs 12% 3–6 months 12% vs 6% 6–12 months	sig. different between grps.
Maher 2001[881]	Cohort EL = 2–	51	F mean age 62 vs 58 years (39–87) with UD stress UI with low urethral pressure (MUCP < 20) who had failed conservative tx. 33% vs 30% had urge UI > 1/week 46% vs 22% had 'poorly supported bladder neck', 13% vs 7% DO 54% vs 59% prior hysterectomy, 71% vs 63% prior anterior colporrhaphy, 17% vs 33% prior continence surgery	Rectus fascial sling *n* = 24	Rectus fascial sling reinforced with polyglactin (Vicryl) mesh *n* = 27	Mean 8 (4–14) vs 5.5 (3–19) months, *P* = 0.05	Patient-determined success	58% vs 85%, *P* = 0.03 (satisfaction of ≥ 8 on VAS 0–10)	Funding: none declared. Procedures undertaken between March 95 and Dec 97. Review at Jan-Mar 1998. Nurses blind to procedure undertaken did UD review. Surgery under supervision of 2 senior authors; up to 4 surgeons took part. 29% vs 22% underwent concomitant surgery.
							Subjective success	71% vs 93% *P* = NS (No or occasional [< 1/week] SUI or UUI)	
							Objective success	50% vs 52%, *P* = NS (no leakage secondary to SUI or DO on urodynamics)	
							Complications	8% vs 7% wound infection 0% vs 4% (*n* = 1) incisional hernia 8% vs 0% voiding difficulties (reqd ISC) 19% vs 7% UD evidence of voiding dysfunction 17% vs 7% *de novo* DO 0 vs 0 ≥ grade 2 rectoenterocele	
Flynn 2002[882]	'Cohort' EL = 2–	134 (96% of the 140 treated)	F mean age ~53 years (21–77) with stress UI. 25% vs 19% had prior continence surgery, 45% vs 60% had mixed UI Exclusions: neurogenic bladder,	Autograft fascia (*n* = 71; rectus fascia 69%, fascia lata 31%)	Allograft fascia lata (cadaveric) *n* = 63	Minimum 24 months (mean 44 SD 7 vs 29 SD 3 months, *P* < 0.05)	Subjective cure/ improvement	77% vs 71% cured 13% vs 13% improved 10% vs 16% failed	Funding: none declared. [EL = 2–] retrospective review of cases, difference in duration of follow-up. Only autograft available from Dec 95 to Aug 97, then both available.
							Symptoms	10% vs 13% recurrent stress UI 16% vs 24% urge UI (28% vs 21% persistent, 5% vs 28% *de novo*)	
							Satisfaction	90% vs 78%, *P* = 0.05	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
			concomitant pelvic surgery				Hospital parameters	Mean operating time 116 (23) vs 69 (17) mins, $P < 0.05$ Mean hosp stay 1.9 (0.6) vs 1.2 (0.4) days, $P < 0.05$ Weeks lost from work 6.4 (2.6) vs 3.4 (2.2), $P < 0.05$	One surgeon.
							Complications	27% vs 6% UTI 6% vs 0% abdominal wound infection 1% vs 0% prolapse 4 vs 1.5% retention for > 30 days (resolved in 2/3 and 1/1; remaining pt reqd urethrolysis) 1.5% bladder perforation (unclear which grp)	
Almeida 2004[883]	'Cohort' EL = 2–	60	F mean age 53 years (37–73) with stress UI	Autograft fascia lata (n = 30)	Allograft fascia lata (cadaveric) n = 30	Mean 33 (24–41) vs 36 (22–44) months	Cure or improvement (no definition)	70% vs 40% cure 20% vs 28% improved, $P < 0.05$	Funding: none declared. No description of procedures given.
							Hospital parameters	Mean op time 81 vs 62 min, $P < 0.05$ Mean hosp stay 2.48 vs 1.25 days, $P < 0.05$	
							Complications	None 'with regard to sling erosion or infection'	
Soergel 2001[884] Associated reference Heit 2000[180]	'Case–control study' EL = 2–	45 (90% of the 50 treated; 5 did not return for follow-up)	F with UD stress UI complicated by ISD and urethral hypermobility (Q-tip angle > 30) Mean ages 57 vs 66 years $P = 0.01$ Prior hysterectomy 85% vs 75% 52% vs 33% concomitant procedure 44% vs 83% prior continence surgery	Autologous rectus fascia (n = 33)	Cadaveric fascia lata (n = 12)	25 (SD 26) vs 12 (SD 7) weeks	Objective cure (no leakage during cough UPP)	70% vs 17%, $P = 0.006$	Funding: none declared. Retrospective analysis of cases- although described as a case–control study, nothing in the methods indicates that this was so.
							Success (cured and no DO)	79% vs 33%, $P = 0.006$	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
McBride 2005[885]	'Cohort' EL = 2–	47 (66% of 71 treated)	F mean age 61 vs 74 (P = 0.000) who had undergone auto- or allo-graft fascia lata sling procedure, for UD stress UI 54% vs 62% had prior hysterectomy, 46% vs 38% prior prolapse or urological surgery, 60% vs 48% current HRT use	Autologous fascia lata sling n = 39	Allograft (cadaveric) fascia lata (Suspend Tutoplast) n = 32	Mean 42 (SD 10) vs 35 (7) months, P = 0.007	Subjective cure	92% vs 91% (85% vs 91% reported ≤ 1 leakage episode/day)	Funding: unrestricted grant from Mentor. [EL = 2–] Differences between groups in duration of follow-up and in other procedures undertaken (46% vs 91%). Case list and chart review, with request for review of patients in clinic; if pt declined invite to clinic, questionnaire administered over telephone. Urodynamic/UPP findings reported for 62% - results nor reproduced here. No information on complications.
							Pad use	Mean 0.29 vs 0.9, P = 0.024 (73% vs 43% used none/day 27% vs 38% used 1 0% vs 19% used ≥ 2)	
							QOL (mean scores)	UDI-6: 21 (17) vs 21 (15), P = NS IIQ-7: 10 (1.5) vs 4 (6.8), P = NS	
Wright 1998[886]	Cohort EL = 2–	92	F mean age 60 (16–82) years, with stress UI 57% had prior continence surgery 8% vs 20% underwent concomitant pelvic surgery	Autologous fascia lata (n = 33)	Allograft fascia lata (cadaveric) n = 59	Mean 16 (15–28) vs 9.6 (1–20) months	Subjective cure	94% vs 98%, P = NS	Funding: Grant from the Fonds de Perfectionnement, Geneva University hospital. Duration of procedure and hospital stay also quoted but only when sling procedure undertaken solely. [EL = 2–] differences in duration of follow-up.
							Mean change in SEAPI scores	–86% vs –77%, P = NS	
							Complications	0% vs 2% (n = 1) sling failure 0. vs 2% reqd blood transfusion 0 bladder perforation 0 infection 0 vaginal skin necrosis	
Brown 2000[887] Associated publication (details of allograft failure cases: O'Reilly	Cohort EL = 2–	167 (80% responded to Q; 65% vs 86%)	F mean age 62 years with stress or mixed UI (35% vs 50% pure stress, 65% vs 50% mixed) 73% vs 42% had prior continence surgery, 10% vs 34% had associated pelvic	Autologous fascia lata sling (n = 46; 30 responded to questionnaire	Allograft (cadaveric) fascia lata (121; 104 responded to questionnaire)	Mean 44 vs 12 months	Subjective cure/ improvement*	73% vs 74% cured 27% vs 19% improved 0% vs 7% failed**	Funding: none declared. Consecutive pts; autograft undertaken May 94 to July 97, and cadaveric from Feb 97 to June 99. Questionnaire mailed to pts to ask about subjective outcomes. *cure = no or minimal leakage not requiring pads;
							Satisfaction	90% vs 89% satisfied 83% vs 83% would recommend to friend	
							Operating time	129 vs 82 min	

Study	Study type and EL	No. of patients	Patient characteristics	Intervention	Comparison	Length of follow-up	Outcome measures	Effect size	Additional comments
2002[888])			surgery				Complications	7% vs 2% prolonged retention (1/3 from autologous grp needed urethrolysis) 0% vs 2% suprapubic abscess 0% vs 1% lower extremity neuropathy 0% vs 1% persistent suprapubic pain at 6 weeks 0% vs 1% suprapubic haematoma 3% vs 0% CVA 11% vs 0% persistent thigh pain at 6 weeks median duration of drainage post-op 14 (6–180) vs 9 (4–120) days	improvement = 1–3 pads/day; failed > 3 pads/day. **failed at mean 6.5 months (range 4–13).[888]
Simsiman 2005[889]	Cohort EL = 2	241 (of 354 treated; minimum 1 year follow-up reqd)	F mean age between 55 and 59 across grps, with stress UI Prior surgery 24 vs 25% vs 14% ($P < 0.05$ auto and allo vs xeno) 'attachment to rectus' 74 vs 84% vs 57% ($P < 0.05$ xeno vs auto and allo) Concomitant surgery 77 vs 82% vs 81%	Autograft (rectus fascia or fascia lata *n* = 78)	Allograft (cadaveric fascia lata, *n* = 80) Xenograft (porcine dermis, Pelvicol *n* = 83)	At least 1 year; mean 23 vs 25 vs 17 months	Objective failure	13 vs 36% vs 46% $P < 0.001$ allo- and xeno-graft vs autograft	Funding: none declared. Retrospective review of cases performed between Jan 1997 and Jan 2003. Objective failure = urinary leakage with cough stress testing at any time after 3 months postop. Objective cure = no leakage with a standing cough stress test with at least 200 mL bladder volume at a min 12 months post-op. *data on complications not systematically collected by authors.
							Subjective failure	31 vs 55% vs 53% $P < 0.01$ allo- and xeno-graft vs autograft	
							Complications*	5 vs 5 vs 2.4% underwent urethrolysis for persistent voiding dysfunction or worsened irritative symptoms	

Rectus fascial slings – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Chou 2003[890]	Case series EL = 3	98	F median age 66 years (45–84) with stress (49%) or mixed (51%) UI Exclusions: urethral	Autologous rectus fascial sling	Median 3 years (1–7)	Combined cure and improved rate (on UI Outcome Score)	97% vs 93% (stress vs mixed UI)	Funding: Institute for Bladder and Prostate Research. Retrospective review of cases

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			diverticulum, neoplasm, urinary fistula			Complications	2% *de novo* DO 1% (*n* = 1) prolonged retention (reqd surgical revision of sling)	treated 1995–2001.
Hassouna 1999[891]	Case series EL = 3	78 (70% of 112 treated)	F mean age 56 years (37–82) with stress UI owing to ISD. 49% had stress UI, 51% mixed. 13% had DO 70% had prior continence surgery, mean 1.4 (1–3) procedures 60% underwent concomitant surgery	Autologous rectus fascial sling (7 x 2.5 cm)	Mean 3.4 (0.5–8)	Subjective success	81% success 19% failure (not improved and using > 1 pad per day)	Funding: none declared. Questionnaire follow-up of cases treated by 1 surgeon between 1988 and 1996. 3rd party followed-up non-responders by telephone. test–retest reliability of questionnaire evaluated in 28%.
						Complications	21% *de novo* urge UI 1.3% (*n* = 1) straining during voiding 25% discomfort or pain related to surgical procedure 0 retention 0 CISC for > 4 weeks	
						Satisfaction	86% satisfied 79% would undergo same surgery 845 would recommend 74% procedure improved social activity 37% (of 51) reported improved sexual activity	
Reichelt 2003[892]	Case series EL = 3	86 (67% of 129 treated)	F mean age 57 years with stress UI Exclusions: neurogenic UI Mean 0.4 continence surgical procedures per pt	Autologous rectus fascial sling	Mean 39 months	Change in continence symptoms	26% dry at all times. *% improvement:* 65% reported 50–100% improvement 15% with 10–40% improvement 17% no change 2% worse (61% using 0–2 pads/day)	Funding: none declared. Procedures undertaken by 2 urologists between 1989 and 1998. Questionnaire follow-up and retrospective review of charts. No information on complications.
						Satisfaction	63% satisfied 59% would recommend to others	
Cross 1998[893]	Case series EL = 3	134 (89% of 150	F mean age 57 (24–79) with stress UI (34% mixed UI). 2% severe urgency	Autologous rectus fascial sling	22 months (6–42)	Objective cure (on urodynamics)	93% cure 7% failure (cure of urge UI in 36/48 [75%])	Funding: none declared. F unable to attend clinic follow-up interviewed by telephone by 3rd

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
		treated)	36% type 2 UI (ALPP > 90 cmH_2O): included if failed continence surgery, engaged in vigorous athletic activity, had chronic pulmonary condition, or grade 3 or 4 cystocele) 54% type 3; ALPP < 60. 12% had type 2/3 58% had prior continence surgery 42% underwent concomitant surgery (mainly cystocele or rectocele repair or hysterectomy)			Complications	19% *de novo* urge UI or urgency at 3 months 3% persistent urge UI 0.7% (*n* = 1) prolonged lower abdominal pain (suture removed, and pt pain free) 4% UTI 3% new, symptomatic enterocele 8% not voiding spontaneously at 1 month 4% (*n* = 6) permanent ISC (4/6 [3%] had urethrolysis at 3 months; other 2 had undergone augmentation cystoplasty for neurogenic UI, and remain on ISC)	party.
Haweekins 2002[894]	Case series EL = 3	198 (80% of 246 treated)*	F mean age 51 (36–75) years with stress UI 26% had prior continence surgery 15% concomitant procedures undertaken	Autologous rectus fascial sling	Median 6 years (2–18)	Subjective success	72% (cured or much improved on symptom severity score and on pts perception of change)	Funding: UK study, DGH based. *who responded to questionnaire sent to F treated between 1979 and 1996.
						Patients perception	41% cure 38% much better 15% little better 4% no change 25 worse	
						Complications (info derived from notes; *n* = 178)	4% haemorrhage requiring transfusion 3% wound infection 1.7% bladder perforation 1.1% reqd sling release	
						Complications (questionnaire)	9% often/always voiding difficulty 29% urgency 11% abdominal pain attributed to surgery 4% recurrent UTI 3% loss of abdominal tone 4.5% incisional hernia 4% had subsequent prolapse or UI surgery	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Morgan 2000[895]	Case series EL = 3	235 (95% of 247 treated)	F mean age 55 years (10–84) with stress UI 54% type 2 SUI (ALPP > 90 cmH_2O and urethral mobility > 2 cm): 46% type 3 (ALPP < 60) 73% had urgency, 45% urge UI 65% had concomitant procedures, incl. cystocele, rectocele, enterocele repair; hysterectomy)	Autologous rectus fascial sling (6 to 8 x 1 to 1.5 cm)	Mean 52 months (24–70)	Subjective cure or stress UI (SUI resolved and no urge UI)	88% (91% type 2 grp, 84% type 3 grp) In 88 pts with > 5 years follow-up, 85% cured	Funding: none declared but one author declared financial interest and/or other relationship with Bard Urologic. Retrospective review with postal questionnaire; 95% response rate; al respondents retested by telephone. Procedures undertaken Jan 1993-Dec 1996. 6% had secondary surgery for sling failure (collagen to repeat sling). *mean duration catheterisation 8.4 days; 98% voided normally at 3 months.
						Subjective cure of urge UI	74%	
						Satisfaction	92% highly satisfied	
						Complications	23% *de novo* urgency 7% *de novo* urge UI 94% transient retention (reqd catheterisation for > 1 day)* 2% prolonged (> 3 months) catheterisation; redq urethrolysis 3% sling failure 2% hypersuspended urethra 0.8% pelvic haematoma 0.8% incisional hernia 0.4% (*n* = 1) DVT 0.4% PE 0 sling erosion	
Chaikin 1998[896]	Case series EL = 3	251	F mean age 56 years (19–80) with stress UI. 25% 'simple' cases (prior surgical failure or DO without urge UI); 75% cases complicated (urge UI, fistula, urethral diverticulum, grade 3 or 4 cystocele or neurogenic bladder) Mean no. prior procedures 0.78 (0–3) simple vs 3.1 (0–19) complex	Autologous rectus fascial sling	Mean 3.1 years (1–15)	Combined subjective and objective cure/ improvement	73% cure (dry under all circumstances and < 2 g on 1 h pad test) 19% improved (≥ 50% reduction in UI symptoms and pad test results) 8% failure (< 50% reduction in UI symptoms and pad test results)	Funding: no funding declared. Retrospective analysis of cases. One surgeon.
						Complications	2% permanent retention 3% *de novo* urge UI 23% persistent urge UI 0.8% bladder injury 0.4% prolonged pain 0.4% death 0 urethral injury	
Muller 1993[897]	Case	108	F mean age 47 years (22–	Autologous	Mean	Subjective cure	67%	Funding: none declared.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	series EL = 3	(90% of 120 treated)	76) with stress UI, not neurological or congenital or following gynae surgery or radiation 67% prior continence surgery 28% concomitant surgery (mainly hysterectomy)	rectus fascial sling (~2 cm x 10–12)	5 years (max. 15)	Complications	33% transient retention (catheterisation for 4–6 weeks) 2% permanent CISC 7% bladder injury 2% retropubic haematoma or wound infection 2% hernia of the abdominal wall	Operations between 1969 and 1987.
Borup 2002[898]	Case series EL = 3	32	F mean age 50 (30–79) years with stress UI. 53% had prior pelvic surgery	Autologous rectus fascial sling	5 years	Subjective cure (*n* = 31; 1 lost to follow-up)	97% (dry during stress) 3% improved	Funding: none declared. Operations undertaken between Dec 92 and Dec 95. Consecutive pts. All pts familiar with ISC pre-op. 6/7 with pre-op DO free of DO post-op. residual volumes and uroflow data reported for each pt – data not reproduced here.
						Complications	16% *de novo* urgency (2/5 using antimuscarinics occasionally) 69% CISC post-op 38% at 6 months 16% at 1 year 6% at 5 years (1/2 used CISC pre-op) 41% UTI 22% recurrent UTI (≥ 2 episodes) 3% sling erosion into urethra 3% re-operation owing to difficulty with CISC 0 pain 0 dyspareunia	
Zaragoza 1996[899]	Case series EL = 3	60	F mean age 57 (34–78) years with stress UI (42%) or mixed UI/stress UI with urgency (58%) 40% had prior continence surgery 5% prior pelvic radiation, 5% prior radical pelvic surgery	Autologous rectus fascial sling	Mean 25 months (11–34)	Subjective cure	95% cure 5% failure (DO with urge UI)	Funding: no funding declared. Consecutive pts.
						Complications	60% transient retention (median 6.5 days [1 day to 5 weeks]) 12% *de novo* urgency (none urge UI; urgency treated with antimuscarinic) 13% UTI 5% persistent incisional pain 0 bladder injury 0 urethral injury	

Fascia lata slings – case series

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Fitzgerald 2004[900]	Case series EL = 3	27 (77% of 35 treated who had > 3 months follow-up)	F median age 59 years (38–79) 85% using HRT 37% had prior continence surgery	Allograft fascia lata (freeze dried, irradiated)	Median 12 months (0.5–51)	Failure (return of SUI symptoms at any time)	52% at between 2 weeks to 2 years following procedure (41% at 1 year)	Funding: none declared. Retrospective chart review; cases of sacrocolpopexy also reviewed in same paper. Procedures undertaken 1997–99, by 3 urogynaecologists. Fitzgerald 1999[960] believed to be an earlier publication relating to same cases.
						Complications	4% (*n* = 1) reqd sling division at 4 weeks owing to persistent urinary retention	
Amundsen 2000[901]	Case series EL = 3	91 (88% of 104 treated)*	F mean age 62 (SD 12), with stress UI symptoms; 65% had mixed UI (16% DO) 70% used oestrogen 40% underwent concomitant surgery Prior surgery: 38% suspension procedure, 80% hysterectomy, 14% collagen tx, 3% sling)	Allograft fascia lata (freeze-dried, non-irradiated, size: 2×15 cm)	Mean 19 (SD 10) months, range 3–37	Subjective cure	63% another 21% reported occasional SUI and used 0–1 pad/day	Funding: none declared. *who responded to mailed questionnaire. No sig. difference between respondents and non-respondents in baseline data (age, parity, weight, oestrogen use, prior continence surgery, pad usage, VLPP). Procedure undertaken March 96-Jan 99. urge UI resolved in 41% (24 of 59). UDI and IIQ also evaluated, but only selective results reported (not reproduced here).
						Pad usage (mean change)	From 4.6 to 1.1, $P < 0.0001$	
						Complications	1% reqd urethrolysis for retention 1% blood transfusion intra-op 15% *de novo* urge UI 2% underwent subsequent surgery for new onset or recurrent POP	
Elliott 2000[902]	Case series EL = 3	26 (of 40 cases treated, with ≥ 1 year follow-up)	F mean age 56 years (31–81), stress UI; 42% had urgency 50% underwent concomitant surgery	Cadaveric fascia lata (solvent dehydrated, irradiated,	Mean 15 months (12–20)	Continence status	77% dry 15% slight or rare leakage (wore 0–1 pads/day) 8% wore 2 pads/day	Funding: none declared. Retrospective review of cases undertaken since June 1998; telephone questionnaire by 3rd party (Tutoplast used).

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
				size: 2×12 cm)		Complications	8% *de novo* urgency 0 recurrent cystocele	Pre-op urgency persisted in 9/11.
Huang 2001[903]	Case series EL = 3	18	F mean age 52 years (37–76) with stress UI (50% mixed UI). 22% had ISD (VLPP < 60 cmH_2O), 78% had urethral hypermobility 28% prior hysterectomy 6% prior needle suspension 11% underwent concomitant surgery	Cadaveric fascia lata (solvent dehydrated, irradiated: size 7×2 cm)	Mean 9 months (7–12)	Subjective cure or improvement	72% cure or improved (mean improvement 83% [50–100%]) 28% failed 6% (n = 1) underwent further sling surgery using autograft fascia lata	Funding: none declared. Procedures undertaken March 1999 to July 1999 (Tutoplast used). Follow-up by mailed questionnaire.
Walsh 2002[904]	Case series EL = 3	31	F mean age 63 years (40–75) with stress UI 65% prior continence surgery; 26% failed conservative tx; 55% were taking antimuscarinics for OAB 19% underwent concomitant vaginal repair	Cadaveric fascia lata	Mean 13.5 months (12–14)	Subjective cure	94%	Funding: none declared. Surgery undertaken or supervised by 1 surgeon, unclear when. Pts who failed to return for follow-up or to return questionnaire were telephoned by 3rd party.
						Improvement (VAS)	85% at 1 year	
						Satisfaction	69% at 1 year 81% would repeat procedure 77% would recommend to friend	
						Complications	0 bleeding 0 wound infection 0 erosion 35% ISC at 4 months 3% ISC at 1 year	
Richter 2003[905]	Case series EL = 3	102	F mean age 63 years (29–87) with stress UI owing to ISD (UCP ≤ 20 and/or VLPP ≤ 60 cmH_2O) combined with urethral hypermobility (cotton swab > 30°). 87% had mixed UI, 5%	Cadaveric fascia lata (2×25 cm)*	Mean 35 months (SD 12.5), median 36	Quality of life (mean score change; reduction = improvement)	IIQ-7: –80% (P < 0.001) at 1 year; –82% at 2 years, –80% at 3 years, –77% at 4 years) UDI-6: –58% (P < 0.001) at 1 year; –62% at 2 years, –57% at 3 years, –58% at 4 years)	Funding: none declared Procedure undertaken Oct 97 to Dec 2001. Questionnaire follow-up annually; response rates: 88% at 1 year, 78% at 2 years, 84% at 3 years, 93% at 4 years.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			pure stress UI, 8% no leakage 59% underwent concomitant surgery			Continence status	80% better or much better at 1 year (77% at 2 years, 75% at 3 and 4 years)	*Lifecell Corp. **30% said 'same or better', 61% not applicable.
						Satisfaction	90% at 1 year (90%, 85%, 86% at 2,3,4 years)	
						Complications (responses to 1 year questionnaire)	58% some voiding difficulty (34% 'slight') 28% vaginal pain, pressure or protrusion 33% bladder or kidney infection 5% less able to have sexual relations**	

Other biological sling case series – porcine small intestine, porcine dermis, dura mater, dermal grafts, vaginal wall slings

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
Giri 2005[906]	Case series EL = 3	40	F mean age 48 (28–66) with UD stress UI. 33% had ISD. 18% prior continence surgery 20% prior hysterectomy Exclusions: UTI within 6 weeks, neuropathic bladder, uterovaginal prolapse, DO, voiding dysfunction (max. flow rate < 15 ml/s, pressure at max. flow rate > 40 cmH_2O, PVR > 50 ml)	Porcine dermal sling (Pelvicol; 2×7 cm)	6 months	Cure/ improvement	75% cured (no leakage in any circumstances and dry cough stress test) 15% improved (≥ 50% reduction in leakage % dry on stress test) 10% failed (< 50% reduction and/or leakage on cough stress test)	Funding: National Institute of Health Sciences, and Pfizer Sales Ireland. Procedures undertaken June to December 2003. Pts taught CISC pre-op; day case surgery was aim of series. 40% discharged 10 h after surgery (same day). KHQ and SF36 used – results only presented in graphs.
						Complications	0 bladder perforation 0 reqd urethrolysis 5% (*n* = 2) minor vaginal bleeding after removing pack 2.5% superficial wound infection 7.5% UTI 5% deep pelvic pain for 3 months 25% persisting urgency 5% *de novo* urgency	
Kinn 1994[907]	Case series	47	F mean age 67 (47–79) years with stress unsuitable for colposuspension	Porcine dermal sling (Zenoderm;	Mean 20 months (7–49)	Cure/ improvement (no definitions)	68% cured 9% persistent leakage 25% failed	Funding: none declared. All underwent PFTM pre and post

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	EL = 3		26% prior continence surgery 43% prolapse, who underwent concomitant colporrhaphy	1×20 cm)		Complications	Early (within 6 weeks): 8.5% wound infection 8.5% UTI 2.1% sling erosion into urethral wall (sling removed) 2.1% DVT 15% retention > 7 days Late (after 6 weeks): 2.1% retention, reqd sling removal 4.2% urgency needing tx (persisting post-op])	surgery. Uroflowmetry and profilometry also reported post-op; not reproduced here.
Jarvis 1985[908]	Case series EL = 3	50	F mean age 51 (37–76) with UD stress UI. 14% had urge UI 100% prior continence surgery (82 procedures in total; 48% had > 1 operation)	Porcine dermis sling (Zenoderm; 30×1.5 cm, central part 3 cm)	Mean 21 months (6 months to 4 years)	Cure/ improvement (dry and no leakage on urodynamics)	78% cure 22% failed (16% remained stress incontinent, 4% urge incontinent, 2% mixed UI)	Funding: none declared. Procedures undertaken 1979–83.
						Complications	64% voiding normally at end of day 10 2% (*n* = 1) catheter reqd for 24 days 2% bladder injury (repaired immediately) UTI 'in small number' Approx 50% abdominal wound infection (if defined as cellulitis around wound or discharge of fluid from wound) 0 reqd sling release or urethral dilatation	
Jones 2005[919]	Case series EL = 3	34	F with UD stress UI on urodynamics or stress test 32% underwent concomitant procedures	Porcine small intestinal submucosa (Stratisis; 2×30 cm)	2 years	Subjective cure/ improvement	79% cure 9% incomplete resolution 12% failed (persistent urge UI)	Funding: none declared. First author research consultant for Cook Urologist. Results taken from case notes or first visit after 2 year period.
						Complications	3% (*n* = 1) *de novo* urge UI 9% suprapubic inflammation (2 resolved with antibiotics, 1 had autologous fascial sling placed) 0 prolonged retention	
Rottenberg 1985[914]	Case series EL = 3	36	F mean age 53 years (SD 9) with severe stress UI; 17% had urgency 100% had some degree of	Lyophilised dura mater (Lyodura; 2×30 cm)	6 months	Objective success	89% (no leakage on coughing or straining with full bladder in upright position, detected by pad test)	Funding: none declared. Uroflowmetry and profilometry also reported post-op; not reproduced here.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			POP 44% prior continence surgery None had DO Exclusions: UTI, DO, voiding difficulties (max. flow rate < 15 ml/s)			Complications	2.7% (*n* = 1) sling passed through the bladder and replaced 2.7% haemorrhage requiring surgery for haemostasis 5% suction drain inside bladder	Mean post-op drainage time 11 days (SD 6).
Owens 2004[915]	Case series EL = 3	25	F mean age 62 years (38–83), with stress, or mixed (28%) UI, owing to urethral hypermobility (> 30˚ on Q-tip test). None had DO 52% had concomitant surgery	Cadaveric dermal grafts (Duraderm; 2×12 cm)	6 months	Subjective cure/ improvement	68% cure (no leakage and pt satisfied) 24% improved (minimal leakage, 0–1 pads/day, and pt satisfied) 8% failure (> 1 pad/day or pt perception of failure)	Funding: none declared. Follow-up by chart review and a telephone interview. Mean post-op drainage time 8 days (3–37).
						Satisfaction	60% very satisfied 16% satisfied 24% not 68% would repeat surgery 68% would recommend to friend	
						Complications	12% retention (catheter for > 2 weeks) 4% PVR > 75 ml 4% bladder perforation	
Onur 2005[916]	Case series EL = 3	25	F mean age 62 years, (39–77) with stress UI 16% prior continence surgery 56% prior hysterectomy	Solvent-dehydrated cadaveric dermis (2×12 cm)	Mean 12 months (8–22)	Continence status	68% cure (no leakage, no pads used) 12% improved (slight leakage, small amounts, or using 0 to 1 pad) 20% failed (using > 1 pad per day)	Funding: none declared. UDI-6 scores also presented, in graph – no numerical data.
						Satisfaction	76%	
						complications	12% (*n* = 3) mild suprapubic or vaginal infection 28% required catheterisation for mean 9 days (4 to 42) 12% *de novo* urgency or urge UI	
Raz 1996[909]	Case	163	F aged 32–81 years with	Vaginal wall	17 months	Recurrent SUI	7%	Funding: none declared.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	series EL = 3		stress or mixed UI (47% mixed). 58% had ISD, and 42% 'anatomical UI' 54% had prior continence surgery	sling	(6–32)	Complications	5% retention for > 8 weeks 9% *de novo* urge UI (7/11 persisting at 11 months) 1% suture removal 1% enterocele 2% superficial wound infection 0.5% persistent pubic pain	Aim of study was to compare outcomes in women with ISD vs hypermobility; results considered as a whole here. Procedures done June 92 to 94.
Kaplan 2000[910]	Case series EL = 3	336 (90% followed up)	F mean age 56 years (18–85) with stress UI. 51% ISD, 49% anatomical UI 34% DO 71% had concomitant surgery	Vaginal wall sling	Mean 40 months (4–77)	Cure (no definition)	93% at 1 year (84% pts) 91% at 3 years (48% pts) 95% at 5 years (29% pts)	Funding: none declared. Procedures done Jan 93 to Oct 99. Aim of study was to compare outcomes in women with ISD vs hypermobility; results considered as a whole here.
						Satisfaction	93% satisfied or very satisfied	
						Complications	8% *de novo* DO and urge UI 5% wound infection 3% UTI 2% sutures removed 7% POP	
Litwiller 1997[911]	Case series EL = 3	51	F mean age 70 years (52–86) with stress or mixed UI (65% mixed). 78% overall had urgency 73% ISD, 27% urethral hypermobility 86% prior hysterectomy 65% prior surgery	Vaginal wall sling	Mean 31 months (5–67)	Continence status	73% had improved urinary control 21% no change 5% worsening UI (55% socially continent)	Funding: none declared. Procedures done Aug 90 to Jan 96. Telephone follow-up.
						Satisfaction	62%	
						Complications	12% ISC 10% *de novo* urge UI 8% *de novo* urgency 4% dyspareunia 2% (*n* = 1) cystocele 2% suprapubic pain	
Palma 2002[912]	Case series EL = 3	45	F mean age 53 (29–75), with UD stress UI owing to ISD (VLPP < 60 cmH_2O Exclusions: grades 3 or 4 cystocele, POP, DO	Vaginal wall sling	Median 40 months (26–61)	Cure*/ improvement	31% cure 38% improved 31% unchanged or worse	Funding: none declared. One surgeon. Cure = no symptoms of UI or bladder dysfunction, no UI on valsalva.
						Complications	0 ISC no further details	
Mikhail 2004[913]	Case	53	F mean age 45 (38–	Vaginal wall	Min	Success*	83%	Funding: none declared.

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
	series EL = 3		63 years) with UI stress UI owing to urethral hypermobility 58% had grade 1 or 2 cysto- or recto-cele and underwent concomitant repair None had prior continence surgery	patch sling	5 years (mean 67 months (63–98)	Complications	4% ISC for 2 months 6% *de novo* DO 1.8% (*n* = 1) superficial wound infection 1.8% bladder injury 1.8% transient neuropathy 0 urethral injury 0 ureter injury 0 enterocele	Retrospective review of cases 1989–2002. *complete symptom improvement, no pads used, and negative stress test.

Competence of surgeons

Outcome by case volume and hospital status

Study	Study type and EL	Aim of study	Number of participants	Participant characteristics	Outcomes	Results	Additional comments
Hutchings 1998[126] Associated reference Black 1997[125] Only data relevant to competence question reproduced in this table	Cohort EL = 2+	To identify risk factors consistently predictive of a successful outcome up to 1 year after surgery for stress UI (outcomes explored were complications, symptom severity index, symptom impact index, and activities of daily living) Health-service factors investigated: pre-op urodynamics, surgical procedure, concomitant procedure, surgeon specialty, (gynae or urology), grade (consultant or not), volume of cases per annum, hospital teaching status	232* 82% responded to Questionnaires	38 gynaecologists and 11 urologists from the North Thames region who carry out surgery for stress UI in NHS hospitals.** Completed questionnaires on pts prior tx, presentation, the procedure, urodynamic investigations, specialty and grade of surgeon, work volume, and hospital teaching status. F undergoing stress UI surgery by 1 of these surgeons between Jan 93 and Jun 94 (excluded if unable to read or understand English). Completed questionnaires on sociodemographic factors, age, general health, UI history severity and impact, and co-existent conditions. Mean age 52 years. 50% underwent colposuspension, 29% anterior repair, 12% needle suspension, 4% missing info, 4% other	Odds for a better outcome of surgery (univariate analysis) according to high volume (20–42 cases per year vs 1–19 cases per year) Odds for a better outcome for surgery according to hospital status (non-teaching vs teaching)	No complications (20–42 cases vs 1–19 per year): OR 0.87 (95% CI 0.50 to 1.50) Reduction in SSI: OR 1.51 (95% CI 0.83 to 2.73) Reduction in SII: OR 1.77 (0.96, 3.27) Improvement in ADL: 1.07 (0.60, 1.92) Univariate analysis: (non-teaching vs teaching) OR 2.32 (95% CI 1.01 to 5.29) Multivariate analysis No longer statistically significant (data not given in paper)	Funding: MRC Health Services Research and Public Health Board. Multivariate analysis using logistic regression. *for whom both patients and surgeons completed questionnaires (of 631 F invited to participate). Of 64 (47%) who accepted request to participate in study; the 49 were selected because representative of surgeon's work volume, specialty, teaching status, and geographic location of hospital. 18% hospitals were teaching, 82% non-teaching. **sig. higher risk of complications reported by surgeon speciality on univariate and multivariate analysis, but when wound problems excluded from analysis (because more gynae undertook anterior repair where there is no wound), this significance did not persist. When analysis restricted to colposuspension gynae associated with fewer complications than urologists (data not shown in paper). Also sig. greater improvement in SII for gynae vs urologists.

Other volume data in relation to continence surgery

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
McLennan 2005[925]	Case series EL = 3	256 (of 278 treated)*	F mean age 58 years (30–85) undergoing TVT surgery. Type of UI not stated 17% had prior 'bladder surgery' 56% had concomitant surgery 82% general anaesthetic, 18% spinal	Tension-free vaginal tape	Not stated	Bladder perforation rate	34% (12.5% right sided, 15.2% left-sided, 6.3% bilateral) By number of procedures undertaken by surgeon:** 40.9% for 1–5 cases 30.7% for 6–10 cases 25.9% for 11–15 cases	Funding: none declared. *Pts considered in groups of 5 for learning curve- analysis. As median number of procedures undertaken by the 23 residents was 13 (range 3–22), mean 12, 22 pts (8%) only fell into the ≥ 16 pts category, therefore these 22 were excluded from analyses. All procedures under guidance of one surgeon. **significant inverse association between no. procedures and bladder perforation according to Kendall's rank correlation (–0.124), *P* = 0.033.
						Factors associated with bladder perforation (multivariate analysis)	Case number performed: OR 0.936 (95% CI 0.873 to 1.004), *P* = NS Age (threshold not stated): OR 0.961 (95% CI 0.939 to 0.982), *P* < 0.001 Weight (threshold not stated): OR 0.985 (0.977, 0.993), *P* < 0.001	
Duckett 2004[926]	Survey EL = 3	1066 consultants sent q, 578 completed (54%)	National survey of consultants who perform continence surgery to describe the experience, current trends, and management of continence surgery for urodynamic stress UI in the UK 40% primary general gynaecologists 31% special interest urogynaecologists 25% urologists 3% subspecialist urogynaecologists 2% did not classify themselves	NA	NA	No. procedures/ study year*	Total 16,412 By procedure: 45% TVT 27% colposuspension 13% anterior repair 9% periurethral injection 4% sling 0.05% needle suspension	Funding: none declared. Ethicon Ltd provided list of surgeons. Questionnaire: 29 item, commissioned by the BSUG Audit Committee covering volume and type of surgery, complications, audit, pt follow-up. *year ending 1st January 2002. #also reported by speciality. **question based on DH Good Practice in Continence Services stating that best surgical results achieved by teams that perform an adequate volume of operations.[34] Complete data for all volumes not given for this question.
						No. procedures performed by surgeons# (1–10, 11–25, 26–50, > 50)	TVT 45%, 28%, 20%, 8% Colposuspension 72%, 21%, 7%, 0.2% Anterior repair 62%, 28%, 10%, 0 Periurethral inj. 73%, 21%, 4%, 2%	
						% performing pre-op urodynamics	91% (range 86% general gynae to 100% urogynae subspecialists)	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
			Duration of consultant post: 25% < 5 years, 31% 5–10, 44% > 10 years			No. procedures considered adequate for good surgical results per annum**	50% said < 50 pa; 50% > 50 pa majority speciality view: 61% general gynae said 10–20 pa 68% urogynae subspecialists 20–50 pa 61% special interest gynae 20–50 pa 59% urologists 10–20 pa 36% urologists 20–50 pa	
						surgical complications (% surgeons reporting)	13% persistent suprapubic pain 25% recurrent UTI 47% development urgency/urge UI 29% bladder perforations 19% voiding abnormality persisting > 6 weeks	
						follow-up after surgery	26% for 6–8 weeks 43% for 2–6 months 31% for > 6 months	
						% using QOL, pad test, UD to assess surgical outcome	By specialty: general gynae 3, < 1, 3% special interest gynae 8, 8, 8% subspecialist 36, 58, 26% urology 10, 6, 10%	
Duckett 2004[817]	Survey EL = 3	426 surgeons*	Surgeons who performed TVT (40% gen gynaecologists 31% urogynaecologists 3% subspecialists in urogynae 25% urologists)	NA	NA	Continence surgery performed	7336 (45%) TVT 4430 (27%) Burch colposuspension	Funding: none declared. Setting: UK, data collected for 2001. 81% response rate. Only data relevant to competence extracted.
						Suggested criteria for gaining competence	46% suggested performing 10–20 cases under supervision 43% suggested 20–50 cases required to gain competence, depending on previous experience	
						TVT operation by group	44% performing ≥ 10 a year 91% gynaecologists and 87% of urologists performed ≥ 25 TVTs a year	
						Intra- and post-op complications noted	44% noted bladder perforations (*n* = 1–5 in 90% of perforations) 37% *de novo* DO 28% voiding abnormality > 6 weeks	

Study	Study type and EL	No. patients	Patient characteristics	Intervention	Length of follow-up	Outcome measures	Effect size	Additional comments
						TVT + Concomitant prolapse surgery	69% (34% of urologist, 76% of gynaecologists)	
						Follow-up of patients	17% follow-up at 6 weeks 19% at 3 months 21% at 6 months 17% at 1 year 4% > 1 year 4% no follow-up 2% follow-up by nurses 1% by junior doctors 6% by other health professional 81% surgeons willing to audit their outcome data	

H.2 2013 evidence table

Urinary incontinence (update)

Percutaneous PTNS vs NAT for OAB

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Finazzi-Agro,E., Petta,F., Sciobica,F., Pasqualetti,P., Musco,S., Bove,P., Percutaneous tibial nerve stimulation effects on detrusor overactivity incontinence are not due to a placebo effect: a randomized, double-blind, placebo controlled trial, Journal of Urology, 184, 2001-2006, 2010 **Ref Id** 100210 **Country/ies where the study was carried out** Italy **Study type** Randomised controlled trial	**Sample size** N = 35 PTNS = 18 Placebo = 17 **Characteristics** Gender - Female/N (% female) PTNS = 18/18 (100%) Placebo = 17/17 (100%) Age (years) - Mean [SD not reported] PTNS = 44.9 years Placebo = 45.5 years Incontinence episodes/3 days - Mean ± SD (N) PTNS = 4.1 ± 1.8 (18) Placebo = 4.2 ± 2.1 (17) Detrusor overactivity - n/N(%) PTNS = 18/18 (100%) Placebo = 17/17 (100%) Duration of OAB - Mean ± SD Not reported Episodes of frequency/day - Mean ± SD	**Interventions** Intervention = 12, 30-minute PTNS sessions, performed 3 times a week. Placebo = 12, 30-minute sham stimulation sessions, performed 3 times a week.	**Details** PTNS A 34 gauge needle was inserted percutaneously approximately 5cm cephalad to the medial malleolus of the right or left ankle. A surface electrode was placed on the medial aspect of the ipsilateral calcaneus. Needle and electrode were connected to a low voltage (9V) electrical stimulator. Stimulation current (0 to 10mA) with a fixed frequency of 20Hz and a pulse width of 200msec was increased until flexion of the big toe or fanning of all toes. If no clear motor response, the needle was removed and insertion procedure repeated. The current was set at the highest level tolerable to the patient. Placebo A 34 gauge needle was inserted in the medial head	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day at end point Episodes of incontinence/3 days - measured by 3-day voiding diary - Mean (range) (N) PTNS = 1.8 (1.2 – 2.2) (17) Placebo = 3.8 (3.0 – 4.5) (15) Episodes of urgency Not reported Continence status Patients with a 50% or greater reduction in urge incontinence episodes were considered responders (recorded in 3-day voiding diary). PTNS = 12/17 (71%) Placebo = 0/15 (0%) Incontinence-specific quality of life at end point Scale used - Incontinence Quality of Life questionnaire (I-QOL) - Mean (range) (N) PTNS = 81.3 (73.4 – 89.2) (17) Placebo = 70.6 (62.2 – 79.1) (15) Adverse effects of treatment "No serious side effects were reported in either group but patients in both groups reported occasional transient	**Limitations** NICE guidelines manual.Appendix D: Methodology checklist: Randomised controlled trials Selection bias A1: appropriate randomisation - yes, "computer generated randomisation list" A2: adequate concealment - unclear A3: groups comparable at baseline - yes Level of bias: low Performance bias B1: same level of care for both groups - yes B2: participants blinded - yes B3: clinical staff blinded - unclear Level of bias: unclear Attrition bias C1: follow up equal for both groups - yes C2: groups comparable for dropout - yes, 1/18 in PTNS and 2/17 in placebo discontinued treatment due to personal reasons C3: groups comparable for missing data - yes Level of bias: low Detection bias

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Aim of the study

"To evaluate the efficacy of percutaneous tibial nerve stimulation in female patients with detrusor overactivity incontinence".

Study dates

February 2007 – February 2009

Source of funding

"Supported by a grant from Uroplasty, Inc".</td>
<td>PTNS = 13.6 ± 4.0 (18)
Placebo = 15.0 ± 5.7 (17)
<u>Incontinence-specific quality of life</u>
Scale used - Incontinence Quality of Life questionnaire (I-QOL) - Mean (range)
PTNS = 69.6 (65.8 – 73.3)
Placebo = 69.5 (65.5 – 73.5)

Inclusion criteria

1] Female
2] Urge incontinence and urodynamically diagnosed detrusor overactivity incontinence
3] Unresponsive to behavioural and rehabilitation therapy or antimuscarinics
4] Able to give written, informed consent
5] 18 years or older
6] Mentally competent and able to understand all study requirements
7] Able to understand the procedures, advantages and possible side effects
8] Willing and able to complete a 3-day voiding diary and I-QoL questionnaire</td>
<td></td>
<td>of the gastrocnemius muscle. Stimulator was briefly activated for approximately 30 seconds so the patient felt a minor electrical sensation in the skin and turned off for the rest of the treatment.

Power calculation

With a sample size of 15 in each group this study had a power of 82.3% to yield a statistically significant result assuming that the difference in proportions was 0.45. This magnitude is reasonable according to previous published findings. A 10% dropout rate was accounted for.

Intention to treat analysis

Not reported</td>
<td>pain at the stimulation site"
<u>Psychological outcomes</u>
Not reported
<u>Clinical measures</u>
Not reported

Continence status

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>12</td><td>18</td></tr>
<tr><td>Control</td><td>0</td><td>17</td></tr>
</table>

Adverse effects

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>0</td><td>18</td></tr>
<tr><td>Control</td><td>0</td><td>17</td></tr>
</table>
</td>
<td>D1: follow up appropriate length - unclear, "after 12 treatments", exact timing of outcome assessment not reported
D2: outcomes defined precisely - yes
D3: valid and reliable methods used to assess outcome - yes
D4: investigators blind to intervention - yes "results were collected by 2 physicians and analysed by a third physician and a statistican, both of whom were blinded regarding the procedure used in any single patient"
D5: investigators blinded to confounding factors - unclear
Level of bias: unclear

Indirectness

Does the study match the review protocol in terms of:
Population: Yes, All participants in the study had detrusor overactivity.
Intervention: Yes
Outcome: No. The main end point (reported here as continence status) was the number of responders. Response was defined as a 50% or greater reduction in incontinence episodes.
Indirectness: Some

Other information</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	9] Bladder capacity 100ml or greater 10] No signs of neurologic abnormalities at objective examination; no history of neurologic pathology 11] No pharmacological treatment or pharmacological treatment unchanged for 30 days before beginning the study **Exclusion criteria** 1] Pregnancy or intention to become pregnant during the study 2] Active urinary tract infection or recurrent urinary tract infections (more than 4 per year) 3] Presence of urinary fistula, bladder or kidney stones, interstitial cystitis, cytoscopic abnormalities that could be malignant 4] Diabetes mellitus 5] Cardiac pacemaker or implanted defibrillator				Participants in both groups were told that they may not have any perception of the electrical sensation due to adaptation. 1/18 in PTNS and 2/17 in placebo discontinued treatment due to personal reasons. 32/35 (91%) were assessed at end of study: PTNS = 17/18, placebo = 15/17. "To verify patient blindness with respect to assigned treatment we observed that patient concordance between type of administered treatment and type of believed treatment was low (60%). This concordance was not significantly different from chance (K = 0.18, *P* = 0.305) suggesting a low ability to recognise the received treatment."
Full citation Peters,K.M., Carrico,D.J., Perez-Marrero,R.A.,	**Sample size** N = 220 PTNS = 110	**Interventions** Intervention = 12 weekly 30-	**Details** <u>PTNS</u> A 34 gauge needle	**Results** <u>Patient satisfaction with treatment at week 13</u>	**Limitations** NICE guidelines manual.Appendix D: Methodology checklist:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Khan,A.U., Wooldridge,L.S., Davis,G.L., Macdiarmid,S.A., Randomized trial of percutaneous tibial nerve stimulation versus Sham efficacy in the treatment of overactive bladder syndrome: results from the SUmiT trial, Journal of Urology, 183, 1438-1443, 2010 **Ref Id** 110327 **Country/ies where the study was carried out** United States **Study type** Randomised controlled trial **Aim of the study** "To assess the efficacy of PTNS compared to a validated sham intervention in subjects with OAB." **Study dates**	Placebo = 110 **Characteristics** Gender - Female/N (% female) PTNS = 86/110 (78.2%) Placebo = 88/110 (80.0%) Age (years) - Mean ± SD PTNS = 62.5 (SD not reported) Placebo = 60.2 (SD not reported) Incontinence episodes/day - Mean ± SD Not reported Detrusor overactivity - n/N(%) Not reported Duration of OAB (years) - Mean ± SD PTNS = 10.2 ± 11.5 Placebo = 9.8 ± 10.4 Self reported rate of absolute symptoms *Episodes of incontinence (defined as an accident associated with moderate or severe urgency): Scale used - 3-day voiding diary - Mean ± SD (N) PTNS = 3.4 ± 3.5 (110) Placebo = 3.1 ± 3.5	minute PTNS sessions Placebo = 12 weekly 30-minute sham sessions	electrode was inserted at a 60 degree angle approximately 5cm cephalad to the medial malleolus and slightly posterior to the tibia. PTNS surface electrode was placed on the ipsilateral calcaneus as well as 2 inactive sham surface electrodes, 1 under the little toe and 1 on the top of the foot. The PTNS lead set was connected to the Urgent PC stimulator and a current level of 0.5 to 9mA at 20Hz was selected based on each subject's foot and plantar motor and sensory responses. Placebo A Streitberger placebo needle was used to stimulate the location and sensation of PTNS needle electrode insertion. An inactive PTNS surface electrode was placed on the ipsilateral calcaneus. Two active TENS surface electrodes were placed, 1 under the little toe and 1 on top of the foot. Sham stimulation parameters were determined based on subject first sensory level of localised stimulation through a TENS unit.	Scale used – 7-level global response assessment (GRA). "Responder was defined as moderately or markedly improved". PTNS = 60/110 (54.5%) Placebo = 23/110 (20.9%) Self reported rate of absolute symptom reduction at week 13 *Episodes of incontinence (defined as an accident associated with moderate or severe urgency): Scale used - 3-day voiding diary - Mean ± SD (N) PTNS = 1.4 ± 2.4 (103) Placebo = 1.9 ± 2.6 (105) *Episodes of urgency (defined as voids with moderate/severe urgency): Scale used - 3-day voiding diary - Mean ± SD (N) PTNS = 4.6 ± 3.6 (103) Placebo = 6.1 ± 4.2 (105) * Data supplied by author Continence status Not reported Incontinence-specific quality of life change from baseline to week 13 Scale used - Overactive Bladder Questionnaire (OAB-q) Symptom Severity Score - Mean ± SD (N) PTNS = −36.7 ± 21.5 (101) Placebo = −29.2 ± 20.0 (102) [lower score is better] Scale used - Short Form-36 (SF-36) - Mean ± SD (N) PTNS = 34.2 ± 21.3 (103) Placebo = 20.6 ± 20.6 (105) [higher score is better] Adverse effects of treatment at week 13 Ankle bruising	Randomised controlled trials Selection bias A1: appropriate randomisation - yes "random block design stratified by investigational site" A2: adequate concealment - unclear A3: groups comparable at baseline - yes Level of bias: low Performance bias B1: same level of care for both groups - yes B2: participants blinded - yes B2: clinical staff blinded -unclear Level of bias: unclear Attrition bias C1: follow up equal for both groups - yes C2: groups comparable for dropout - unclear, 4/110 in PTNS and 1/110 in placebo "withdrew consent" prior to week 13 C3: groups comparable for missing data - unclear, 3/110 in PTNS and 4/110 in placebo did not contribute data to analysis due to "lost to follow-up" or "other". Level of bias: unclear Detection bias D1: follow up appropriate length - unclear, outcome measurement was performed at week 13 after 12 weeks of treatment D2: outcomes defined precisely - yes D3: valid and reliable methods used to assess outcome - yes D4: investigators blind to intervention - yes "study

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>September 2008 – January 2009

Source of funding

Supported by Uroplasty, Inc.</td>
<td>(110)
*Episodes of urgency (defined as voids with moderate/severe urgency):
Scale used - 3-day voiding diary - Mean ± SD (N)
PTNS = 8.5 ± 4.2 (110)
Placebo = 8.2 ± 4.5 (110)
* Data supplied by author

Inclusion criteria

1] Women and men more than or equal to 18 years
2] A score of more than or equal to 4 on the OAB-q short form for urgency
3] Average urinary frequency of more than or equal to 10 voids per day
4] Self reported bladder symptoms more than or equal to 3 months
5] Self-reported failed conservative care
6] Discontinued all antimuscarinics for more than or equal to 2 weeks
7] Capable of giving informed consent
8] Ambulatory and able to use toilet</td>
<td></td>
<td>Power calculation

A sample size estimate of around 214 subjects, 107 per study arm was calculated using a 2 sided-Fisher's exact binomial test based on an estimated 60% responder rate in the PTNS group and a 40% responder rate in the sham group with a 5% significance level and 80% power.

Intention to treat analysis

"An intent to treat analysis which counted any subject not assessed at 13 weeks as a failure was planned for the study primary end point."</td>
<td>PTNS = 1/110 (0.9%)
Placebo = 0/110 (0%)
Discomfort at needle site
PTNS = 2/110 (1.8%)
Placebo = 0/110 (0%)
Bleeding at needle site
PTNS = 3/110 (2.7%)
Placebo = 0/110 (0%)
Tingling in the leg
PTNS = 1/110(0.9%)
Placebo = 0/110 (0%)
<u>Psychological outcomes</u>
Not reported
<u>Clinical measures</u>
Not reported

Patient satisfaction with treatment
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>60</td><td>110</td></tr><tr><td>Control</td><td>23</td><td>110</td></tr></table>
Incontinence episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>1.40</td><td>2.40</td><td>103</td></tr><tr><td>Control</td><td>1.90</td><td>2.60</td><td>105</td></tr></table></td>
<td>coordiantors who administered questionnaires and reviewed voiding diary outcome measures were blinded to the assigned treatment intervention throughout the trial."
D5: investigators blinded to confounding factors - unclear
Level of bias: unclear

Indirectness

Does the study match the review protocol in terms of:
Population: Yes (although unclear whether participants were refractory to drug treatment).
Intervention: Yes
Outcome: Yes
Indirectness: None

Other information

All participants were informed that they may or may not feel a sensory stimulus effect on their lower extremities as a result of the intervention.
Participants were assessed at week 13 after receiving 12 weeks of intervention sessions. 208/220 (95%) were evaluated at week 13; PTNS = 103/110, placebo = 105/110.
At week 13 the percentage of subjects who correctly identified their randomised intervention assignment was equivalent</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>independently without difficulty
9] Capable and willing to follow all study-related procedures

Exclusion criteria

1] Pregnant or planning to become pregnant during the study duration
2] Neurogenic bladder
3] Botox use in bladder or pelvic floor muscles within past one year
4] Pacemakers or implantable defibrillators
5] Current urinary tract infection
6] Current vaginal infection
7] Use of interstim
8] Use of Bion
9] Current use of TENS in pelvic region, back or legs
10] Previous PTNS treatment
11] Use of investigational drug/device therapy within past 4 weeks
12] Participation in any clinical investigation involving or impacting gynecologic, urinary or renal function within past 4 weeks</td>
<td></td>
<td></td>
<td>Urgency episodes

<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>4.60</td><td>3.60</td><td>103</td></tr><tr><td>Control</td><td>6.10</td><td>4.20</td><td>105</td></tr></table>
Incontinence QOL

<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>-36.70</td><td>21.50</td><td>101</td></tr><tr><td>Control</td><td>-29.20</td><td>20.00</td><td>102</td></tr></table>
Adverse effects

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>6</td><td>110</td></tr><tr><td>Control</td><td>0</td><td>110</td></tr></table></td>
<td>between groups (52% in PTNS group, 58% in sham group), confirming the validity of the sham model.</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments

Full citation

Finazzi-Agro,E., Rocchi,C., Pachatz,C., Petta,F., Spera,E., Mori,F., Sciobica,F., Marfia,G.A., Percutaneous tibial nerve stimulation produces effects on brain activity: Study on the modifications of the long latency somatosensory evoked potentials, Neurourology and Urodynamics, 28, 320-324, 2009

Ref Id

131537

Country/ies where the study was carried out

Italy

Study type

Randomised controlled trial.

Aim of the study

To evaluate long-latency somatosensory evoked potentials in patients with overactive bladder

Sample size

N = 24
PTNS = 16
Placebo = 8

Characteristics

Gender - Female/N (% female)
PTNS = 16/16 (100%)
Placebo = 8/8 (100%)
Age (years) - Mean ± SD
PTNS = 47 ± 10.5
Placebo = 42 ± 7
Incontinence episodes/day - Mean ± SD
Not reported
Detrusor overactivity - n/N (%)
Not reported
Duration of OAB (months) - Mean (range)
PTNS = 23 (6 – 48)
Placebo = 20 (6 – 52)

Inclusion criteria

1] Female patients (male patients were excluded to minimise the variables in analysing patients population)

Interventions

Intervention = 12, 30-minute PTNS sessions, performed 3 times a week for 4 weeks
Placebo = 12, 30-minute sham stimulation sessions, performed 3 times a week for 4 weeks

Details

Intervention
A 34 gauge needle was inserted percutaneously 5cm proximal to the medial malleolus of the right and left ankle alternatively. A surface electrode was placed over the ipsilateral calcaneus. A low voltage electrical stimulator furnished a stimulation current of (0 to 10mA) with a fixed frequency of 20Hz and a pulse width of 200msec. Stimulation current was increased until flexion of the big toe or fanning of all toes. The current was set at the highest level tolerable to the patient.
Placebo
A 34 gauge needle was inserted in the medial head of the gastrocnemius muscle. Stimulator was briefly activated for approximately 30 seconds so the patient felt a minor electrical sensation in the skin and turned off for the rest of the treatment.

Power calculation

Results

Patient satisfaction with treatment
Not reported
Self reported rate of absolute symptom reduction per day
Episodes of incontinence:
Not reported
Episodes of frequency:
Not reported
Continence status
Scale used – "Patients showing reduction > 50% of urgency episodes were defined 'responders' to treatment." (3-day voiding diary used at baseline, unclear whether this was used to measure outcome)
PTNS = 10/16 (62.5%)
Placebo = 0/8 (0%)
Incontinence-specific quality of life
Not reported
Adverse effects of treatment
Not reported
Psychological outcomes
Not reported
Clinical measures
Not reported

Continence status

	Events	Total
Experimental	10	16

Limitations

NICE guidelines manual.Appendix D: Methodology checklist: Randomised controlled trials
Selection bias
A1: appropriate randomisation - unclear "randomly assigned to group A (PTNS) or gorup B (sham PTNS)."
A2: adequate concealment - unclear
A3: groups comparable at baseline - unclear
Level of bias: unclear
Performance bias
B1: same level of care for both groups - yes
B2: participants blinded - unclear
B2: clinical staff blinded - unclear
Level of bias: unclear
Attrition bias
C1: follow up equal for both groups - unclear
C2: groups comparable for dropout - yes, all participants completed treatment
C3: groups comparable for missing data - yes, all partiicpants contributed data to analysis
Level of bias:low
Detection bias
D1: follow up appropriate length - unclear, not specified when outcome measurement performed
D2: outcomes defined precisely: yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
syndrome treated by means of PTNS. **Study dates** Not reported **Source of funding** Research grant: Uroplasty	2] Presence of OAB syndrome nonresponding to conventional treatments (behavioural and rehabilitative therapy, antimuscarinics), lasting since at least 6 months. OAB syndrome was diagnosed by means of OAB-q SF part A questionnaire (score >20%). 3] Presence of at least three urgency episodes in 3 days in a 3-day bladder diary. **Exclusion criteria** 1] Urinary tract infections 2] Pregnancy 3] Age under 18 years 4] Central or peripheral neurological disorders 5] Severe cardiopulmonary disease		With the proposed sample size, the study power to yield a statistically significant result was estimated to be of 99.3%. **Intention to treat analysis** Not reported	**Control** 0 8	D3: valid and reliable methods used to assess outcome -unclear D4: investigators blind to intervention - unclear D5: investigators blinded to confounding factors - unclear Level of bias: unclear **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: No. Sessions were performed three times per week. Outcome: No. The main end point (reported here as continence status) was the number of responders. Response was defined as a 50% or greater reduction in incontinence episodes. Indirectness: Serious **Other information** Focus of study was "effects of neuromodulation technique on the activity of cerebral centers". Number of controls was chosen to be significantly lower than those of patients for ethical considerations. A significant reduction of OAB-q SF part A acore was also noticed only in patients who underwent PTNS (from 83% to 42%, *P* =

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					0.001).

Percutaneous PTNS versus drugs

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Peters,K.M., MacDiarmid,S.A., Wooldridge,L.S., Leong,F.C., Shobeiri,S.A., Rovner,E.S., Siegel,S.W., Tate,S.B., Jarnagin,B.K., Rosenblatt,P.L., Feagins,B.A., Randomized trial of percutaneous tibial nerve stimulation versus extended-release tolterodine: results from the overactive bladder innovative therapy trial, Journal of Urology, 182, 1055-1061, 2009 **Ref Id** 100388 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** To compare the effectiveness of PTNS with tolterodine extended release for the treatment of OAB	**Sample size** N = 100 Percutaneous Tibial Nerve Stimulation (PTNS) = 50 Tolterodine extended release (TOL ER) = 50 **Characteristics** Gender - Female/N (% female) PTNS = 48/50 (96%) TOL ER= 46/50 (92%) Age (years) - Mean ± SD PTNS = 57.5 ± 15.2 TOL ER = 58.2 ± 11.3 Incontinence episodes/ days Not reported Episodes of urgency/day Not reported	**Interventions** PTNS given as 12 weekly 30 minute sessions using Urgent PC (an office based neuromodulation system to deliver retrograde srimulation to the sacral nerve plexus through percutaneous electrical stimulation of the posterior tibial nerve via temporary insertion of a 34 gauge needle electrode, slightly cephalad to the medial malleolus. TOL ER given as 4mg daily for 90 days with a drcrease to 2 mg/day if intolerability was experienced.	**Details** A standardized checklist was used at weekly visit to elicit information about adverse effects and to keep number of clinical contacts equal in both groups **Power calculation** Sample size calculated on assumptions of a significance level of 5%, power of 80% and expected mean reduction in b=voids of 1.8 for TOL ER and 3.6 for PTNS. **Intention to treat analysis** Not reported	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Incontinence epidoses Not reported Episodes of urgency Not reported Continence status Investigator rated as cured PTNS = 2/50 (4%) TOL ER= 2/50 (4%) Incontinence-specific quality of life Scale used: OAB-q Health related QoL score PTNS: 25.3 ± 21.5 (N = 44) TOL ER: 22.1 ± 20.7 (N = 43) Adverse effects of treatment PTNS: 8/49 (16.3%) TOL ER: 7/49 (14.3%) Psychological outcomes Not reported Clinical measures Not reported **Continence status**	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>Selection bias</u> A1: appropriate randomisation - yes, "random block design stratified by study site" A2: adequate concealment - unclear - not reported A3: groups comparable at baseline - yes Level of bias: low <u>Performance bias</u> B1: same level of care for both groups - yes B2: participants blinded - no B3: clinical staff blinded - no Level of bias: some <u>Attrition bias</u> C1: follow up equal for

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study dates

June 2006 to September 2008

Source of funding

Supported by Uroplasty, Inc.</td>
<td>Detrusor overactivity
Not reported

Duration of OAB (Years) - Mean ± SD
PTNS: 9.8 ± 12.3
TOL ER: 9.4 ± 12.1

Inclusion criteria

1] ambulatoory adults with OAB symptoms with or without prior anticholinergic use
2] at least 8 voids per 24 hours documented by history and diary

Exclusion criteria

1] OAB pharmacotherapy within previous month
2] primary complaint of stress urinary incontinence
3] demonstrated sensitivity to tolterodine or its ingredients
4] pacemakers or implantable defibrillators
5] excessive bleeding
6] urinary or gastric retention</td>
<td></td>
<td></td>
<td>
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>2</td><td>50</td></tr>
<tr><td>Control</td><td>2</td><td>50</td></tr>
</table>
Incontinence QOL
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>25.30</td><td>21.50</td><td>44</td></tr>
<tr><td>Control</td><td>22.10</td><td>20.70</td><td>43</td></tr>
</table>
Adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>8</td><td>49</td></tr>
<tr><td>Control</td><td>7</td><td>49</td></tr>
</table>
</td>
<td>both groups - yes
C2: groups comparable for dropout - yes, 6/50 in PTNS and 7/50 in TOL ER
C3: groups comparable for missing data - yes
Level of bias: low

<u>Detection bias</u>
D1: follow up appropriate length - yes
D2: outcomes defined precisely - yes
D3: valid and reliable methods used to assess outcome - yes
D4: investigators blind to intervention - no
D5: investigators blinded to confounding factors - unclear
Level of bias: low

Indirectness

Does the study match the review protocol in terms of:
Population: Yes
Intervention: Yes
Outcome: Yes.
Indirectness: None</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	7] nerve damage or neuropathy 8] uncontrolled narrow angle glaucoma 9] positive urinalysis for infection or pregnancy 10] current pregnancy 11] planning of becoming pregnant during trial period				**Other information** Inadequate reporting of adverse effects as it is not clear how many in each group experienced any adverse effect.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Svihra,J., Kurca,E., Luptak,J., Kliment,J., Neuromodulative treatment of overactive bladder--noninvasive tibial nerve stimulation, Bratislavske Lekarske Listy, 103, 480-483, 2002 **Ref Id** 125307 **Country/ies where the study was carried out** Slovakia **Study type** Randomized controlled trial **Aim of the study** "To produce non-invasive stimulation and achieve comparable effect by superficial electrode without iatrogenic damage to the tibial nerve" **Study dates**	**Sample size** N = 28 Transcutaneous PTNS = 9 Oxybutynin = 10 No treatment = 9 **Characteristics** Gender - Female/N (% female) Transcutaneuos PTNS = 9/9 (100%) Oxybutynin = 10/10 (100%) No treatment = 9/9 (100%) Age Average = 54 years Range = 45 - 63 years Incontinence episodes - Mean ± SD (N) Not reported Urgency episodes - Mean ± SD (N)	**Interventions** Transcutaneous PTNS (Stoller afferent nerve stimulation) 30 mins once a week for 5 weeks. Oxybutynin 5mg three times a day No treatment	**Details** An electromyographic device Nicolet Viking IIE was used. The patient stayed in a horizontal position on her back and the the electrodes were placed behind the medial ankle of the left lower extremity. Cathode was placed proximally and anode distally. After control stimulation accompanied by optimalization of the electrode position and set intensity of the stimulation of tibial nerve. Intensity of the surface SANS was equal to 70% of intensity. Frequency of stimulation was 1 HZ and duration of square impulse was 0.1ms. Surface stimulation of 30 mins duration was repeated once a week for 5 weeks.	**Results** Patient satisfaction with treatment Transcutaneous PTNS: 5/9 Oxybutynin: Unclear No Treatment: 0/9 Self reported rate of absolute symptom reduction per day Not reported Continence status Not reported Incontinence-specific quality of life at end point Not reported Adverse effects of treatment Transcutaneous PTNS: 0/9 Oxybutynin: 2/10 No treatment: 0/9 Psychological outcomes Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials Selection bias A1: appropriate randomisation - Unclear - sys women were randomly chosen for each group A2: adequate concealment - unclear A3: groups comparable at baseline - Unclear Level of bias: unclear Performance bias B1: same level of care for both groups - Unclear B2: participants blinded - Unclear B3: clinical staff blinded - unclear Level of bias:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Not reported **Source of funding** Ministry of Education of the Slovak Republic	Not reported <u>Detrusor overactivity - n/N(%)</u> Not reported <u>Duration of OAB - Mean ± SD</u> Not reported **Inclusion criteria** 1] Overactive bladder without bladder outlet obstruction **Exclusion criteria** None reported			<u>Clinical measures</u> Not reported	unclear <u>Attrition bias</u> C1: follow up equal for both groups - unclear C2: groups comparable for dropout - Yes C3: groups comparable for missing data - No Level of bias: unclear <u>Detection bias</u> D1: follow up appropriate length - unclear D2: outcomes defined precisely - no D3: valid and reliable methods used to assess outcome - no D4: investigators blind to intervention - unclear D5: investigators blinded to confounding factors - unclear Level of bias: unclear **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					None
Full citation Bellette,P.O., Rodrigues-Palma,P.C., Hermann,V., Riccetto,C., Bigozzi,M., Olivares,J.M., [Posterior tibial nerve stimulation in the management of overactive bladder: a prospective and controlled study]. [Spanish], Actas Urologicas Espanolas, 33, 58-63, 2009 **Ref Id** 132186 **Country/ies where the study was carried out** Brazil **Study type** Randomized controlled trial **Aim of the study** "To evaluate the impact of transcutaneous posterior tibial nerve electrical stimulation on the quality of life of women with clinical symptoms of OAB"	**Sample size** N = 37 Transcutaneous stimulation = 21 Sham stimulation = 16 **Characteristics** Gender - Female/N (% female) Transcutaneous = 21/21 (100%) Sham = 16/16 (100%) Age Mean ± SD 47.73 ± 10.9 years Incontinence episodes - Mean ± SD (N) Not reported Urgency episodes - Mean ± SD (N) Not reported Detrusor overactivity - n/N(%) Not reported	**Interventions** Transcutaneous posterior tibial nerve stimulation 8 30 mins sessions twice weekly Sham stimulation 8 30m mins sessions twice weekly without electricity	**Details** Transcutaneous stimulation was given using a Dualplex 961 device, with positioning of electrodes over tibial nerve according to Amarenco 2003	**Results** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status*</u> Transcutaneous: 12/21 Sham: 16/15 <u>Incontinence-specific quality of life change scores (Mean ± SD N)</u> <u>OAB-q total score</u> Transcutaneous: 31.73 ± 23.44 N = 21 Sham: 15.71 ± 19.46 N = 16 <u>Adverse effects of treatment</u> Transcutaneous: 0/21 Sham: 0/16 <u>Psychological outcomes</u> Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>Selection bias</u> A1: appropriate randomisation - Unclear A2: adequate concealment - unclear A3: groups comparable at baseline - Unclear Level of bias: unclear <u>Performance bias</u> B1: same level of care for both groups - Unclear B2: participants blinded - Unclear B3: clinical staff blinded - unclear Level of bias: unclear <u>Attrition bias</u> C1: follow up equal for both groups - unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Not reported	Duration of OAB - Mean ± SD 6.86 ± 7.06 years Micturitions per day - Mean (No SD reported) Trabscutaneous: 11.35 Sham: 13.88 **Inclusion criteria** 1] Age between 18 and 65 2] Presence of overactive bladder symptoms for more than 6 months 3] Urinary frequency greater than 8 micturitions per day 4] episodes of nocturia and/or urinary urgency **Exclusion criteria** 1] pregnancy 2] neurological problems 3] pronounced dystopias (ICS Stage II or III) 4] urinary infection 5] stress urinary incontinence			<u>Clinical measures</u> Not reported *we used number who has no symptoms of urgency as a proxy for being 'continent'	C2: groups comparable for dropout - Yes C3: groups comparable for missing data - Unclear Level of bias: unclear <u>Detection bias</u> D1: follow up appropriate length - unclear D2: outcomes defined precisely - Yes D3: valid and reliable methods used to assess outcome - no D4: investigators blind to intervention - unclear D5: investigators blinded to confounding factors - unclear Level of bias: unclear **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments

In women with OAB, what is the comparative effectiveness of pharmacological interventions?

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Chapple,C., DuBeau,C., Ebinger,U., Rekeda,L., Viegas,A., Darifenacin treatment of patients >or= 65 years with overactive bladder: results of a randomized, controlled, 12-week trial, Current Medical Research and Opinion, 23, 2347-2358, 2007 **Ref Id** 100152 **Country/ies where the study was carried out** United Kingdom, United States, Poland, South Africa, Hungary, Sweden, Germany **Study type** Randomized controlled trial **Aim of the study** "To evaluate the efficacy, tolerability and safety, and associated QoL in patients ≥ 65 years with OAB following 12 weeks of darifenacin treatment"	**Sample size** N = 400 Darifenacin = 266 Placebo = 144 **Characteristics** Gender - Female/N (% female) DAR: 206/266 (77.4%) PLA: 100/133 (75.2% Age (years) - Mean ± SD DAR: 72 ± 5 PLA: 73 ± 5 Incontinence episodes/week - Median (range) DAR: 19.8 (4 - 142) PLA: 21 (7 - 155.4) Urgency episodes/day - Median (range) DAR: 7.6 (1 - 24.4) PLA: 7.4 (1.3 - 22.2) Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported	**Interventions** Following a 2-week screening period, candidates entered a 1-week placebo run-in peroid. Eligible patients were then allocated to Darifenacin 7.5 mg qd or placebo. After 2 weeks dose could be titrated up to Darifenacin 15mg qd or sham titration	**Details** Efficacy was based on 3-day diaries completed prior to clinical visit at week, 1, 2 and 6. A seven-day diary was completed at baseline and 12 weeks. Tolerability and safety were monitored throughout the study. Post-void residual volumes were recorded at week 12 A standard 12-lead ECG was conducted on day 1 and week 12. Vital signs and laboratory variables were assessed at screening and study end. **Power calculation** Sample size calculation was based on a previous study and the aim was to include 399 patients. This number was expected to achieve 81% power for the primary efficacy variable and a probability of 0.59 for darifenacin superiority over placebo usning a 2-sided Wilcoxon rank sum test with an assumed dropout rate of 5%	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day Incontinence episodes - reported as mean change from baseline DAR: - 2 (no SD) N = 166 PLA: -1.86 (no SD) N = 133 Urgency episodes - reported as mean change from baseline DAR: -13.3 (no SD) N = 266 PLA: -13.1 (no SD) N = 133 Continence status (zero episodes per day)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Study was funded by Novartis Pharmaceuticals Inc.	**Inclusion criteria** 1] OAB symptoms ≥ 6 months 2] aged ≥ 65 years 3] capable of independent toileting 4] able to complete the diary independently **Exclusion criteria** 1] treatment with drugs known to affect urinary bladder function or the external urethral sphincter 2] a total daily volume > 3000ml 3] mean volume voided per micturition of > 300ml 4] clinically significant stress urinary incontinence or bladder outlet obstruction 5] post-void residual urinary volume > 100ml 6] women with marked cystocele or other clinically significant Stage 3 or Stage 4 pelvic prolapse 7] had received bladder training or received electric stimulation within 3 months of screening 8] serious or intermittent urinary tract infection 9] any clinically significant congenital or acquired disorder of the urinary tract 10] any urinary bladder dysfunction (other than OAB) 11] a history of chronic pain syndrome of the low urinary tract 12] other significant medical conditions which in the triallists		**Intention to treat analysis** Last observation carried forward (LOCF) was used where variables were missing if at least 1 dose of Darifenacin or placebo was taken.	Incontinence episodes DAR: 80/266 (30.7%) PLA: 21/134 (15.7%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Scale used - OAB-q - mean change from baseline DAR: 20.9 (no SD) N = 266 PLA: 15.3 (no SD) N = 133 <u>Adverse effects</u> Any adverse effect DAR: 99/266 (37.2%) PLA: 24/134 (19%) Dry mouth DAR: 59/266 (22.2%) PLA: 5/134 (3.8%) Dropouts for any reason DAR: 22/266 (8.3%) PLA: 17/134 (12.7%)	C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	opinion made them an unsuitable candidate for the study			Dropouts for adverse effects DAR: 12/266 (4.5%) PLA: 9/134 (6.7%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Mean change from baseline (95% CI) DAR: 11.9 (1.7 to 22.1) ml N = 266 PLA: 17.3 (-18.1 to 52.8) ml N = 133	**Other information** None
Full citation Chapple,C., Van,Kerrebroeck P., Tubaro,A., Haag-Molkenteller,C., Forst,H.T., Massow,U., Wang,J., Brodsky,M., Clinical efficacy, safety, and tolerability of once-daily fesoterodine in subjects with overactive bladder.[Erratum appears in Eur Urol. 2008 Jun;53(6):1319], European Urology, 52, 1204-1212, 2007	**Sample size** N = 1135 Tolterodine extended release 4mg = 290 Fesoterodine 4mg = 272 Fesoterodine 8mg = 288 Placebo = 285 **Characteristics** <u>Gender - Female/N (% female)</u> TOL ER 4mg = 226/290 (78%) FES 4mg = 220/272 (81%)	**Interventions** Patients were randomised to one of four treatments once daily for 12 weeks: tolterodine ER 4mg fesoterodine 4mg fesoterodine 8mg placebo	**Details** All patients recruited into the trial entered a two-week placebo 'wash out' phase in which they received either a capsule (tolterodine placebo) or a tablet (fesoterodine placebo). For assessment of efficacy, patients were required to complete a 3-day micturition diary noting the time of each micturition and/or urgency	**Results** **Week 4** No data reported **Week 12** <u>Patient satisfaction with treatment</u> reported as response TOL ER 4mg: 72/290 (24.8%) FES 4mg: 75/272 (27.6%) FES 8mg: 79/288	**Limitations** NICE guidelines manual. bAppendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Yes - computer-generated schedule A2 - Was there adequate

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 100153 **Country/ies where the study was carried out** Belgium, Bulgaria, Czech Republic, Estonia, France, Germany, Hungary, Italy, the Netherlands, Poland, Romania, Russia, Spain, Ukraine, United Kingdom, South Africa, Australia and New Zealand **Study type** Randomised controlled trial **Aim of the study** "To investigate the efficacy, tolerability, and safety of fesoterodine 4 and 8 mg versus placebo in subjects with OAB." **Study dates** Not reported **Source of funding** The study was supported by Schwarz Biosciences GmbH and Pfizer Inc	FES 8mg = 235/287 (82%) Placebo = 229/283 (81%) <u>Age - Mean ± SD</u> TOL ER 4mg = 57.7 ± 14.6 years FES 4mg = 57.1 ± 13.2 years FES 8mg = 55.6 ± 14.1 years Placebo = 56.0 ± 13.7 years <u>Incontinence episodes (UUI) / day - Mean ± SD</u> TOL ER 4mg: 3.8 ± 3.1 FES 4mg: 3.8 ± 3.4 FES 8mg: 3.7 ± 3.0 Placebo: 3.7 ± 3.1 <u>Urgency episodes / day - Mean ± SD</u> TOL ER 4mg: 11.0 ± 3.4 FES 4mg: 11.0 ± 4.2 FES 8mg: 11.5 ± 4.2 Placebo: 11.4 ± 4.0 <u>Detrusor overactivity</u> Not reported <u>Duration of OAB (mean ± SD)</u> TOL ER 4mg =: 8.7 ± 10.1 years FES 4mg: 9.0 ± 11.2 years FES 8mg: 7.6 ± 8.4 years Placebo: 7.9 ± 9.6 years **Inclusion criteria** 1] ≥ 18 years old 2] ≥ 8 micturitions/24hr and ≥ 6 urgency episodes or ≥ 3 UUI episodes in 24hrs		episode, urine volume (each micturition), any episodes of incontinence and severity of urgency (1 = none; 2 = mild or 3 = moderate or 4 = severe) before visit 2 and days immediately preceding visits 3, 5 & 6. In addition, on one of the three days the patients had to record their micturition volume. Safety assessments were conducted at each clinic visit and after the safety follow-up. **Power calculation** Not reported. **Intention to treat analysis** Not described. Table 3 refers to LOCF used to calculate baseline and baseline to end of treatment in bladder efficacy variables.	(27.4%) Placebo: 53/285 (18.6%) <u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes - Mean ± sd (Change scores) TOL ER 4mg: -1.74 ± 2.39 N = 223 FES 4mg: -1.95 ± 2.40 N = 199 FES 8mg: -2.22 ± 2.40 N = 223 Placebo: -1.14 ± 2.32 N = 211 Urgency episodes TOL ER 4mg: -2.03 ± 3.20 N = 283 FES 4mg: -1.88 ± 3.26 N = 265 FES 8mg: -2.36 ± 3.22 N = 276 Placebo: -1.07 ± 3.17 N = 279 <u>Continence status</u> Incontinence episodes Not reported Urgency episodes	concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	3] Indicated OAB caused them at least moderate problems on a Likert scale 4] Negative pregnancy test **Exclusion criteria** 1] lower urinary tract pathology that could be responsible for urgency or incontinence (e.g. genuine SUI, bladder stones, interstitial cystitis, urothelial tumours) 2] pelvic prolapse (grade III or higher) 3] clinically relevant outlet obstruction 4] polyuria (> 3l per 24 hr) 5] symptomatic recurrent UTIs 6] postvoid residual volume (PVR) > 100ml 7] currently receiving treatment or treated within 2 wks of screening visit with antimuscarinic drugs 8] treated in past 4 wks with electrostimulation for bladder training 9] active UTI 10] underlying neurological disease causing their OAB symptoms 11] clinically relevant cardiac arrhythymia and/or unstable angina 12] QtcB interval > 500ms			Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse event TOL ER 4mg: 144/290 (49.7%) FES 4mg: 135/272 (49.6%) FES 8mg: 167/288 (58.2%) Placebo: 107/285 (37.5%) Dry mouth TOL ER 4mg: 49/290 (16.9%) FES 4mg: 59/272 (21.7%) FES 8mg: 97/288 (33.8%) Placebo: 20/285 (7.0%) Dropouts for any reason TOL ER 4mg: 37/290 (12.8%) FES 4mg: 42/272 (15.4%) FES 8mg: 37/288 (12.8%) Placebo: 34/285 (11.9%)	<u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** "After the start of the trial, the protocol was amended to ensure enrollment of the planned 80% of subjects with UUI at baseline; the

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Dropouts for adverse effects TOL ER 4mg: 9/290 (3.1%) FES 4mg: 7/272 (2.6%) FES 8mg: 14/288 (4.9%) Placebo: 6/285 (2.1%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume Not reported	amendment required ≥ 3 UUI episodes per 24 h in all remaining subjects".
Full citation Choo,M.S., Lee,J.Z., Lee,J.B., Kim,Y.H., Jung,H.C., Lee,K.S., Kim,J.C., Seo,J.T., Paick,J.S., Kim,H.J., Na,Y.G., Lee,J.G., Efficacy and safety of solifenacin succinate in Korean patients with overactive bladder: a randomised, prospective, double-blind, multicentre study, International Journal of Clinical Practice, 62, 1675-1683, 2008	**Sample size** N = 357 Solifenacin 5mg = 120 Solifenacin 10mg = 119 Tolterodine IR = 118 **Characteristics** Baseline characteristics: <u>Gender - Female/N (% female)</u> SOL 5mg: 90/107 (84.11%) SOL 10mg:83/111 (74.77%) TOL 4mg: 88/111 (79.28%)	**Interventions** Solifenacin 5mg once-daily Solifenacin 10mg once-daily Tolterodine immediate-release 4 mg All medications taken for 12 weeks.	**Details** All patients received two weeks of placebo medication twice-daily and after this patients were randomised to take solifenacin 5mg, 10mg or tolterodine 4mg. Three days before the second visit (4 weeks into the study), patients recorded episodes of urgency and urgency incontinence, times of voiding and volumes voided per void in a bladder diary. Patients visited the investigational sites at the	**Results** **Week 4** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes - Mean ± sd (endpoint scores) TOL IR 4mg: 0.90 ± 1.16 N = 100	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Unclear - Not reported A2 - Was there adequate

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 100168 **Country/ies where the study was carried out** Korea **Study type** Randomised Controlled Trial **Aim of the study** To compare the efficacy and tolerability of solifenacin 5 and 10 mg once daily and tolterodine 2mg twice daily in patients with symptoms of OAB. **Study dates** Not reported **Source of funding** Research grant received from Astellas Pharma, Inc. Toyko, Japan.	<u>Age - mean and SD</u> SOL 5mg: 53.07 ± 10.52 years SOL 10mg: 52.65 ± 12.7 years TOL 4mg: 53.05 ± 12.19 years <u>Incontinence episodes - mean and SD</u> SOL 5mg: 1.92 ± 2.19 SOL 10mg: 2.59 ± 2.91 TOL 4mg: 1.74 ± 1.55 <u>Incontinence episodes - mean and SD</u> SOL 5mg: 4.29 ± 3.45 SOL 10mg: 3.81 ± 3.04 TOL 4mg: 3.89 ± 3.12 <u>Detrusor overactivity</u> Not reported <u>Duration of OAB</u> Not reported **Inclusion criteria** 1] an average frequency of ≥ 8 voids per 24 hr 2] at least 3 episodes of urgency OR 3 episodes of urgency incontinence in the 3-day voiding diary period **Exclusion criteria** 1] clinicallly significant bladder		following intervals: - Screening (visit 1) - 2-week placebo run-in period (visit 2) - Week 4 (visit 3) - Week 8 (visit 4) - Week 12 (visit 5 = endpoint) The following data were collected at each visit: Mean daily micturition frequency; Mean micturition vol per voiding; Mean daily urgency incontinence freq; Mean daily no. of urgency episodes; Mean no. of nocturia episodes Adverse events elicited by general questioning by the investigator or volunteered by the patient. Weeks 4, 8 and 12 safety assessments were made and these inc. vital signs, physical exam and electrocardiograms and AE recordings. Baseline and 12 weeks: PVR volume was assessed by bladder scanning. Quality of life was assessed at baseline and endpoint using the King's Health	SOL 5mg: 0.97 ± 1.49 N = 98 SOL 10mg: 0.76 ± 1.10 N = 98 Urgency episodes TOL IR 4mg: 2.32 ± 2.86 N = 92 SOL 5mg: 2.32 ± 3.00 N = 83 SOL 10mg: 2.09 ± 2.49 N = 88 <u>Continence status</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Not applicable <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume Not reported **Week 12**	concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Unclear <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Unclear - Not reported Level of bias: Low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - No - more dropouts abd protocol violation in SOL 5mg group C3 - Were groups comparable for missing data - LOCF used Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	outlet obstruction 2] PVR volume of > 200ml; 3] incontinence for which stress was determined to be the predominant factor; 4] presence of a neurological cause for detrusor muscle overactivity; 5] evidence of urinary tract infection or bladder stones, previous pelvic irridation, or previous or current malignant disease in the pelvic organs; 6] any medical condition contraindicating the use of antimuscarinic medication; 7] non-pharmacological treatment for OAB including electrostimulation therapy or bladder training during the 2 weeks before or during the study; 8] use of any drugs with cholinergic or anticholinergic side effects and participation in a clinical trial within 30 days before study entry; 9] women of childbearing potential who were pregnancy or nursing, intending to become pregnant during the study, or who were not using reliable contraceptive methods were ineligible.		Questionnaire. **Power calculation** Not reported. **Intention to treat analysis** "For subject withdrawal, data available at the point of withdrawal were analysed. Missing data were accepted as such. Nonetheless, data analysis with the last observation carried forward (LOCF) method were performed and presented for efficacy analysis".	<u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes - Mean ± sd (endpoint scores) TOL IR 4mg: 0.67 ± 1.16 N = 100 SOL 5mg: 0.78 ± 1.76 N = 98 SOL 10mg: 0.72 ± 1.51 N = 98 Urgency episodes TOL IR 4mg: 1.68 ± 2.88 N = 100 SOL 5mg: 1.77 ± 2.74 N = 98 SOL 10mg: 1.42 ± 2.21 N = 98 <u>Continence status</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported	<u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable method used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of; 1] Population: Yes 2] Intervention: Yes 3] Outcomes: Yes Indirectness: None **Other information** Patients were regarded compliant if they had taken at least 70% of the required study medication.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				<u>Adverse effects</u> Any adverse effect Not reported Dry mouth TOL IR 4mg: 22/118 (18.6%) SOL 5mg: 9/120 (7.5%) SOL 10mg: 23/119 (19.3%) Dropout for any reason TOL IR 4mg: 18/118 (15.3%) SOL 5mg: 22/120 (18.3%) SOL 10mg: 21/119 (17.6%) Dropout for adverse event TOL IR 4mg: 2/118 (1.7%) SOL 5mg: 5/120 (4.2%) SOL 10mg: 7/119 (5.9%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume TOL IR 4mg: 4.8 ±	Data from SOL 5mg group used in meta-analysis based on BNF starting dose

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				31.5 N = 108 SOL 5mg: 8.4 ± 40.78 N = 110 SOL 10mg: 4.6 ± 50.5 N = 111	
Full citation Dmochowski,R.R., Sand,P.K., Zinner,N.R., Staskin,D.R., Trospium 60 mg once daily (QD) for overactive bladder syndrome: results from a placebo-controlled interventional study, Urology, 71, 449-454, 2008 **Ref Id** 100195 **Country/ies where the study was carried out** United states **Study type** Randomized controlled trial **Aim of the study** "To evaluate the effects of Trospium 60mg (QD) compared with placebo on urinary frequency, UUI, and other symptoms related to	**Sample size** N = 564 Trospium externder release (TRO ER) = 280 Placebo (PLA) = 284 **Characteristics** Gender - Female/N (% female) TRO ER: 230/280 (82.1%) PLA: 249/284 (87.7%) Age (years) - Mean ± SD* TRO ER: 61.2 ± 11.7 PLA: 58.4 ± 11.8 Number of incontinence episodes/week Mean ± SD* TRO ER: 4.0 ± 2.2 PLA: 4.0 ± 3.4 Urgency episodes Not reported Detrusor overactivity Not reported Duration of OAB - Mean ± SD Not reported	**Interventions** Subjects were allocated to receive Trospium extended release (60 mg) oral capsules or matching placebo once daily for 12 weeks	**Details** 3-day bladder diary was completed for visits at 1, 4 and 12 weeks. Urgency severity was measured ising the Indevus Urgency Severity Scale. The OAB Symptom Composite Score was used to assess the overall complex of OAB symptoms. Complaints and adverse effects were assessed at 1, 4 and 12 weeks. **Power calculation** Not reported **Intention to treat analysis** Last observation carried forward (LOCF) was used to account for any missing data	**Results** **Week 4** Patient satisfactiopn with treatment Not reported Self-reported rate of absolute symptoms reduction/day - Mean ± SD Incontinence episodes - change from baseline reported TRO ER: -2.3 ± 3.3 N = 267 PLA: -1.5 ± 3.3 N = 276 Urgency episodes Not reported Continence status (Zero episodes per day) Incontinence episodes TRO ER: 78/280	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - Randomizatyion was stratified by number of voids/day A2 - Was there adequate concealment - unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
OAB over a 12-week treatment period" **Study dates** September 2005 to June 2006 **Source of funding** Study supported by Esprit Phama and Indevas Pharmaceuticals INc	**Inclusion criteria** 1] aged ≥ 18 years 2] OAB ≥ 6 months 3] symptoms of urinary frequency (a mean of 10 or more toilet voids per day) 4] urgency (1 or more episodes of severe urgency related to toilet voids) 5] UUI (a mean of 1 or more UUI episodes per day) **Exclusion criteria** 1] total voided volume ≥ 3000ml/day or a mean volume volume voided/void ≥ 250ml 2] predominant stress, insensate or overflow incontinence 3] history of neurogenic bladder 4] history of indwelling or intermittent catheterization 5] history of significant renal disease (serum creatinine ≥ 1.5mg/dl) 6] uninvestigated hematuria 7] urinary tract infection during screening 8] history of > 3 urinary tract infections in previous 12 months 9] other baldder pathogies, including clinically significant urinary retention (postvoid residual volume > 100ml), cancer, institial cystitis			(27.8%) PLA: 48/284 (16.9%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Not reported at 4 weeks <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported **Week 12** <u>Patient satisfactiopn with treatment</u> Not reported <u>Self-reported rate of absolute symptoms reduction/day - Mean ± SD</u> UUI episodes - change from baseline reported TRO ER: -2.4 ± 3.3 N = 267	B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	10] a prostate specific antigen level ≥ 4 ng/ml, prostate cancer or chronic prostatitis			PLA: -1.6 ± 3.3 N = 276 Urgency episodes Not reported <u>Continence status (Zero episodes per day)</u> Incontinence episodes TRO ER: 95/280 (33.9%) PLA: 58/284 (20.4%) Urgency epsiodes Not reported <u>Incontinence-specific quality of life</u> OAB-SCS used TRO ER: - 9.9. (No SD) N = 267 PLA: -6.5 (No SD) N = 276 <u>Adverse effects</u> Any adverse effect TRO ER: 154/280 (55.0%) PLA: 130/284 (45.8%) Dry mouth TRO ER: 36/280 (12.9%) PLA: 13/284	Indirectness: None **Other information** SD for continuous data calculated by NCC-WCH from SEM reported Data for 'Dropout for any reason" taken from pooled analysis in "Dmochowski et al., 2010"

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				(4.6%) Dropout for any reason TRO ER: 37/280 (13.2%) PLA: 36/284 (12.3%) Dropouts for adverse effects TRO ER: 18/280 (6.4%) PLA: 8/284 (2.8%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	
Full citation Dmochowski,R.R., Peters,K.M., Morrow,J.D., Guan,Z., Gong,J., Sun,F., Siami,P., Staskin,D.R., Randomized, double-blind, placebo-controlled trial of flexible-dose fesoterodine in subjects with overactive bladder.[Erratum appears in Urology. 2010 Jun;75(6):1519], Urology, 75, 62-68, 2010	**Sample size** N = 896 Fesoterodine (FES) = 448 Placebo (PLA) = 448 **Characteristics** Gender - Female/N (% female) FES: 368//446 (82.1%) PLA: 364/448 (82.1%) Age (years) - Mean ± SD FES: 60.1 ± 12.9	**Interventions** Women were allocated to FES 4mg or matching placebo to be taken once daily with 4 hours of bedtime. After 2 weeks, women could, after a consultaion regarding efficacy and adverse effects, increase dose to FES 8mg once daily or sham dose escalation for the remaining 10 weeks. No dose adjustment were permitted after week 2.	**Details** Subjects completed a 3-day bladder diary before the baseline visit and at each subsequent visit. Subjects recorded all micturitions, including incontinence episodes. The Urinary Sensations Scale, Patient Perception of Bladder Condition and Urgency Perception Scale were also completed at baseline and all visits and the Overactive	**Results** **Week 4 results** Not reported **Week 12 results** Patient satisfaction with treatment FES: 310/448 (69.2%) PLA: 257/448 (57.4%) Self-reported rate of absolute	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - computer generated A2 - Was there adequate concealment - Unclear -

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 100197 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** The study assessed the efficacy, safety and tolerability of a flexible-dose regimen of fesoterdine in subjects with OAB. **Study dates** August 2007 to April 2008 **Source of funding** Study was funded by Pfizer Inc	PLA: 59.7 ± 13.7 Incontinence episodes/week - Mean ± SD Urge incontinence data used FES: 2.2 ± 2.7 PLA: 2.0 ± 1.9 Urgency episodes/day - Mean ± SD FES: 9.2 ± 4.3 PLA: 9.2 ± 3.8 Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported **Inclusion criteria** 1] OAB symptoms ≥ 3 months before screening 2] recorded mean of ≥ 8 micturitions per 24 hours and ≥ 3 urgency episodes per 24 in a 3-day bladder diary 3] rated their bladder problem condition as baseline as causing at least soome moderate problems using Patient Perception of Bladder Condition **Exclusion criteria** 1] history of acute urinary retention requiring catheterisation		Bladder Questionnaire **Power calculation** Using published studies it was calculated that 350 subjects per arm would provide ≥ 85% ppower to detect a difference in 24-hour micturitions using a 2-sided t test with a 0.05 significance level. **Intention to treat analysis** Not reported	symptom reduction per day (LS mean change from baseline, no SD reported) Incontinence episodes FES: -1.5 (No SD) N = 267 PLA: -1.2 (No SD) N = 251 Urgency episodes FES: -4 (No SD) N = 434 PLA: -3 (No SD) N = 428 Continence status (zero episodes per day) Incontinence episodes - incontinent at baseline only FES: 162/257 (63%) PLA: 133/260 (51%) Urgency episodes Not reported Incontinence-specific quality of life Not reported Adverse effects	not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	2] severe voiding difficulties 3] urinary inconntinence symptoms attributed to stress urinary incontinence 4] significant pelvic organ prolapse or lower urinary tract surgery in preceding 6 months 5] clinically significant hepatic or rebnal disease 6] neurologic disease that significantly affects bladder function 7] treatment with an antimuscarinic OAB medication or potent CYP3A4 inhibitor within 2 weeks of screening 8] any contraindications to fesoterodine 9] mean with intermittent or unstable use of alpha blockers or 4-alpha-reductase inhibitors or who started such treatment within 4 weeks of screening			Any adverse effect Not reported Dry mouth FES: 113/448 (25.2%) PLA: 34/448 (7.6%) Dropouts for any reason FES: 66/448 (14.7.%) PLA: 63/448 (14.1%) Dropouts for adverse effects FES: 34/448 (7.6%) PLA: 21/448 (4.7%) Psychological outcomes Not reported Clinical measures Not reported	blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Only continence status and discontinuation for any reason data used in the network meta-analysis
Full citation Herschorn,S., Swift,S., Guan,Z., Carlsson,M., Morrow,J.D., Brodsky,M., Gong,J., Comparison of fesoterodine and tolterodine	**Sample size** N = 1712 Fesoterodine (FES): 679 Tolterodine (TOL ER): 684 Placebo (PLA): 334	**Interventions** Fesoterodine (4mg for 1 week then 8mg for 11 weeks) Tolterodine ER 4mg Placebo	**Details** Patients were randomised in the ratio in a 2:2:1 to fesoterodine (4mg for 1 week then 8mg for 11 weeks), tolterodine ER or placebo.	**Results** **Week 4** Patient satisfaction with treatment Improved on Patients	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
extended release for the treatment of overactive bladder: a head-to-head placebo-controlled trial, BJU International, 105, 58-66, 2010 **Ref Id** 100249 **Country/ies where the study was carried out** USA **Study type** Randomised controlled trial **Aim of the study** "The primary objective of the present study was to assess whether the efficacy of fesoterodine 8 mg is superior to that of tolterodine ER 4 mg and placebo in improving symptoms of OAB and patient-reported outcomes." **Study dates** Not reported **Source of funding** "The study was sponsored by	**Characteristics** <u>Gender - Female/N (% female)</u> TOL ER = 564/684 (82.5%) FES = 558/679 (82.2%) PLA = 269/334 (80.5%) <u>Age - Mean ± SD</u> TOL ER = 58.5 ± 13.2 years FES = 57.8 ± 12.8 years PLA = 58.4 ± 13.7 years <u>Incontinence episodes (UUI) / day - Mean ± SD</u> TOL ER: 11.7 ± 3.1 FES: 11.7 ± 3.4 PLA: 11.9 ± 3.5 <u>Urgency episodes / day - Mean ± SD</u> TOL ER: 9.3 ± 3.9 FES: 9.3 ± 3.7 PLA: 9.4 ± 4.2 <u>Detrusor overactivity</u> Not reported <u>Duration of OAB (mean ± SD)</u> TOL ER: 6.9 years FES: 7.1 years PLA: 7.3 years **Inclusion criteria** 1] aged ≥ 18 years 2] symptoms of OAB (self-		All patients took their medication once a day in the morning. Treatment was double-blind with all patients receiving one tablet (fesoterodine 4 mg or 8 mg or matching placebo) or a capsule for those taking tolterodine 4mg or matching placebo. At baseline and 12 weeks, patients completed 3-day bladder diaries recording UUI episodes per 24 hours (primary endpoint), mean volume voided, noctural voids, urgency episodes, severe urgency episodes and frequency-urgency sum per 24 hours. They also completed the Perception of Bladder Condition (PPBC) and the Urgency Perception Scales (UPS) and the Overactive Bladder Questionnaire (OAB-q) at both time points. **Power calculation** A sample size of 606 patients per active treatment group was required to detect a difference between fesoterodine and tolterodine	Perception of Bladder Condition TOL ER: 370/684 (54.1%) FES: 420/679 (61.9%) PLA: 152/334 (45.5%) Self reported rate of absolute symptom reduction per day Episodes of incontinence / day - Mean ± sd (change scores) TOL ER: -1.40 ± 1.50 N = 626 FES: -1.52 ± 1.49 N = 618 PLA: -1.06 ± 1.75 N = 307 Episodes of urgency / day - Mean ± sd (change scores) TOL ER: -2.4 ± 5.0 N = 631 FES: -2.6 ± 5.00 N = 627 PLA: -1.2 ± 3.5 N = 311 Continence status Incontinence episodes TOL ER: 290/684	trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Yes - block randomisation using a centralised system A2 - Was there adequate concealment - Yes - randomisation schedule generated and stored off site A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Unclear - not reported Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Pfizer Inc."	assessed) for ≥ 3 months before screening 3] mean of one or more UUI episodes/24hr 4] ≥8 voids/24h reported in 3-day bladder diaries completed at baseline **Exclusion criteria** 1] clinically significant hepatic or renal disease 2] lower genitourinary pathology or having undergone surgery that could cause voiding dysfunction; 3] neurological conditions, e.g. stroke, MS, spinal cord injury, or Parkinson's disease: 4] previous history of acute urinary retention requiring catherterization 5] predominately SUI symptoms (in the opinion of the investigator) 6] treatment with antimuscarinic medication within 2 weeks before screening: 7] use of any electrostimulation, bladder training or pelvic floor exercises within 4 weeks of screening; 8] female pts of childbearing age, heterosexually active and not using contraception 9] pregnant, nursing or with a positive pregnancy test.		ER in the change in UUI episodes from baseline to week 12 using a two-sided t-test at the 5% significance level with 90% power. Based on the previously observed mean (SD) treatment differences of 1.07 (2.85) between fesoterodine 8 mg and placebo groups in an earlier study. 303 patients were required in the placebo group for ≥ 88% power for each comparison. Thus, 1515 patients were required. Assuming that approximately 90% of the randomized patients would contribute to the full analysis set, it was planned to randomize 1675 patients **Intention to treat analysis** "Missing postbaseline data were imputed based on the last-observation-carried forward principle using data from interim visits; baseline data were not carried forward".	(42.4%) FES: 306/679 (45.1%) PLA: 97/334 (29.0%) Urgency episodes Not reported Incontinence-specific quality of life Not reported Adverse effects of treatment Any adverse effect Not reported Dry mouth Not reported Dropout for any reason Not reported Dropout for adverse event Not reported Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported	<u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low <u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				12 weeks results Patient satisfaction with treatment - Improved on Patients Perception of Bladder Condition TOL ER: 399/684 (58.3%) FES: 452/679 (66.6%) PLA: 169/334 (50.6%) Self reported rate of absolute symptom reduction per day Episodes of incontinence / day - Mean ± sd (change scores) TOL ER: -1.61 ± 1.50 n = 626 FES: -1.72 ± 1.72 n = 619 PLA: -1.46 ± 1.75 n = 307 Episodes of urgency / day - Mean ± sd (change scores) TOL ER: -3.5 ± 5.0 n = 631 FES: -3.5 ± 5.00 n = 628 PLA: -2.00 ± 5.30 n = 311	1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Additional data on baseline levels and results taken from NCT00444925 (www.clinicaltrials.gov)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Continence status Incontinence episodes TOL ER: 358/684 (52.3%) FES: 396/679 (58.3%) PLA: 138/334 (41.3%) Urgency episodes Not reported Incontinence-specific quality of life (endpoint week 12) Scale used - OAB-q: Total HRQOL TOL ER: 16.3 ± 24.2 n = 588 FES: 19.3 ± 23.9 n = 572 PLA: 12.0 ± 21.3 n = 289 Adverse effects of treatment Any adverse effect TOL ER: 232/684 (33.9%) FES: 305/679 (44.9%) PLA: 84/334 (25.1%) Dry mouth TOL ER: 112/684	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				(18.6%) FES: 189/679 (27.8%) PLA: 20/334 (6.0%) Dropout for any reason TOL ER: 56/684 (8.2%) FES: 81/679 (11.9%) PLA: 30/334 (9.0%) Dropout for adverse event TOL ER: 28/684 (4.1%) FES: 44/679 (6.5%) PLA: 6/334 (2.08%) Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported	
Full citation	**Sample size**	**Interventions**	**Details**	**Results**	**Limitations**
Hill,S., Khullar,V., Wyndaele,J.J., Lheritier,K.,	N = 439	DAR 7.5, DAR 15, DAR 30 and PLA was given as once	After a screening visit (history and urinalysis) eligible	**Week 4** Not reported	NICE guidelines manual. Appendix D:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Darifenacin Study Group., Dose response with darifenacin, a novel once-daily M3 selective receptor antagonist for the treatment of overactive bladder: results of a fixed dose study, International Urogynecology Journal, 17, 239-247, 2006 **Ref Id** 100250 **Country/ies where the study was carried out** UK **Study type** Randomized controlled trial **Aim of the study** To evaluate 'the efficacy, tolerability, and safety of varying doses of darifennacin in patients with OAB' **Study dates** Not reported **Source of funding** Study was funded by Pfizer Inc.	Darifenacin 7.5mg (DAR 7.5) = 108 Darifenacin 15mg (DAR 15) = 107 Darifenacin 30mg (DAR 30) = 115 Placebo (PLA) = 109 **Characteristics** Gender - Female/N (% female) DAR 7.5: 94/108 (87.0%) DAR 15: 92/107 (86.0%) DAR 30: 99/115 (86.1%) PLA: 90/109 (82.6%) Age (years) - Mean (range) DAR 7.5: 56.1 (23 - 88) DAR 15: 55.1 (24 - 82) DAR 30: 54.0 (23 - 79) PLA: 53.7 (21 - 85) Incontinence episodes/week - Median (95% CI) DAR 7.5: 13.7 (11.8 to 17.8) DAR 15: 17.3 (13.5 to 21.5) DAR 30: 19.1 (15.8 to 22.8) PLA: 16.1 (14.0 to 19.4) Urgency episodes/day - Median (range) DAR 7.5: 8.5 (7.0 to 8.7) DAR 15: 8.6 (7.8 to 9.4) DAR 30: 8.4 (7.8 to 8.8) PLA: 8.1 (7.4 to 8.7) Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD	daily controlled realease tablets or matching placebo	patients entered a 2-week placebo washout phase (if required) before screening assessments. Patients then entered a 2-week run-in phase with daily assessments using an electronic urinary dairy. Patients still eligible were randomized to 12 weeks of active treatment or placebo. A double dummy technique was used to maintain blinding. No dose adjustments were allowed and compliance was measured by a pill count. **Power calculation** Sample size calculation was based on previous darifenacin studies. Assuming a difference vs. placebo of 5 incontinence episodes per week and using a two-sided 5% significance level with 90% power to the the null hypothesis of no difference it was estimated that 85 patients would be needed. Assuming a 20% withdrawal rate 424 patients (106 per group) would be required.	**Week 12** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per week Incontinence episodes (Median change from baseline) DAR 7.5: -8.1 N = 107 DAR 15: -10.4 N = 106 DAR 30: -11.4 N = 114 PLA: -5.9 N = 108 Urgency episodes (Median change from baseline) DAR: -1.8 N = 107 DAR 15: -2.3 N = 106 DAR 30: -3.0 N = 114 PLA: -1.2 N = 108 Continence status (zero episodes per day) - n/N (%) Incontinence episodes - Reported as 7-	Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - blocks of eight used A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Not reported **Inclusion criteria** 1] aged ≥ 18 2] urge incontinence (at least 10 episodes over 14 days) 3] high micturition frequency (mean of at least 8 voids per day) 4] urinary urgency (a strong desire to void on average at least once a day) 5] OAB symptoms ≥ 6 months **Exclusion criteria** 1] clinically significant stress incontinence (judged by investigator) 2] bladder outlet obstruction 3] postvoid residual urinary volume > 200ml 4] local pathology that could cause urinary symptoms (e.g. interstitial cyctitis, bladder stones, severe constipation (≤ bowel movements per week) 5] history of intermittent urinary tract infections 6] urogenital surgery in previous 6 months 7] cystoscopy in previous 30 days 8] patients with an indwelling catheter or using intermittent self-catheterization 9] clinically significnt systemic disease		**Intention to treat analysis** Not reported	consecutive dry days DAR 7.5: Not reported DAR 15: 26/107 (24/3%) DAR 30: 29/115 (25.2%) PLA: 17/109 (15.6%) Urgency episodes Not reported Incontinence-specific quality of life Not reported Adverse effects - n/N (%) Any adverse effect DAR 7.5: 62/108 (57.4%) DAR 15: 73/107 (68.2%) DAR 15: 92/115 (82.0%) PLA: 54/110 (49.5%) Dry mouth DAR 7.5: 25/108 (23.1%) DAR 15: 43 /107 (40.2%) DAR 30: 68/115 (59.1%) PLA: 6/109 (5.5%)	D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study reflect the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** Data from Darifenacin 7.5 mg group used in review

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	10] pregnant or lactating women 11] patients who inteneted to start bladder training 12] any contraindication to antimuscarinic therapy			Dropouts for any reason DAR 7.5: 9/108 (8.3%) DAR 15: 14/107 (13.1%) DAR 30: 19/115 (16.5%) PLA: 8/109 (7.3%) Dropouts for adverse effects DAR 7.5: 2/108 (1.9%) DAR 15: 6/107 (5.6%) DAR 30: 13/115 (11.3%) PLA: 3/109 (2.8%) Psychological outcomes Not reported Clinical measures Not reported	
Full citation Ho,C.H., Chang,T.C., Lin,H.H., Liu,S.P., Huang,K.H., Yu,H.J., Solifenacin and tolterodine are equally effective in the treatment of overactive bladder symptoms, Journal of	**Sample size** N = 75 Solifenacine 5mg = 39 Tolterodine ER 4mg = 36	**Interventions** Patients received either 5 mg solifenacin once daily or 4 mg tolterodine once daily for 12 weeks. Patients were asked to complete a 3-day voiding	**Details** Patients completed a voiding diary three days before clinic visits at 4, 8 and 12 weeks, and completed the Patient Perception of Bladder Condition (PPBC) and a Visual Analogue Scale (VAS)	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment Scale:Patient	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
the Formosan Medical Association, 109, 702-708, 2010 **Ref Id** 100252 **Country/ies where the study was carried out** Taiwan **Study type** Randomised controlled trial **Aim of the study** "To compare the efficacy and safety of 5mg solifenacin once daily and 4mg tolterodine once daily" **Study dates** Feb 2007 - May 2008 **Source of funding** Not reported.	**Characteristics** Baseline characteristics <u>Gender - Female/N (% female)</u> SOL:26/39 (66.7%) TOL ER:24/36 (66.7%) <u>Age - Mean ± SD</u> SOL: 58.9 ± 15.1 years TOL ER: 55.3 ± 15.7 years <u>Incontinence episodes/day - Mean ± SD</u> SOL: 3.21 ± 3.05 TOL ER: 6.19 ± 5.83 <u>Urgency episodes/day - Mean ± SD</u> SOL: 4.57 ± 5.83 TOL ER: 3.68 ± 4.45 <u>Detrusor overactivity - n/N (%)</u> Not reported <u>Duration of OAB - Mean ± SD</u> SOL:4.2 ± 6.2 years TOL ER:4.4 ± 4.9 years **Inclusion criteria** 1] aged ≥ 18 years old 2] offered informed consent 3] willing and able to complete the micturition diary daily 4] have OAB symptoms (inc. urine freq, urgency or urge incontinence) ≥ 3 months	diary Dry mouth was assessed using a Viaual Analogue Scale	scales for dry mouths. Any other adverse events were recorded by researchers at these time points. PVR assessed by ultrasonography at the visit in week 12. Response to treatment was assessed by patients and investigators using a 3-point scale (not, a little and much improved). **Power calculation** Not reported. **Intention to treat analysis** None - All efficacy analyses were based on 'per protocol set'	Perception of Bladder Condition (PPBC) SOL: 32/39 (82.1%) TOL ER: 28/36 (77.8%) <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes SOL: -2.79 ± 2.82 N = 34 TOL ER: -4.67 ± 9.29 N = 32 Urgency episodes SOL: -1.70 ± 3.07 N = 34 TOL ER:-1.15 ± 2.68 N = 32 <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u>	<u>A Selection bias</u> A1 - Was there appropriate randomisation - Unclear - randomisation method not repored A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - No - study was open-label B3 - Were clinical staff blinded - No - study was open-label Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	5] Must have experienced frequency, defined as ≥ 8 micturitions/24 hrs **Exclusion criteria** 1] pregnant or lactating patients or those intending to become pregnant 2] clinical significant bladder outflow obstruction (females with bladder outlet obstruction or benign prostatic hyperplasia in males) 3] significant post-void residual volume (PVR) 4] stress incontinence 5] evidence of symptomatic UTI, chronic inflammation, bladder stones, previous pelvic radiation therapy, precious or current malignant disease of the pelvic organs 6] patients with a medical condition that contraindicated the use of antimuscarinic drugs 7] uncontrolled narrow angle glaucoma, urinary or gastic retention, or any additional medication condition that, in the opinion of the investigator, contraindicated the use of antimuscarinics.			Not measured <u>Adverse effects</u> Any adverse effect SOL: 15/39 (38.5%) TOL ER: 9/36 (25.0%) Dry mouth SOL: 7/39 (17.9%) TOL ER: 3/36 (8.3%) Dropouts for any reason SOL: 5/39 (12.8%) TOL ER: 4/36 (11.1%) Dropouts for adverse effects SOL: 1/39 (2.6%) TOL ER: 1/36 (2.8%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> - Post-void residual volume SOL: 0.60 ± 44.6 mL N = 34 TOL ER: 3.51 ± 2.26 mL N = 32	comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low <u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - No - study was open-label D5 - Were investigators blinded to confounding factors - No - study was open-label Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Other information Unclear on dropout numbers
Full citation Junemann,K.P., Hessdorfer,E., Unamba-Oparah,I., Berse,M., Brunjes,R., Madersbacher,H., Gramatte,T., Propiverine hydrochloride immediate and extended release: comparison of efficacy and tolerability in patients with overactive bladder, Urologia Internationalis, 77, 334-339, 2006 **Ref Id** 100270 **Country/ies where the study was carried out** Bulgaria, Czech Republic, Germany, UK, Spain, Ukraine, Romanian, Austria and France. **Study type** Randomised controlled trial	**Sample size** N = 988 Propiverine IR = 395 Propiverine ER = 391 Placebo = 202 **Characteristics** <u>Gender - Female/N (% female)</u> PRO IR: 353/395 (89.4%) PRO ER: 348/391 (89.0%) PLA: 13/202 (90.6) <u>Age - Mean ± SD</u> PRO IR: 56.3 **(no SD given)** PRO ER: 55.3 PLA: 57.2 <u>Incontinence episodes/ day - Mean ± SD</u> PRO IR: 3.29 ± 2.65 PRO ER: 3.38 ± 2.75 PLA: 3.50 ± 3.63 <u>Urgency episodes/ day - Mean ±</u>	**Interventions** Propiverine hydrochloride immediate release 15mg twice daily Propiverine hydrochloride extended release 30mg once daily Placebo	**Details** Following a run-in period of seven days, patients received propiverine hydrochloride IR 15mg twice a day, propiverine hydrochloride ER 30mg once a day or a placebo for 32 days. Investigators undertook regular assessments of efficacy and tolerability. **Power calculation** Not reported. **Intention to treat analysis** Reference made to the intention to treat population but no details offered on how missing data was treated.	**Results** **Week 4** <u>Patient satisfaction with treatment</u> PRO IR: 249/395 (63.0%) PRO ER: 245/391 (62.7%) PLA: 87/202 (43.1%) <u>Self-reported rate of absolute risk reduction per day</u> Incontinence episodes - Mean ± SD (endpoint scores) PRO IR: 1.08 ± 2.10 N = 360 PRO ER: 0.91 ± 1.70 N = 363 PLA: 1.72 ± 2.78 N = 187 Urgency episodes - Mean ± SD PRO IR: 4.10 ± 3.67 N = 360	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - A2 - Was there adequate concealment - A3 - Were groups comparable at baseline - Level of bias: <u>B Performance bias</u> B1 - Did groups get same level of care - B2 - Were participants blinded - B3 - Were clinical staff blinded -

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To compare the efficacy and tolerability of propiverine hydrochloride immediate release (IR), propiverine hydrochloride extended release (ER) and placebo for the treatment of overactive bladder **Study dates** December 2001 to August 2003 **Source of funding** Apogepha Arzneimittel GmbH	SD PRO IR: 6.13 ± 3.83 PRO ER: 6.37 ± 4.13 PLA: 6.05 ± 4.08 Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported **Inclusion criteria** 1] ≥18 years old 2] able to provide voluntarily signed informed consent 3] at least 2 incontinence episodes within 3 days 4] at least 10 micturitions within 24 hours **Exclusion criteria** 1] stress incontinence 2] intermittent catheterization 3] neurogenic detrusor under- and overactivity 4] postvoid residual urine ≥100ml 5] acute UTI 6] electrostimulation therapy, bladder training if performed within 4 weeks before the run-period for the study 7] anomalies of the lower GU tract (e.g. ectopic ureters, fistulas etc) 8] pre-existing medical			PRO ER: 3.79 ± 3.29 N = 363 PLA: 4.44 ± 4.06 N = 187 Continence status (zero episodes per day) n/N (%) Incontinence episodes PRO IR: 184/395 (46.6%) PRO ER: 199/391 (50.1%) PLA: 76/202 (35.1%) Urgency episodes Not reported Incontinence-specific quality of life Scale: Kings's Health Questionnaire (total score) PRO IR: 40.38 ± 21.70 N = 360 PRO ER: 40.58 ± 21.86 N = 363 PLA: 44.23 ± 21.28 N = 187 Adverse event n/N (%) Any adverse effect PRO IR: 152/395 (38.5%)	Level of bias: C Attrition bias C1 - Was follow-up equal for both groups - C2 - Were groups comparable for dropout - C3 - Were groups comparable for missing data - Level of bias: D Detection bias D1 - Was follow-up appropriate length - D2 - Were outcomes defined precisely - D3 - Was a valid and reliable methods used to assess outcome - D4 - Were investigators blinded to intervention - D5 - Were investigators blinded to confounding factors - Level of bias: **Indirectness** Does the study match the protocol in terms of:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	contraindications for anticholinergics (e.g. obstruction of the bowel) 9] cardiac insufficiency 10] multiple sclerosis 11] evidence of severe renal, hepatic or metabolic disorders 12] history of drug or alcohol abuse 13] concomitant medications known to have a potential to interfere with the study medication 14] pregnant or breast feeding women 15] women of childbearing potential not using a reliable form of contraception.			PRO ER: 134/391 (34.3%) PLA: 41/202 (20.3%) Dry mouth PRO IR: 90/395 (22.8%) PRO ER: 85/391 (21.7%) PLA: 13/202 (6.4%) Dropouts for any reason PRO IR: 26/395 (6.6%) PRO ER: 23/391 (5.9%) PLA:11/202 (5.4%) Dropouts for adverse event PRO IR: 15/395 (3.8%) PRO ER: 11/391 (2.8%) PLA: 1/202 (0.5%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume Not reported	1] Population: Yes 2] Intervention: Yes 3] Outcomes: Yes Indirectness: None **Other information** Data from the PRO IR group not used in review or network meta-analysis as dose used (15mg twice daily) was less than the recommended starting doses of 15mg three times daily

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Week 12 Not applicable	
Full citation Karram,M.M., Toglia,M.R., Serels,S.R., Andoh,M., Fakhoury,A., Forero-Schwanhaeuser,S., Treatment with solifenacin increases warning time and improves symptoms of overactive bladder: results from VENUS, a randomized, double-blind, placebo-controlled trial, Urology, 73, 14-18, 2009 **Ref Id** 100280 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** Not reported **Study dates**	**Sample size** N = 739 Solifenacin (SOL) = 372 Placebo (PLA) = 367 **Characteristics** Gender - Female/N (% female)* SOL: 317/372 (85%) PLA: 305/367 (83%) Age (years) - Mean ± SD* SOL: 57 ± 14 PLA: 57 ± 15 Incontinence episodes/day - Mean ± SD SOL: 2.82 ± 2.71 PLA: 2.56 ± 2.72 Urgency episodes/day - Mean ± SD SOL: 6.15 ± 3.93 PLA: 6.03 ± 3.90 Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported	**Interventions** SOL or PLA given as 5mg/day for 4 weeks, then the dose could be maintained or increased to 10mg/day. At 8 weeks dose could be maintained or increased from 5mg/day to 10mg/day or decreased from 10mg/day to 5mg/day	**Details** Participants completed 3-day bladder diaries before each study visit (weeks 0, 4, 8, 12) to record each urinary event including micturitions, inocntinence episodes and urgency episodes. **Power calculation** Triallists determined that 289 patients per treatment arm would provide 90% power at α - 0.05 to detect a group difference of 1 urgency episode/day with a standard deviation of 3.7. Using a 20% dropout rate, 720 would be required* *data from secondary publication (Toglia et al., 2009) **Intention to treat analysis** Last observation carried forward (LOCF) was used	**Results** **Week 4 results** Not reported **Week 12 results** <u>Patient satisfaction with treatment</u> Reported as improved on PPBC SOL: 207/372 (55.6%) PLA: 145/367 (39.5%) <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes - mean ± SD change from baseline SOL: -2.10 ± 2.39 n = 229 PLA: -1.24 ± 2.30 n = 224 Urgency episodes - mean ± SD change from baseline SOL: -3.91 ± 3.54	**Limitations** NICE guidelines manual.Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Not reported **Source of funding** Astellas Pharma US, Inc and GlaxoSmithKline	*data from secondary publication (Toglia et al., 2009) **Inclusion criteria** 1] aged 18 or over 2] OAB defined as at leats 1 urgency episode/day, with or without urge incontinence, usually accompanied by frequency (at leat 8 micturitions/day), nocturia or both for at least 3 months **Exclusion criteria** 1] stress incontinence or mixed incontinence with predominant stress 2] urinary tract infection 3] chronic inflammation (e.g. institial cystitis) 4] bladder stones 5] clinically significant bladder outflow obstruction 6] other conditions (including hypersensitivity to anticholinergic drugs) that might prevent safe completion of the study			n = 348 PLA: -2.73 ± 3.84 n = 336 <u>Continence status (zero episodes per day)</u> Incontinence episodes reported as no episodes at endpoint (week 12 or last observation) SOL: 133/229 (58.1%) PLA: 93/224 (41.5%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect SOL: 160/372 (43.0%) PLA: 88/367 (24.0%) Dry mouth SOL: 94/372 (25.3%) PLA: 33/367 (9.0%)	C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in terms of Population: Yes Intervention: Yes Outcome: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Dropouts for any reason SOL: 58/372 (15.6%) PLA: 64/367 (17.4%) Dropouts for adverse effects SOL: 25/372 (6.7%) PLA: 16/367 (4.4%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported	**Other information** Data on continence status and dropouts for any reason used in network meta-analysis Data on dropouts taken from secondary publication "Toglia et al., 2009"
Full citation Malone-Lee,J.G., Al-Buheissi,S., Does urodynamic verification of overactive bladder determine treatment success? Results from a randomized placebo-controlled study, BJU International, 103, 931-937, 2009	**Sample size** N = 307 Tolterodine extended release (TOL ER) 4mg QD = 165 Placebo (PLA) = 142 **Characteristics** Gender - Female/N (% female) Not reported by group but overall	**Interventions** Participants received eith TOL ER 4mg qd or placebo for 12 weeks	**Details** Subjects completed a diary card for the 7 days before the first (baseline) study visit. They were assessed for eligibility and after urodynamic study returned for two further visits at 4 and 12 weeks, and completed diary cards for the 7 days before each study visit.	**Results** **Week 4** Not reported **Week 12** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom</u>	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - independent stratified

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 100338 **Country/ies where the study was carried out** UK **Study type** Randomized controlled trial **Aim of the study** To determine whether patients with OAB manifest different treatment responses, dependent on whether a urodynamics study had demonstrated detrusor overactivity **Study dates** Not reported **Source of funding** Sponsored by Pharmacia (now Pfizer)	228/307 (74.3%) were female Age (years) - Mean ± SD Not reported by group but overall age = 56.4 ± 14.1 Incontinence episodes/week Not reported Urgency episodes/week Not reported Detrusor overactivity - n/N (%) TOL ER: 81/165 (49.1%) PLA: 73/142 (51.4%) Duration of OAB Not reported **Inclusion criteria** 1] aged ≥ 18 years 2] urinary frequency (defined as an average of ≥ 8 voids/24 h, measured over a 7-day period) and urgency (with or without UUI) 3] symptoms of OAB for ≥ 6 months with no significant stress UI 4] Female subjects were required to use a medically accepted form of contraception for the duration of the study. **Exclusion criteria** 1] significant hepatic or renal		The information to be recorded on the diary card included the time of each bladder void and whether the void was voluntary or involuntary, the number of incontinence pads used, and the number of laundry loads. Subjects were also asked to record the volume at each void for 3 of the 7 days. **Power calculation** The study was designed with 90% power to detect any difference in treatment by outcome interaction assuming that the interaction effect was 30 ml (standard deviation [SD], 40 ml) at a 5% level of significance (two-tailed test). With an expected discontinuation rate of 20%, it was calculated that 450 subjects would have to be recruited to the study. **Intention to treat analysis** Last observation carried forward (LOCF) was used.	<u>reduction per day</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Continence status (zero episodes per day</u>) reported as no UI episodes (of those incontinent at baseline) TOL ER: 41/96 (42.7%) PLA: 26/73 (35.6%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect TOL ER: 88/165 (53%) PLA: 67/142 (47%) Dry mouth Not reported Dropouts for any reason DAR: 21/165 (12.7%)	randomization A2 - Was there adequate concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	disease 2] symptomatic UTI 3] diagnosed interstitial cystitis 4] un-investigated haematuria 5] clinically significant bladder outlet obstruction 6] receiving anticholinergic drugs or other treatments for OAB in the 14 days before randomization 7] known hypersensitivity to tolterodine-ER or any of its excipients 8] receiving oral cytochrome P450 3A4 inhibitors (e.g. macrolide antibiotics) 9] had received electrostimulation or bladder retraining in the 3 months before randomization.			PLA: 19/142 (13.4%) Dropouts for adverse effects DAR: 7/165 (4.2%) PLA: 2/142 (1.4%) <u>Psychological outcomes</u> Not reported <u>Clinical outcomes</u> Not reported	defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Data on continence status and discontinuation for any reason only used in network meta-analysis
Full citation Minassian,V.A., Ross,S., Sumabat,O., Lovatsis,D., Pascali,D., Al-Badr,A., Alarab,M., Drutz,H.P.,	**Sample size** N = 72 Oxybutynin XL = 39 Oxybutynin IR = 33	**Interventions** Oxybutynin XL 5mg once-daily Oxybutynin IR 2.5 mg three	**Details** Interventions were given for 12 weeks A medical history was taken from all patients.	**Results** **Week 4** No data reported **Week 12**	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Randomized trial of oxybutynin extended versus immediate release for women aged 65 and older with overactive bladder: lessons learned from conducting a trial, Journal of Obstetrics and Gynaecology Canada: JOGC, 29, 726-732, 2007 **Ref Id** 100357 **Country/ies where the study was carried out** Canada **Study type** Randomised controlled trial **Aim of the study** "To investigate whether the once daily administration of oxybutynin XL is more effective than the three times per day administration of oxybutynin IR in reducing symptoms of OAB, including urgency, frequency, and nocturia with or without urge incontinence, in a community-dwelling female population over the age of 65."	**Characteristics** <u>Gender - Female/N (% female)</u> OXY XL: 39/39 (100%) OXY IR: 33/33 (100%) <u>Age - Mean ± SD</u> OXY XL:75 ± 6 years OXY IR:73 ± 5 years <u>Incontinence episodes/ day Mean ± SD</u> Not reported <u>Urgency episodes/ day Mean ± SD</u> Not reported <u>Detrusor overactivity -n/N (%)</u> Not reported <u>Duration of OAB - Mean ± SD</u> Not reported **Inclusion criteria** 1] female 2] over 65 years old 3] symptoms of OAB including urgency, frequency and nocturia (as defined by the International Continence Society) 4] experiencing mixed symptoms of OAB and stress urinary incontinence, with the former being the main presenting symptom	times a day	A focused physical and pelvic examination was performed that included testing the patient lying and standing for stress incontinence and staging of concurrent pelvic organ prolapse. Uroflowmetry and measurement of post-void residual bladder volume by ultrasound were performed. Patients witha urinary tract infection were treated with a one-week course of antibiotics prior to enrolment in the study. Patients were randomised to either oxybutynin XL 5 mg once-daily or oxybutynin IR 2.5 mg three times a day for 12 weeks. Drug dosage was increased, in non-responders, after four weeks of treatment to 10mg in the oxybutynin XL group and 5mg three times a day in the oxybutynin IR group for the remainder of the trial. **Power calculation** A sample of 120 subjects (60 per group) was needed for 80% power to detect a difference fo 1.5 in the	<u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Episodes of incontinence / day - Mean ± SD Not reported Episodes of urgency Not reported <u>Continence status</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Scale used - U-UDI - Mean ± SD - Endpoint week 12 OXY XL: 2.1 ± 1.0 n = 37 OXY IR: 1.7 ± 1.0 n = 28 <u>Adverse effects</u> Any adverse effect OXY XL: 19/39	trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Yes - central telephone randomisation service A2 - Was there adequate concealment - Yes - central randomisation to reduce bias by conealing allocation A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Unclear - Not reported B3 - Were clinical staff blinded - Unclear - Not reported Level of bias: Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates February 2003 to December 2005 **Source of funding** Study was supported by a grant from Janssen-Ortho Inc.	5] able to give written informed consent **Exclusion criteria** 1] bedridden 2] permanent indwelling catheter 3] MMSE score < 24 4] incontinence due to causes other than predominant urge incontinence 5] evidence of glaucoma, gastric retention or bowel obstruction 6] history of allergy to oxybutynin or anticholinergic drugs 7] taking antidepressants or anticholinesterase inhibitors 8] post-void residual bladder vol. of more than 100mL 9] history of neurologic disorder, e.g. multiple sclerosis, spinal cord injury or demyelinating disorder.		number of micturitions per 24 hours at a two-tailed alpha level of 5%, a sample of 120 subjects (60 per group) was needed. Allowing for a drop-out rate of 10%, the estimated sample required was 132 (66 per group) **Intention to treat analysis** Analysis of data was conducted by "intent to treat"	(48.7%) OXY IR: 16/33 (48.5%) Dry mouth OXY XL: 14/39 (35.9%) OXY IR: 16/33 (48.5%) Dropouts for any reason OXY XL: 13/39 (33.3%) OXY IR: 16/33 (48.5%) Dropouts for adverse effects: OXY XL: 12/39 (30.8%) OXY IR: 13/33 (39.4%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume Not reported	<u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low <u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					2] Intervention: Yes 3: Outcomes: Yes Indirectness: None **Other information** Study stopped recuitment early due to difficulty in recruitment
Full citation Nitti,V.W., Dmochowski,R., Sand,P.K., Forst,H.T., Haag-Molkenteller,C., Massow,U., Wang,J., Brodsky,M., Bavendam,T., Efficacy, safety and tolerability of fesoterodine for overactive bladder syndrome, Journal of Urology, 178, 2488-2494, 2007 **Ref Id** 100367 **Country/ies where the study was carried out** United States **Study type** Randomised controlled trial	**Sample size** N = 836 Fesoterodine 4mg (FES 4) = 283 Fesoterodine 8mg (FES 8) = 279 Placebo (PLA) = 274 **Characteristics** Gender - Female, n/N (%) FES 4: 213/282(76%) FES 8: 218/279 (78%) PLA: 200/271 (74%) Age (years). Mean (range) FES 4: 59 (21 - 85) FES 8: 59 (23 - 91) PLA: 59 (24 - 88) Incontinence episodes / day - Mean ± SD Not reported Urgency episodes / day Mean ±	**Interventions** Participants were randomised to either fesoterdine 4mg, fesoterodine 8mg or matching placebo	**Details** Participants completed a 3-day bladder diary before ransomisation, and 2, 8 and 12 weeks after starting treatment Voided volumes were recorded on 1 on the 3 days Treatment response was assessed using a self-administered treatment benefit scale **Power calculation** Not reported **Intention to treat analysis** Not reported	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment defined as improved from 4 point treatment benefit scale FES 4: 171/283 (60%) FES 8: 198/279 (71%) PLA: 120/274 (44%) Self reported rate of absolute symptom reduction per day reported as Mean ± SD change from baseline	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - computer generated A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To evaluate the efficacy, safety and tolerability of 4mg and 8mg fesoterodine for OAB **Study dates** October 20 2003 to February 10 2005 **Source of funding** Supported by Schwarz BioSciences GmbH abd Pfizer, Inc.	SD Not reported Detrusor overactivity Not reported OAB duration (years) Mean ± SD FES 4: 9.1 ± 10.3 FES 8: 10.1 ± 11.5 PLA: 9.8 ± 10.3 **Inclusion criteria** 1] aged > 18 with OAB symptoms for at least 6 months 2] at least 8 micturitions per day, at least 6 urinary urgency episodes per day or 3 UUI epsiodes per day **Exclusion criteria** 1] lower urinary tract pathology that could cause urgency or incontinence 2] pelvic organ prolapse grade III or greater 3] clinically relevant bladder outlet obstruction 4] PVR volume greater than 100ml 5] polyuria 6] symptomatic or recurrent urinary tract infections 7] current treatment with antimuscarinic drugs 8] a neurogenic cause for OAB 9] clinically relevant arrhythmia, unstable angina or a corrected QT			Incontinence episodes FES 4: -1.65 ± 2.42 N = 228 FES 8: -2.28 ± 2.36 N = 218 PLA: -0.96 ± 2.43 N = 205 Urgency episodes FES 4: -1.91 ± 3.27 N = 267 FES 8: -2.3 ± 3.27 N = 267 PLA: -0.79 ± 2.86 N = 205 <u>Continence status</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect FES 4: 171/283 (60%) FES 8: 193/279 (69%)) PLA: 149/274 (55%)	B2 - Were participants blinded - Yes - Study was double-blindB3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	interval (Bazett's formula) of greater than 500 milliseconds 10] current treatment or within 4 weekks with electrostimulation or baldder training			Dry mouth FES 4: 45/283 (16%) FES 8: 99/279 (36%) PLA: 19/274 (7%) Dropout for any reason FES 4: 60/283 (21%) FES 8: 57/279 (20%) PLA: 42/274 (15%) Dropout for adverse event FES 4: 17/283 (6%) FES 8: 25/279 (9%) PLA: 11/274 (4%) <u>Psychological outcomes</u> Not reported <u>Clinical outcomes</u> Not reported	terms of Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None **Other information** N/A
Full citation Rackley,R., Weiss,J.P., Rovner,E.S., Wang,J.T., Guan,Z., Study Group., Nighttime dosing with	**Sample size** N = 850 Tolterodine extended release (TOL ER) = 429	**Interventions** After a 2-week placebo run-in period, eligible patients were given TOL 2R (4mg qd) or PLA to be taken 4 hours or	**Details** 7-day bladder diaries were completed for studies visists at baseline and weeks 4 and 12	**Results** **Week 4** Not reported **Week 12**	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
tolterodine reduces overactive bladder-related nocturnal micturitions in patients with overactive bladder and nocturia, Urology, 67, 731-736, 2006 **Ref Id** 100392 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** To eveluate the efficacy and tolerability of nighttime tolterodine extended release dosing on urgency and urgency-related micturition in patients with OAB and nocturia **Study dates** Not reported **Source of funding** Not reported	Placebo (PLA) = 421 **Characteristics** Gender - Female/N (% female) TOL ER: 223/429 (52%) PLA: 211/421 (50%) Age (years) - Mean ± SD TOL ER: 59 ± 14 PLA: 58 ± 14 Urge incontinence episodes/week - Mean ± SD TOL ER: 5.04 ± 11.27 PLA: 4.13 ± 11.06 Urgency episodes/day Not report Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] aged 18 or over 2] OAB symptoms (8 or more micturitions/day and urgency with or without UUI) 3] nocturia (mean of 2.5 or more episodes per night) 4] mean voided volume of	less before bedtime.	**Power calculation** To detect a difference of 7% nighttime micturitions compared with placebo, 722 patients (361 per grou) would be needed to reject the null hypothesis at a significance level of 5% with a power of 80%. **Intention to treat analysis** Last observation carried forward (LOCF) was used.	<u>Patient satisfaction with treatment</u> TOL ER: 231/429 (54%) PLA: 183/421 (43%) <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes Not reported Urgency episodes Not reportyed <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect TOL ER: 47/429 (11%) PLA: 25/421 (6%)	trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	200ml/micturition or less 5] mean nighttime voided volume of less that 40% of total voided volume **Exclusion criteria** 1] significant stress urinary incontinence 2] postvoid residual volume greater than 200ml 3] maximum flow rate of less tha 20ml/s 4] 24 hour urine volume greater than 3000ml			Dry mouth TOL ER: 39/429 (9%) PLA: 8/421 (2%) Dropouts for any reason TOL ER: 56/429 (13.1%) PLA: 63/421 (15.0%) Dropouts for adverse effects TOL ER: 4/429 (0.9%) PLA: 17/421 (4.0%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** Data on Dropouts for any reason used in network meta-analysis
Full citation Rogers,R., Bachmann,G., Jumadilova,Z., Sun,F.,	**Sample size** N = 413 Tolterodine extended release (TOL	**Interventions** TOL ER (4mg) or PLA was given once daily within 4	**Details** 5-day bladder diaries were completed at baseline and at	**Results** **Week 4** No data reported	**Limitations** NICE guidelines manual. Appendix D:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Morrow,J.D., Guan,Z., Bavendam,T., Efficacy of tolterodine on overactive bladder symptoms and sexual and emotional quality of life in sexually active women, International Urogynecology Journal, 19, 1551-1557, 2008 **Ref Id** 100403 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** To evaluate the efficacy of tolterodine ER in treating OAB symptoms in sexually-active women with OAB and UUI **Study dates** Not reported **Source of funding** Study was funded by Pfizer.	ER) = 202 Placebo (PLA) = 211 **Characteristics** Gender - Female/N (% female) TOL ER: 202/202 (100%) PLA: 211/211 (100%) Age (years) - Mean ± SD TOL ER: 49 ± 12 PLA: 47 ± 12 Incontinence episodes/day - Mean ± SD TOL ER: 2.5 ± 2.1 PLA: 2.2 ± 1.8 Urgency episodes/day Not reported Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD TOL ER: 6 ± 8 PLA: 5 ± 6.5 **Inclusion criteria** 1] female outpatients aged 18 or more 2] mean of 8 or more micturitions/day 3] 0.6 or more UUI episodes/day 4] 3 or more OAB micturitions	hours of bedtime for 12 weeks	week 12 to record time of each micturition and incontinence pad usage. **Power calculation** The sample size was determined based on a projected treatment difference of 1.02 in the number of UUI episodes. Using a two-tailed alpha level of 0.05 and 80% power to detect this difference 174 subjects were required for each treatment group. Assuming a 15% dropuout rate 400 subjects were to be randomized. **Intention to treat analysis** Last observation carried forward (LOCF) was used.	**Week 12** Patient satisfaction with treatment* TOL ER: 139/202 (68.8%) PLA: 110/211 (52.1%) Self reported rate of absolute symptom reduction per day Incontinence episodes / day - LS Mean ± SD Change from baseline TOL ER: -1.8 ± 1.37 N = 189 PLA: -1.4 ± 1.35 N = 182 Urgency episodes Not reported Continence status Incontinence episodes TOL ER: 93/202 (46.0%) PLA: 70/211 (33.2%) Urgency episodes Not reported Incontinence-specific quality of	Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Inc	(associated with moderate or severe urgency or UUI)/day 5] reporte at leazst some moderate problems on Patient Perception of Bladder Condition Questionnaire 6] in a stable, sexually active relationship with a male partner for 6 or more months 7] OAB symptoms for 3 or more months **Exclusion criteria** 1] stage 3 or greater pelvic organ prolapse 2] history of lower urinary tract surgery 3] lifelong sexual dysfucntion unrelated to lifelong UUI 4] predominant stress urinary incontinence			<u>life</u> IIQ scale used - mean change from baseline TOL ER: -71.6 ± 78.3 N = 182 PLA: -59.2 ± 77.0 N = 189 <u>Adverse effects</u> Any adverse event TOL ER: 114/202 (56.7%) PLA: 111/211 (52.9%) Dry mouth TOL ER: 26/202 (12.9%) PLA: 19/211 (9.0%) Dropouts for any reason TOL ER: 38/202 (18.9%) PLA: 43/211 (20.4%) Dropouts for adverse effects TOL ER: 9/202 (4.5%) PLA: 6/211 (2.9%) <u>Psychological outcomes</u> Not reported	D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None **Other information** Data on Continence status and Dropouts for any reason used in network meta-analysis Satisfaction data taken from secondary publication "Rogers et al., 2009"

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Clinical measures Not reported	SD for IIQ change from baseline scores calculated from the reported SEM
Full citation Rudy,D., Cline,K., Harris,R., Goldberg,K., Dmochowski,R., Multicenter phase III trial studying trospium chloride in patients with overactive bladder, Urology, 67, 275-280, 2006 **Ref Id** 100414 **Country/ies where the study was carried out** United States **Study type** Randomise controlled trial **Aim of the study** To examine the effect of trospium chloride 20mg twice daily as treatment for urinary frequency and other related symptoms in patients with OAB.	**Sample size** N = 658 Trospium (TRO) = 329 Placebo (PLA) = 329 **Characteristics** Gender - Female/N (% female) TRO: 267/329 (81.2%) PLA: 269/329 (81.8%) Age (years) - Mean ± SE DAR: 61.1 ± 0.69 PLA: 61.0 ± 0.70 Incontinence episodes/week - Median TRO: 2.86 (No range reported) PLA: 2.86 (No range reported) Urgency episodes/day Not reported Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported	**Interventions** Patients who met the inclusion criteria at baseline were randomised to either Trospium chloride 20mg twice daily or placebo for 12 weeks.	**Details** Patient urinary diaries were completed for 7 days prior to each study visit at 1 wee, 4 weeks and 12 weeks. Primary outcomes was number of toilet voids in 24 hours **Power calculation** Sample size was determined on the basis for two efficacy outcomes; change in number of voids per day and in urge urinary incontinence per day, assuming 90% power and 80% power respectively. Patients lost to follow-up during the study were not replaced. **Intention to treat analysis** Last observation carried forward (LOCF) used	**Results** **Week 4** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day Incontinence episodes TRO: -1.71 (No SD) N = 323 PLA: -1.14 (No SD) N = 325 Urgency episodes Not reported Continence status (zero episodes per day) Incontinence episodes Not reported Urgency episodes Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Funded by Indevus Pharmaceuticals, Inc	**Inclusion criteria** 1] 18 years or older 2] OAB symptoms for at least 6 months 3] minimal urinary frequency of 10 or more toilet voids per day 4] symptoms or urgency (at least 1 'mild', 'moderate' or 'severe' severity rating on patient diary) 5] at least 7 urge urinary incontinence episodes per week **Exclusion criteria** 1] predominantly stress, insensate or overflow in nature 2] neurogenic bladder disorders 3] significant renal disease 4] uninvestigated hematuria 5] urinary tract infection at washout or more tha twice during the first year 6] significant bladder outlet obstruction (postvoid residual volume > 100ml) in clinical opinion of trial investiagtor 7] concurrent use of any anticholinergic or other drug for OAB with 21 days of strat of study 8] bladder surgery with 6 months 9] cancer or institial cystitis 10] men with a prostate antigen level of 10ng/ml or great11] diuretic use			Incontinence-specific quality of life Not reported Adverse effects Any adverse effect Not reported Dry mouth Not reported Dropouts for any reason Not reported Dropouts for adverse effects Not reported Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported **Week 12** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day Incontinence	Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	11] estrogen therapy 12] non-medical bladder therpay as part of a long-standing treatment program 13] pregnancy 14] other contraindiction to antimuscarinic therapy			episodes - Median change from baseline TRO: -1.86 (No SD) N = 323 PLA: -1.29 (No SD) N = 325 Urgency episodes Not reported <u>Continence status (zero episodes per day)</u> Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect TRO: 196/329 (59.6%) PLA: 153/329 (46.5) Dry mouth TRO: 65/329 (19.8%) PLA: 17/329 (5.2%) Dropouts for any reason TRO: 42/329 (8.3%) PLA: 32/329	**Other information** All data used in review

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				(12.7%) Dropouts for adverse effects TRO: 25/329 (4.5%) PLA: 16/329 (6.7%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported	
Full citation Staskin,D., Sand,P., Zinner,N., Dmochowski,R., Trospium Study Group., Once daily trospium chloride is effective and well tolerated for the treatment of overactive bladder: results from a multicenter phase III trial, Journal of Urology, 178, 978-983, 2007 **Ref Id** 100455 **Country/ies where the**	**Sample size** N = 601 Trospium extended release (TRO ER) = 298 Placebo (PLA) = 303 **Characteristics** Gender - Female/N (% female) TRO ER: 254/296 (85.2%) PLA: 256/303 (84.5%) Age (years) - Mean ± SE TRO ER: 59.6 ± 0.77 PLA: 59.3 ± 0.70	**Interventions** TRO ER (60mg) or matching PLA was given once daily for 12 weeks	**Details** Patricipants underwent a 7-day washout period before completing a written bladder diary for 3 days. Eligible patients were the randomized by stratification by average baseline daily urinary frequency. 3 day bladder diaries were completed before each study visit at weeks 1, 4 and 12. Diaries and drug accountabiility were reviewed at each visit and adverse effects were logged and assessed.	**Results** **Week 4** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptoms reduction/day - Mean ± SD</u> UUI episodes - change from baseline reported TRO ER: -2.36 ± 2.22 N = 292 PLA: -1.75 ± 2.25 N = 300	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
study was carried out United States **Study type** Randomized controlled trial **Aim of the study** To evaluate the effects of trospium chloride (6omg qd) capsules compared with placebo in subjects iwth OAB with predominant UUI **Study dates** August 2005 to May 2006 **Source of funding** Supported by Esprit Pharma and Indevus Pharaceuticals	Number of incontinence episodes/day Not reported Urgency episodes Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] mean and women 18 years and older with symptoms of OAV for 6 months or greater 2] symptoms of urgency (at least 1 'severe' urgency severity rating per 3 days as measured using Indevus Urgency Severity Scale) 3] minimum urgency frequency of 30 or greater toliet voids per 3 days with an average of 1 or greater UUI episode/day 4] average total volume voided 3000ml or less per day and 250ml or less per void **Exclusion criteria** 1] stress, insensate or overflow incontinence 2] neurogenic bladder disorder 3] significant renal disease 4] uninvestiagted hematuria		**Power calculation** A sample size of 300 in each arm was required to provide sufficient statistical power based on the co-primary efficacy outcomes with the primary timepoint for analysis at week 12. **Intention to treat analysis** Last observation carried forward (LOCF) was used consisting of data recorded or carried forwrad at each visit.	Urgency episodes Not reported <u>Continence status (Zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life - Mean ± SD</u> Scale used = OAB-SCS - change from baseline TRO ER: -9.67 ± 9.57 N = 292 PLA: -6.13 ± 11.10 N = 300 <u>Adverse effects</u> Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported **Week 12** <u>Patient satisfaction with treatment</u>	differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	5] urinary tract infection at washout, or greater urinary tract infections requiring treatment during the previous year 6] significant bladder outlet obstruction (defined as postvoid residual urine volume greater than 100ml) or an indwelling catheter 7] active inflammatory bowel disease 8] diagnosis of interstitial cystitis or bladder cancer with the past 6 months 9] males with prostate specific antigen 4ng/ml or greater, prostate cancer or chronic prostatis 10] subjects undergoing/likely to undergo bladder retraining or a bladder drill program 11] diuretic estrogen use outside of a long-term stable program			Not reported <u>Self-reported rate of absolute symptoms reduction/day - Mean ± SD</u> UUI episodes - change from baseline reported TRO ER: -2.48 ± 2.9 N = 292 PLA: -1.93 ± 2.8 N = 300 Urgency episodes Not reported <u>Continence status (Zero episodes per day)</u> Incontinenec episodes TRO ER: 54/298 (18.1%) PLA: 31/303 (10.3%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Scale used = OAB-SCS - change from baseline TRO ER: -11.2 ±	Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Data on continence status and dropouts for any reason only used in network meta-analysis

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				9.4 N = 292 PLA: -7.8 ± 11.6 N = 300 <u>Adverse effects</u> Any adverse effect TRO ER: 80/298 (26.8%) PLA: 53/303 (17.5%) Dry mouth TRO ER: 28/298 (8.7%) PLA: 9/303 (3.0%) Dropout for any reason TRO ER: 35/298 (11.7%) PLA: 30/303 (9.9%) Dropouts for adverse effects TRO ER: 12/298 (4.0%) PLA: 11/303 (3.6%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Staskin,D.R., Dmochowski,R.R., Sand,P.K., MacDiarmid,S.A., Caramelli,K.E., Thomas,H., Hoel,G., Efficacy and safety of oxybutynin chloride topical gel for overactive bladder: a randomized, double-blind, placebo controlled, multicenter study, Journal of Urology, 181, 1764-1772, 2009 **Ref Id** 100463 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** To evaluate the efficacy and safety of Oxybutynin topical gel in adults with overactive bladder **Study dates**	**Sample size** N = 789 Oxybutynin topical gel (OXY TG) = 389 Placebo (PLA) = 400 **Characteristics** <u>Gender - Female, n/N (%)</u> OXY TG: 352/389 (90.5%) PLA: 352/400 (88.0%) <u>Age (Years) - Mean ± SD</u> OXY TG: 59.5 ± 12.5 PLA: 59.3 ± 12.2 <u>Urge Incontinence episodes / day - Mean ± SD</u> OXY TG: 5.4 ± 3.3 PLA: 5.4 ± 3.3 <u>Urgency episodes / day Mean ± SD</u> Not reported <u>Detrusor overactivity</u> Not reported <u>OAB duration (Months) - Mean ± SD</u> OXY TG: 106.6 ± 121.6 PLA: 97.4 ± 96.8 **Inclusion criteria**	**Interventions** OXY TG (10% weight per weight ethanol-based oxybutynin formulation) and matching PLA gel was applied (1gm) daily to rotating sites on the abdomen, upper arm pr shoulder and thigh	**Details** Patients were instruced to maintain a consistent level of fluid intake and initiate/maintain behavioral management for incontinence during the screening period. A 2 week period between visits 1 and 2 provided a washout for patients on antimuscarinics for OAB. At visit 2 patients received training to distinguish between urge and stress UI epsiodes and to properly complete the baldder diary **Power calculation** A sample size of 700 equally divided between groups ould be needed to provide 85% power to detect a real difference with the two-tailed t test and an α of 0.05. **Intention to treat analysis** MITT population included all randomized patients who received 1 or more doses of study drug and provided data for the baseline efficacy assessent.	**Results** **Week 4** Not reported **Week 12** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes - change from baseline - Mean ± SD OXY TG 3.9mg: -3.0 ± 2.7 N = 389 PLA: -2.5 ± 3.1 N = 400 Urgency episodes Not reported <u>Continence status (zero episodes per day)</u> Incontinence episodes OXY TG: 108/389 (27.8%) PLA: 69/400 (17.3%) Urgency episodes Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - Not reported A2 - Was there adequate concealment - Unclear A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Some B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
June 2006 to May 2007 **Source of funding** Supported by Watson Pharmaceuticals, Inc	1] urge or mixed UI with a preponderance of urge UI episodes 2] mean of 8 or more urinary voids per day 3] 4 or more urge UI episodes per day 4] mean voided volume of 350ml or less during a 2 day urine collection period 5] PVR of 250ml or less on ultrasonography or catheterization **Exclusion criteria** 1] pregnancy 2] breast-feeding 3] inadequate brith-control by premenopausal women not using brith control 4] Contraindication to oxybutynin (uncontrolled narrow angle glaucoma, gastic obstruction or retention, known hypersensitivity to oxybutynin related compounds or any component of the gel 5] treatable condition that could cause urinary incontinence or urgency (acutre urinary tract infection, prostatitis, hematuria, urinary tract obstruction, urethral diverticulus, bladder tumor, bladder stones, fecal impaction, conditions that require diyretic use) 6] interstitial cystitis 7] urethral syndrome 8] painful bladder syndrome 9] overflow incontinence			Incontinence-specific quality of life Not reported Adverse effects Dropouts for any reason OXY TG: 43/389 (11.1%) PLA: 45/400 (11.3%) Dropouts for adverse effects OXY TG: 19/389 (4.9%) PLA: 13/400 (3.3%) Any adverse effects OXY TG: 221/389 (56.8%) PLA: 193/400 (48.3%) Dry mouth OXY TG: 27/389 (6.9%) PLA: 11/400 (2.8%) Psychological outcomes Not reported Clinical measures - Post-void	comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match teh review protocol in terms of: Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None **Other information** Data on continence status and dropouts for any reason used in network meta-analysis

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	secondary to outlet obstruction or underactive detrusor 10] lower urinary tract surgery in previous 6 months 11] unstable diabetes mellitus 12] anticipated hormonal changes 13] recurrent urinary tract infections (more than 3 in previous year) 14] clinically significant systemic disease 15] abnormal baseline laboratory test result 16] concomitant medications that affect detrusor activity (antimuscarinics or tricyclic antidepressants) 17] prostate cancer or prostate specific antigen plasma concentration greater than 4ng/ml 18] active skin condition affecting treatment sites 19] excessive consumption of caffeinated beverages (more than 5 cups per day) 20] alcohol or drug use in the previous year 21] participation in another clinical trial in the previous 30 days 22] failure to complete baseline 3-day diary			residual volume Not reported	
Full citation Yamaguchi,O., Marui,E., Kakizaki,H., Itoh,N.,	**Sample size** N = 1593 (9 subjetcs were non-compliant so not included in group	**Interventions** Solifenacin 5mg Solifenacin 10mg	**Details** Patients received placebo medication once daily during	**Results** **Week 4** No data reported	**Limitations** NICE guidelines manual.Appendix D:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Yokota,T., Okada,H., Ishizuka,O., Ozono,S., Gotoh,M., Sugiyama,T., Seki,N., Yoshida,M., Japanese Solifenacin Study Group., Randomized, double-blind, placebo- and propiverine-controlled trial of the once-daily antimuscarinic agent solifenacin in Japanese patients with overactive bladder, BJU International, 100, 579-587, 2007 **Ref Id** 100508 **Country/ies where the study was carried out** Japan **Study type** Randomised controlled trial **Aim of the study** "To assess whether soifenacin 5mg and 10mg once daily was comparable with placebo and propiverine 20 mg once daily (the most commonly prescribed dose in Japan), respectively, in a large population of Japanese patients with OAB"	numbers) SOL 5mg = 398 SOL 10mg = 381 PRO 20mg = 400 PLA = 405 **Characteristics** Gender - Female/N (% female) SOL 5mg: 318/383 (83%) SOL 10mg: 316/371 (85.7%) PRO 20mg: 321/384 (83.6%) PLA: 333/395 (84.3%) Age - Mean ± SD (range) SOL 5mg: 60.4 ± 13.3 years SOL 10mg: 59.9 ± 13.0 years PRO 20mg: 59.6 ± 13.6 years PLA: 60.8 ± 12.5 years Incontinence episodes/24hr Mean ± SD SOL 5mg: 2.35 ± 2.45 SOL 10mg: 2.19 ± 2.04 PRO 20mg: 2.15 ± 2.3 PLA: 1.99 ± 2.11 Urgency episodes/24hr Mean ± SD SOL 5mg: 4.40 ± 3.30 SOL 10mg: 4.42 ± 3.30 PRO 20mg: 4.07 ± 3.19 PLA: 4.04 ± 3.11 Detrusor overactivity -n/N (%) Not reported Duration of OAB - Mean ± SD Not reported	Propiverine 20mg Placebo	a 2-week run-in period and were then randomised to one of four treatment arms: solifenacin 5mg, solifenacin 10mg, propiverine 20mg or placebo for 12 weeks after a three-day diary were recorded Patients were evaluated every four weeks for the following variables: mean number of voids/24h, urgency incontinence episodes/24hr, urgency episodes, nocturia episodes, volume voided per void, incontinence episodes. Safety assessments were performed at weeks 4,8 and 12 and included physical assessments and recording of adverse events. Vital signs and laboratory test results were assessed at 0, 4 and 12 weeks. 12-lead ECG carried out during the run-period and at the end of the study. Patient quality of life assessed at baseline end of study. **Power calculation** "The required enrolment was ≥350 patients per arm to detect superiority to placebo at a power of 90%, and the non-inferiority of solifenacin	**Week 12** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Incontinence episodes - Mean ± sd (Change scores) SOL 5mg: -1.60 ± 1.81 n = 274 SOL 10mg: -1.59 ± 2.12 n = 270 PRO 20mg: -1.25 ± 2.79 n = 295 PLA: -0.72 ± 1.95 n = 283 Urgency episodes SOL 5mg: -2.41 ± 2.88 n = 383 SOL 10mg: -2.78 ± 2.82 n = 371 PRO 20mg: -2.30 ± 3.08 n = 384 PLA: -1.28 ± 2.90 n = 395 Continence status (Zero episodes per day) Incontinence episodes SOL 5mg: 154/274 (56.2%) SOL 10mg:	Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - Not reported A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Unclear B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Unclear - Not reported Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates June 2003 to January 2004 **Source of funding** Astellas Pharma Inc (formerly Yamanouchi Pharmaceutical Co, Ltd), Tokyo, Japan.	**Inclusion criteria** 1] adults ≥20 years old 2] symptoms of OAB reported ≥6 months 3] mean number of voids ≥8/24hr 4] ≥3 episodes of urgency and/or ≥3 episodes of urgency incontinence during a 3-day voiding diary **Exclusion criteria** 1] significant bladder outlet obstruction (assessment based on measuring the postvoid urine volume. 2] Patients with a PVR of ≥100mL were excluded 3] symptoms of bladder outlet obstruction 4] urinary retention 5] demonstrable stress incontinence 6] bladder stones 7] UTI 8] interstitial cystitis 9] previous or current malignant disease of the pelvic organs 10] previous pelvic radiation 11] concomitant anticholinergic medications 12] known of suspected hypersensitivity to anticholinergic medications or lactose		to propiverine 20 mg at a power of 80%" **Intention to treat analysis** "Efficacy data were measured at week 12, and the last-observation-carried-forward approach was used to determine endpoint values if week 12 data were not available."	161/270 (59.6%) PRO 20mg: 165/295 (55.9%) PLA: 105/283 (37.1%) Urgency episodes SOL 5mg: 126/400 (31.5%) SOL 10mg: 138/385 (35.8%) PRO 20mg: 128/402 (31.8%) PLA: 82/406 (20.2%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect Not reported Dry mouth SOL 5mg: 67/400 (16.8%) SOL 10mg: 130/385 (33.8%) PRO 20mg: 103/402 (25.6%) PLA: 23/406 (5.7%) Dropouts for any reason SOL 5mg: 34/400 (8.5%) SOL 10mg: 32/385 (8.3%) PRO 20mg:	comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low <u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Intervention: Yes 3] Outcomes: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				36/402 (9.0%) PLA: 34/406 (8.4%) Dropouts for adverse effects SOL 5mg: 20/400 (5.0%) SOL 10mg: 26/385 (6.8%) PRO 20mg: 26/402 (6.5%) PLA: 11/406 (2.7%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported	**Other information**
Full citation Zat'ura,F., Vsetica,J., Abadias,M., Pavlik,I., Schraml,P., Brod'ak,M., Villoria,J., Sust,M., Study Group., Cizolirtine citrate is safe and effective for treating urinary incontinence secondary to overactive bladder: a phase 2 proof-of-concept study, European Urology, 57, 145-152, 2010	**Sample size** N = 135 Cizolirtine (CIZ) = 34 Oxybutynin immediate release (OXY IR) = 27 Placebo (PLA) = 54 **Characteristics** Gender - Female/N (% female) CIZ: 50/54 (92.6%)	**Interventions** Participants were randomised in a proportion of 2:2:1 to cizolirtine 230 mg two times per day (bid; given as 400 mg bid of citrate salt), placebo three times per day (tid), or oxybutynin 5 mg tid, respectively, took place after a 21-d run-in period. All treatments were given for 12 weeks.	**Details** Participants completed a bladder diary and underwent a baseline urodynamic evaluation throughout the last week prior to randomisation. A 21-d wash-out period was kept by patients entering the study following treatment with any of the forbidden drugs.	**Results** **Week 4** Not reported **Week 12** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u>	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - based on random block permutations

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 100512 **Country/ies where the study was carried out** Czech Republic **Study type** Randomized controlled trial **Aim of the study** To demonstrate the efficacy of cizolirtine by showing its superiority over placebo **Study dates** February 2002 to April 2003 **Source of funding** Laboratorios Doctor Esteve S.A. sponsored the study	OXY IR: 22/27 (81.5%) PLA: 53/54 (98.1%) Age (years) - Mean ± SD CIZ: 51.9 ± 11.7 OXY IR: 54.7 ± 13.0 PLA: 50.2 ± 13.9 Incontinence episodes/day - Mean ± SD CIZ: 1.6 ± 1.4 OXY IR: 2.1 ± 2.0 PLA: 2.0 ± 2.0 Urgency episodes/day - Median (range) Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] outpatients aged 18–80 yr with a diagnosis of urinary incontinence with urgency 2] idiopathic detrusor overactivity confirmed by urodynamic study 3] showing signs of lower urinary tract dysfunction (i.e. increased 24-h frequency [eight or more micturitions per 24 h] and/or urge incontinence [one incontinent episode or more per 24 h] as assessed by a bladder diary filled		After randomisation, visits were done after 2, 4, 8, and 12 wk. Shortly before the last visit, the urodynamic evaluation was repeated. **Power calculation** Based on previous studies, a sample size of 46 in each group would provide an 80% power to detect a between-group difference in means of 1.6 voidings per 24 h with a common standard deviation (SD) of 2.7 using a student t test at a 5% two-sided significance level. **Intention to treat analysis** Last observation carried forward (LOCF) was used to impute missing data.	Incontinence episodes CIZ: -1.2 ± 1.4 N = 52 OXY IR: -1.4 ± 1.8 N = 26 PLA: -0.6 ± 1.9 N = 54 Urgency episodes CIZ: -5.2 ± 7.7 N = 52 OXY IR: -4.8 ± 4.0 N = 26 PLA: -2.2 ± 4.0 N = 54 <u>Continence status (zero episodes per day)</u> Incontinence episodes reported as 'complete dryness' CIZ: 25/54 (46.3%) OXY IR: 17/27 (63.0%) PLA: 17/54 (31.5%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported	A2 - Was there adequate concealment - Yes - randomisation code kept in sealed envelopes A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	out throughout the week prior to randomisation 4] present with detrusor overactivity (phasic, terminal, or both) and/or increased bladder sensation during filling cystometry at a physiologic filling rate in the baseline urodynamic evaluation performed for the study. **Exclusion criteria** 1] evidence of a prevailing obstructive component (maximum flow rate < 10 ml per second with a postvoiding residual volume > 200 ml or chronic retention of urine) 2] urodynamic stress incontinence (involuntary leakage of urine during increased abdominal pressure in the absence of detrusor contraction) 3] an average total voided volume > 3000 ml per 24 h 4] obstructive conditions affecting the urethra 5] prostatic diseases 6] malignant hypertension 7] allergy or hypersensitivity to study drugs or to structurally related drugs 8] history of recurrent bacterial cystitis, bladder pain, or urethral pain on voiding; urinary tract infection within 1 wk prior to study enrolment; or any other clinically relevant disease which, in the opinion of the investigator, could			<u>Adverse effects</u> Any adverse effect CIS: 12/54 (22.2%) OXY IR: 8/27 (29.6%) PLA: 5/54 (9.3%) Dry mouth CIZ: 6/54 (11.1%) OXY IR: 5/27 (18.5%) PLA: 0/54 (0%) Dropouts for any reason CIZ:15/54 (27.8%) OXY IR: 3/27 (11.1%) PLA: 3/54 (5.6%) Dropouts for adverse effects CIZ:8/54 (14.8%) OXY IR: 2/27 (7.4%) PLA: 0/54 (0%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported	reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Data on continence status and discontinuation for any reason for both OXY IR and PLA groups only used in network meta-analysis

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	interfere with the evaluation of the study drug. 9] pregnant or breast-feeding 10] receiving pharmacologic treatment for incontinence, diuretics, long-acting benzodiazepines, central or peripheral a-adrenergic agonists or antagonists, or changing doses (ie, dose adjustments expected during the study) of drugs with anticholinergic side effects 11] had undergone urogenital surgery within the prior 3 mo or who received concomitant conservative treatment for urinary incontinence (eg, vaginal cones, behavioural modification, intermittent urinary catheterisation).				
Full citation Cartwright,R., Srikrishna,S., Cardozo,L., Robinson,D., Patient-selected goals in overactive bladder: a placebo controlled randomized double-blind trial of transdermal oxybutynin for the treatment of urgency and urge incontinence, BJU International, 107, 70-76, 2011	**Sample size** N = 96 Oxybutynin Trensdermal (OXT TD) = 48 Placebo = 48 **Characteristics** <u>Gender - Female, n/N (%)</u> OXY TD 3.9mg: 48/48 (100%) PLA: 48/48 (100%)	**Interventions** Oxybutynin transdermal was given in a matrix patch (functionally identical to EU and US licensed Kentera and Oxytrol) Placebo was given in matching patches Both OXY TD and plaecbi patches were stored in identical sealed foil sachets that fully mainteined blinding	**Details** After recruitment, patients entered a 2-week unblinded placebo period. Those already taking OAB medication stopped the medication and completed all baseline assessments. Patients then entered the 4-week double-blind period and further efficacy assessments were carried out at the end of this period. Safety assessments were carried	**Results** **Week 4** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes OXY TD 3.9mg: -0.47 ± 0.81 N not	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - true number method used A2 - Was there adequate

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 129148 **Country/ies where the study was carried out** UK **Study type** Randomized controlled trial **Aim of the study** To assess patient-reported goal improvement with 3.9mg/day transdermal oxybutynin in comparison with placebo over a 4-week period. **Study dates** October 2006 to December 2007 **Source of funding** UCB Pharma	<u>Age (Years) - Mean ± SD</u> OXY TD 3.9mg: 53.1 ± 14.5 PLA: 50.5 ± 13.7 <u>Urge Incontinence episodes / day - Mean ± SD</u> OXY TD 3.9mg: 1.0 ± 0.8 PLA: 0.6 ± 0.6 <u>Urgency episodes / day Mean ± SD</u> OXY TD 3.9mg: 3.9 ± 2.88 PLA: 2.74 ± 1.82 <u>Detrusor overactivity</u> Not reported <u>OAB duration Mean ± SD</u> Not reported **Inclusion criteria** 1] > 3 months history of OAB symptoms 2] with or without urgency urinary incontinence **Exclusion criteria** 1] history of hypersensitivity to oxybutynin 2] previous transdermal skin patch 3] pregnancy 4] breast feeding 5] voiding difficulties (flow rate < 15 Ml/s)	for both patients and clinicians. Patients were instructed to apply patches twice weekly. Patches were applied to dry intact skin over the abdomen, hip or buttock, immediately after removal from sealed foil patches. Patients were asked to place patch on a new site each application.	out throughout the 6-week study period. **Power calculation** A sample size of 74 was estinated to provide an 80% power to detect a 30% difference between OXY TD and placebo with alpha set at 0.05. Anticipating a 20% loss to follow-up, triallists planned to randomize 96 patients. **Intention to treat analysis** ITT analysis reported but no details given	reported PLA: -0.23 ± 0.61 N not reported Urgency episodes OXY TD 3.9mg: -1.23 ± 1.4 N not reported PLA: -0.21 ± 1.58 N not reported <u>Continence status</u> Not reported <u>Incontinence-specific quality of life</u> Not reported as means and SD's <u>Adverse effects</u> Dropouts for any reason OXY TD 3.9mg: 11/48 (22.9%) PLA: 7/48 (14.6%) Dropouts for adverse effects OXY TD 3.9mg: 4/48 (8.3%) PLA: 2/48 (4.2%) Any adverse effects Not reported Dry mouth Not reported	concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	6] postvoid residual > 50mLs 7] current UTI 8] one of a number of complaints contraindicating anticholinergic treatmnet as detailed in SPC for Kentera incluing narrow angle glaucome and myasthenia gravis			Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported **Week 12** Not applicable	assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Only data on dropouts for any reason used in network meta-analysis
Full citation Kaplan,S.A., Schneider,T., Foote,J.E., Guan,Z., Carlsson,M., Gong,J., Superior efficacy of fesoterodine over tolterodine extended release with rapid onset: a prospective, head-to-head, placebo-controlled trial, BJU International, 107, 1432-	**Sample size** n = 2417 Tolterodine (TOL ER) 4mg = 973 Fesoterodine (FES) = 960 Placebo = 478 **Characteristics** Gender - Female, n/N (%)	**Interventions** Tolterodine 4mg Extended Release Fesoterodine 8mg Placebo (dummy capsule or tablet)	**Details** A two-week single-blind placebo run-in period predated the study. Subjects were randomly allocated to festoterodine 8mg (*week 1 subjects received 4mg and from weeks 2-12 8mg), tolterodine	**Results** **Week 4** Patient satisfaction with treatment TOL ER: 588/973 (60.4%) FES: 614/960 (64.0%) PLA: 235/478 (49.2%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1440, 2011 **Ref Id** 129248 **Country/ies where the study was carried out** North America, South America, Europe, Asia and Africa **Study type** Randomised controlled trial **Aim of the study** "To prospectively assess the superiority of the maximum available dose of fesoterodine (8mg) over the maximum available dose of tolterodine ER (4mg)" **Study dates** Feb 2008 - Oct 2009 **Source of funding** "This study was funded and conducted by Pfizer Inc."	TOL ER: 817/973 (84%) FES: 816/960 (85%) PLA: 410/478 (86%) <u>Age. Mean ± SD</u> TOL ER: 58.1 ± 13.8 years FES: 57.9 ± 13.5 years PLA: 59.5 ± 13.2 years <u>Incontinence episodes / day - Mean ± SD</u> Not reported <u>Urgency episodes / day Mean ± SD</u> Not reported <u>Detrusor overactivity</u> Not reported <u>OAB duration Mean ± SD</u> TOL ER: 6.5 ± 7.3 years FES: 6.6 ±7.7 years PLA: 6.3 ± 7.2 years **Inclusion criteria** 1] Men and women ≥ 18 years old 2] self-reported AOB symptoms for three or more months 3] a mean of at least one UUI episode and ≥ 8 micturitions/24hr noted in a 3-day bladder diary at baseline.		4mg ER or placebo for twelve weeks. All subjects took one tablet (fesoterodine) or capsule (tolterodine) daily or matching placebo. All subjects completed a three-day bladder diary at baseline, weeks 1, 4 and 12. Subjective improvement scales, the Patient Perception of Bladder Condition (PPBS) and the Urgency Perception Scale (UPS) was collected at baseline, 1, 4 and 12 weeks. Patients completed the Overactive Active Bladder questionnaire (OAB-q) at baseline and the endpoint of the study. **Power calculation** 606 subjects per active treatment group were required for 90% power for comparisons at the 5% significance level. 303 subjects were required in placebo group for 88% power for each comparison. 1515 subjetcs were required	<u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes TOL ER: -1.52 ± 1.53 N = 932 FES: -1.68 ± 1.52 N = 920 PLA: -1.31 ± 1.49 N = 456 Urgency episodes TOL ER: -2.5 ± 6.1 N = 929 FES: -3.1 ± 6.0 N = 915 PLA: -1.9 ± 4.3 N = 453 <u>Continence status</u> Incontinence episodes TOL ER: 432/963 (43.4%) FES: 464/950 (48.3%) PLA: 177/472 (37.0%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported	<u>A Selection bias</u> A1 - Was there appropriate randomisation - Yes - block randomisation using a centralised system A2 - Was there adequate concealment - Yes - randomisation schedule generated and stored off site A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Unclear - not reported Level of bias: Low <u>C Attrition bias</u> C1 - Was follow-up equal

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria 1] Clinically significant hepatic or renal disease 2] Voiding dysfunction attributable to lower genitourinary pathology or surgical treatment 3] Neurological conditions (stroke, multiple sclerosis, spinal cord injury or Parkinson's disease) 4] History of acute urinary retention requiring catheterization 5] Symptoms of incontinence being predominately stress urinary incontinence in the opinion of the investigator 6] Antimuscarinic medication within two weeks before screening or electrostimulation, bladder training or pelvic floor exercises within four weeks of screening 7] Pregnant or nursing 8] women of childbearing potential who were heterosexually active without using adequate contraceptive measures.		assuming 90% of subjects woulc ontribute to full analysis set. **Intention to treat analysis** Last-observation-carried-forward was used for all missing post-baseline data but baseline data were not used.	<u>Adverse effects</u> Not applicable <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported **Week 12** <u>Patient satisfaction with treatment</u> TOL ER: 629/973 (64.6%) FES: 676/960 (70.4%) PLA: 272/478 (56.9%) <u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes of incontinence - Mean ± sd change scores TOL ER: -1.74 ± 1.82 N = 926 FES: -1.95 ± 1.51 N = 908 PLA: -1.62 ± 1.48 N = 448	for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low <u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Intervention: Yes 3] Outcomes: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Urgency episodes TOL ER: -3.5 ± 6.1 N = 933 FES: -4.2 ± 6.0 N = 915 PLA: -3.2 ± 4.3 N = 453 <u>Continence status</u> Incontinence episodes TOL ER: 538/963 (56.0%) FES: 574/950 (60.0%) PLA: 241/472 (50.4%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> OAB-q - HRQOL total score - change score TOL ER: 19.5 ± 29.6 N = 875 FES: 22.9 ± 28.9 N = 894 PLA: 17.2 ± 25.0 N = 435 <u>Adverse effects</u> Any adverse effect TOL ER: 267/973 (27.4%) FES: 388/960	**Other information** Results taken from clinicaltrials.gov (NCT00611026)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				(40.4%) PLA: 91/478 (19.0%) Dry mouth TOL ER: 130/973 (13.4%) FES: 265/960 (27.6%) PLA: 26/478 (5.4%) Dropout for any reason TOL ER: 88/973 (9.0%) FES: 98/960 (10.2%) PLA: 47/478 (9.8%) Dropout for adverse event TOL ER: 28/973 (4.7%) FES: 46/960 (2.9%) PLA: 9/478 (1.9%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume Not reported	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Vardy,M.D., Mitcheson,H.D., Samuels,T.A., Wegenke,J.D., Forero-Schwanhaeuser,S., Marshall,T.S., He,W., Effects of solifenacin on overactive bladder symptoms, symptom bother and other patient-reported outcomes: results from VIBRANT - a double-blind, placebo-controlled trial, International Journal of Clinical Practice, 63, 1702-1714, 2009 **Ref Id** 129390 **Country/ies where the study was carried out** USA **Study type** randomized controlled trial **Aim of the study** To evaluate the efficacy of solifenacin on symptom bother using the Overactive Bladder Questionnaire **Study dates**	**Sample size** N = 768 SOL = 386 PLA = 382 **Characteristics** Gender - Female/N (% female) SOL: 306/377 (81%) PLA: 314/374 (84%) Age (years) - Mean ± SD SOL: 59 ± 13 PLA: 60 ± 12 Incontinence episodes/day - Mean ± SD SOL: 2.9 ± 2.7 PLA: 2.8 ± 2.6 Urgency episodes/day - Mean ± SD SOL: 5.7 ± 3.7 PLA: 5.7 ± 3.9 Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported **Inclusion criteria** 1] Aged ≥ 18 years 2] OAB symptoms for ≥ 3 months	**Interventions** 5 mg solifenacin or placebo once daily	**Details** Eligible patients were randomised to receive 5mg solifenacin or placebo once daily for 4 weeks. At 4 weeks patients could maintain 5mg dose or increase to 10mg for 4 weeks. At week 8 patients taking 10mg could maintain or decrease dose to 5mg, patients taking 5mg could increase to 10mg. At baseline, and weeks 4, 8 and 12 patients completed the OAB-q and 3-day bladder diaries. At baseline and 12 weeks patients completed the PBBC and additional health-related quality of life and satisfaction with treatment questionnaires. At each visit investigators conducted brief physical examinations and recorded vital signs. Treatment-emergent adverse events were monitored and recorded **Power calculation** The primary efficacy variable was mean change on the OAB-q Symptom Bother scale from baseline to end of treatment. Assuming a	**Results** **Week 4** <u>Dropouts for any reason</u> SOL: 15/386 (3.9%) PLA: 22/382 (5.8%) **Week 12** Patient satisfaction with treatment SOL: 281/386 (72.8%) PLA: 197/382 (51.6%) <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes - change from baseline SOL: -1.85 (No SD) N not reported PLA: -1.24 (No SD) N not reported Urgency episodes SOL: -3.05 (No SD) N not reported PLA: -1.84 (No SD) N not reported <u>Continence status (zero episodes per day)</u>	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Yes A3 - Were groups comparable at baseline - Yes - but baseline characteristics not reported for full study population - 17 patients with missing postbaseline OAB-q data were excluded from data set Level of bias: unclear B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Not reported **Source of funding** Astellas Pharma US Inc and GlaxoSmithKline	(≥ 8 micturitions and ≥ 1 urgency episode with or without incontinence per 24 h) 3] Score ≥ 3 on Patient Percpetion of Bladder Condition (PBBC) questionnaire **Exclusion criteria** 1] Significant stress or stress-predominant mixed incontinence 2] ≥ 3 episodes of urinary tract infection (UTI) within past 3 months 3] Evidence of UTI at baseline 4] Evidence of chronic urologic inflammation/interstitial cystitis 4] Urinary/gastric retention		standard deviation of 22.0 and that 80% of randomised patients would be evaluable, 381 randomised subjects per treatment group provided > 99% power to detect a 10-point difference in between treatment groups using a two-sided test at a significance level of 0.05. **Intention to treat analysis** All efficacy analyses were conducted on the full analysis set which consisted of patients who took ≥1 dose of study drug, had a baseline OAB-q assessment and ≥1 post baseline OAB-q assessment	Incontinence episodes SOL: 119/273 (43.6%) PLA: 80/272 (29.4%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Scale used - OAB-q - mean change from baseline SOL: 29.9 (No SD) N not reported PLA: 20.4 (No SD) N not reported <u>Adverse effects</u> Any adverse effect SOL: 100/386 (26%) PLA: 50/382 (13%) Dry mouth SOL: 51/386 (13.2%) PLA: 9/382 (2.4%) Dropouts for any reason SOL: 35/386 (9.1%) PLA: 48/382 (12.6%)	C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Use of antimuscarinics, antispasmodics, tricyclic

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Dropouts for adverse effects SOL: 12/386 (3%) PLA: 15/382 (4%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	anitdepressants and anti-Parkinson agents was prohibited, use of tetracyclic antidepressants, antihistamines and antiemetics was permitted to continue if patients had been taking drug on a long-term basis at a stable dose. Patients taking OAB medications were eligible after discontinuation and completion of a ≥14 day washout period. Additional data (continence status) from secondary publication: Vardy et al. Female Pelvic Medicine & Reconstructive Surgery 2011; 17(1): 24-29
Full citation Yamaguchi,O., Nishizawa,O., Takeda,M., Yoshida,M., Choo,M.S., Gu,LeeJ, Tong-Long,LinA, Lin,H.H., Andrew,YipW, Isowa,H., Hiro,S., Efficacy, safety and tolerability of fesoterodine in asian patients with overactive bladder, LUTS: Lower Urinary	**Sample size** N = 951 Fesoterodine 4mg QD (FES $) = 320 Fesoterodine 8mg QD (FEs 8) = 313 Placebo (PLA) = 318	**Interventions** The study, which consisted of a 2-week placebo run-in period followed by a 12-week double-blind treatment period, required a total of six clinic visits. In the placebo run-in period, subjects received one tablet of placebo in the morning. Once eligibility was	**Details** Efficacy variables were assessed with 3-day micturition diaries that subjects completed on 3 consecutive days during the 7 days prior to each visit. The primary efficacy endpoint was the change from baseline in the mean number	**Results** **Week 4** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u>	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Tract Symptoms, 3, 43-50, 2011 **Ref Id** 129406 **Country/ies where the study was carried out** Japan, Korea, Taiwan, Hong Kong **Study type** Randomised controlled trial **Aim of the study** To assess the efficacy, safety and tolerability of fesoterodine 4 and 8 mg QD compared with placebo at week 12 of treatment in Asian subjects with OAB. **Study dates** Not reported **Source of funding** Sponsored by Pfizer Japan	**Characteristics** Gender - Female/N (% female) FES 4: 251/320 (78.9%) FES 8: 255/313 (81.5%) PLA: 251/318 (78.9%) Age (years) - Mean ± SD FES 4: 57.2 ± 14.2 FES 8: 58.8 ± 13.4 PLA: 56.7 ± 13.5 Number of incontinence episodes/week Mean ± SD FES 4: 2.2 ± 1.8 FES 8: 2.3 ± 1.8 PLA: 2.2 ± 1.9 Urgency episodes Not reported Detrusor overactivity Not reported Duration of OAB - Mean ± SD Not reported **Inclusion criteria** 1] ≥ 20 years of age 2] a medical history of OAB symptoms or signs with urinary urgency and increased urinary frequency that lasted for ≥6 months prior to enrollment and UUI that lasted for ≥ 1 month prior to enrollment 3] ≥ 1 UUI episodes and ≥8	established, subjects were randomized 1:1:1–12 weeks of double-blind treatment (QD in the morning) with fesoterodine 4 mg QD, fesoterodine 8 mg QD, or matching placebo.	of UUI episodes per 24 h at week 12 of treatment. **Power calculation** None reported **Intention to treat analysis** None reported	Incontinence episodes - mean ± SD change from baseline FES 4: -1.61 ± 1.76 N = 314 FES 8: -1.50 ± 1.71 N = 296 PLA:-1.22 ± 1.59 N = 301 Urgency episodes FES 4: -2.16 ± 2.91 N = 303 FES 8: -2.16 ± 3.07 N = 296 PLA: -1.60 ± 2.78 N = 301 <u>Continence status (zero episodes per day)</u> Incontinence episodes - incontinent at baseline only Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Not reported	randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Unclear B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	micturitions per 24 h during a 3-day diary period of the placebo run-in phase 4] at least moderate problems based on the Patient Perception of Bladder Condition (PPBC) measure 5] a negative urine pregnancy test for women of child-bearing potential. **Exclusion criteria** 1] neurological diseases influencing bladder function (e.g. stroke, multiple sclerosis, Parkinson's disease, spinal cord injury, spina bifida and autonomic neuropathy) 2] lower urinary tract pathologies potentially responsible for urgency or incontinence (e.g. bladder stone, interstitial cystitis and urothelial tumors) 3] clinically relevant bladder outlet obstruction (e.g. benign prostatic hyperplasia) 4] pelvic organ prolapse 5] predominant symptoms of stress urinary incontinence 6] active urinary tract infection 7] residual urine volume of > 100 ml 8] polyuria (> 3000 ml/24 h) 9] treatment with antimuscarinic drugs during the study 10] clinically relevant arrhythmia,			Psychological outcomes Not reported Clinical measures Not reported **Week 12** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day Incontinence episodes - mean ± SD change from baseline FES 4: -1.97 ± 1.84 N = 284 FES 8: -1.86 ± 2.0 N = 281 PLA: -1.59 ± 2.87 N = 284 Urgency episodes FES 4: -2.89 ± 2.83 N = 284 FES 8: -3.05 ± 3.46 N = 281 PLA: -2.37 ± 2.98 N = 284 Continence status (zero episodes per day) Incontinence	reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Outcome data taken from NCT00561951 (www.clinicaltrials.gov) Data from FES 4 group used in reviews

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	unstable angina, other unstable cardiovascular conditions, or pacemaker 11] corrected QT interval (Bazett's formula or Fridericia formula) of > 500 ms.			episodes - incontinent at baseline only Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> OAB-q HRQOL used FES 4: 17.84 ± 17.88 N = 283 FES 8: 17.29 ± 19.67 N = 283 PLA: 12.88 ± 18.87 N = 285 <u>Adverse effects</u> Any adverse effect FES 4: 138/320 (43.1%) FES 8: 185/313 (59.1%) PLA: 66/318 (20.8%) Dry mouth FES 4: 93/320 (9.1%) FEs 8: 158/313 (50.5%) PLA: 31/318 (9.7%) Dropouts for any reason	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				FES 4: 34/320 (10.6%) FES 8: 32/313 (10.2%) PLA: 33/318 (10.4%) Dropouts for adverse effects FES 4: 14/320 (4.4%) FES 8: 14/313 (4.5%) PLA: 11/318 (3.5%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> FES 4: 17.8 ± 33.4 N not reported FES 8: 18.8 ± 31.3 N not reported PLA: 10.4 ± 23.4 N not reported	
Full citation Weiss,Jeffrey P., Jumadilova,Zhanna, Johnson II,Theodore M., FitzGerald,Mary P., Carlsson,Martin, Martire,Diane L., Malhotra,Atul, Efficacy and	**Sample size** N = 963 FES = 476 (463 began treatment) PLA = 487 (474 began treatment)	**Interventions** 4 mg fesoterodine or placebo once daily	**Details** After 2-week screening, subjects who met inclusion criteria began a 2-week single-blind placebo run-in period. After run-in period, subjects with ≤35% decrease in nocturnal urgency	**Results** **Week 4 results** Not reported **Week 12 results** <u>Patient satisfaction with treatment</u> Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Safety of Flexible-Dose Fesoterodine in Men and Women with Overactive Bladder Symptoms, Including Nocturnal Urinary Urgency, The Journal of Urology, ePub ahead of print, -, 2012 **Ref Id** 214959 **Country/ies where the study was carried out** USA **Study type** randomized controlled trial **Aim of the study** To test the hypothesis that fesoterodine would be superior to placebo in the treatment of nocturnal urgency in OAB patients with nocturia **Study dates** August 2009 - September 2011 **Source of funding** Sponsored by Pfizer Inc.	**Characteristics** Gender - Female/N (% female) FES: 313/463 (67.6%) PLA: 312/474 (65.8%) Age (years) - Mean ± SD FES: 58.0 ± 14.7 PLA: 57.5 ± 14.0 Incontinence episodes/week - Mean ± SD FES: 2.20 ± 2.55 PLA: 2.23 ± 2.49 Urgency episodes/day - Mean ± SD FES: 9.8 ± 3.62 PLA: 10.0 ± 4.0 Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean (range) FES: 7.5 (0.3 - 49.8) PLA: 8.0 (0.3 - 56.0) **Inclusion criteria** 1] Aged ≥ 18 years 2] Self-reported OAB symptoms including nocturnal urgency for ≥ 3 months before screening 3] Mean ≥ 8 micturitions/24 h, ≥ 3 urgency episodes/24 h, and ≥ 2 but ≤ 8 nocturnal urgency episodes/24 h on bladder diary at screening		episodes/24 h from screening to baseline, total urine volume ≤ 3500 ml recorded on 1 of 3 baseline diary days and nocturnal volume voided ≤ 50% of total 24-h urine volume voided recorded on 1 of 3 baseline diary days were randomized. Eligible subjects were randomized to fesoterodine 4mg or matching placebo once daily. At week 4, based on efficacy and tolerability, the investigator could increase fesoterodine dose to 8mg once daily or continue 4mg once daily for remaining 8 weeks of the study. No further dose adjustments were permitted after week 4. Subjects completed a 3-day bladder diary at screening (week -4), beginning placebo run-in (week -2), end of placebo run-in (baseline), and weeks 4 and 12. OAB-q completed at baseline and week 12 **Power calculation** Estimated sample size was 426 subjects per group to provide approximately 80% power to detect a clinically	<u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes - mean ± SD change from baseline FES: -1.44 ± 2.42 N = 463 PLA: -1.28 ± 2.02 N = 474 Urgency episodes - mean ± SD change from baseline FES: -3.53 ± 3.98 N = 463 PLA: -2.81 ± 3.81 N = 474 <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported urgency episodes Not reported <u>Incontinence-specific quality of life</u> OAB-q used* FES: 17.42 ± 18.0	A1 - Was there appropriate randomisation - Yes A2 - Was there adequate concealment - Yes A3 - Were groups comparable at baseline - Yes - but baseline data only reported for those beginning treatment Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Medical writing support funded by Pfizer Inc	**Exclusion criteria** 1] Clinically significant hepatic or renal disease 2] Treatment with potent CYP3A4 inhibitors 3] Intermittent or unstable use of tricyclic antidepressants, estrogens, diuretics, alpha-blockers or 5-alpha reductase inhibitors 4] Pregnancy or nursing 5] Recent history/known diagnosis of any sleep disorder 6] Nocturia due to uncontrolled conditions other than OAB including chronic heart failure, diabetes mellitus, diabetes insipidus or polyuria 7] History of acute urinary retention requiring catheterization or severe voiding difficulties 8] Use of indwelling catheter or intermittent self-catheterization 9] Predominant stress urinary incontinence 10] Urinary tract infection or recurrent UTI (≥ 3 times in past year) 11] Initiation of electrostimulation, formal bladder training, or pelvic floor exercises within 4 weeks of screening 12] Prior use of study medication 13] Treatment with antimuscarinic OAB medication within 2 weeks of screening		meaningful difference of ≥ 0.25 epsidoes/24 H in mean change from baseline to week 12 in nocturnal urgency episodes between fesoterodine and placebo using a 2-sided t-test with alpha 5%. Allowing for drop-out rate of 8%, 928 randomized subjects (464 per group) were required. A blinded sample size re-estimation conducted when 341 subjects completed the study indicated that no increase in sample size was necessary. **Intention to treat analysis** Diary and OAB-q analyses were based on the full analysis set (i.e. all subjects who took ≥ 1 dose of study drug and had at least a baseline and a post-baseline efficacy assessment)	N = 393 PLA: 14.39 ± 20.4 N = 416 <u>Adverse effects</u> Any adverse effect FES: 188/476 (39%) PLA: 152/487 (31%) Dry mouth FES: 98/476 (21%) PLA: 36/487 (7%) Dropouts for any reason FES: 95/476 (20%) PLA: 87/487 (18%) Dropouts for adverse effects FES: 25/476 (5%) PLA: 11/487 (2%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume - Mean change from baseline (95% CI) Not reported	assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** 13 particpants in each group dropped out of the trial before starting treatment 12 week data on OAB-q taken from NCT00911937 (www.clinicaltrials.gov)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Huang,Alison J., Hess,Rachel, Arya,Lily A., Richter,Holly E., Subak,Leslee L., Bradley,Catherine S., Rogers,Rebecca G., Myers,Deborah L., Johnson,Karen C., Gregory,W.Thomas, Kraus,Stephen R., Schembri,Michael, Brown,Jeanette S., Pharmacologic treatment for urgency-predominant urinary incontinence in women diagnosed using a simplified algorithm: a randomized trial, American Journal of Obstetrics and GynecologyAm J Obstet Gynecol, 206, 444-444, 2012 **Ref Id** 214960 **Country/ies where the study was carried out** USA **Study type** randomized controlled trial	**Sample size** N = 645 Fesoterodine = 322 Placebo =323 **Characteristics** Gender - Female/N (% female) FES: 322/322 (100%) PLA: 323/323 (100%) Age (years) - Mean ± SD FES: 56.2 ± 14.7 PLA: 55.9 ± 14.2 Incontinence episodes/day - Mean ± SD FES: 3.8 ± 2.9 PLA: 4.0 ± 3.0 Urgency episodes/day - Mean ± SD FES: 7.5 ±4.1 PLA: 7.8 ± 4.5 Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported	**Interventions** 12-weeks flexible dose (4-8mg) fesoterodine (Toviaz; Pfizer, Inc, New York, NY, USA) or identical placebo pill daily	**Details** Eligible women were randomised 1:1 to either fesoterodine or placebo. Women were initially started on 4mg fesoterodine or an idential placebo pill daily. At 2-week telephone call and 4-week follow-up visit women were offered option of increasing their dose to 8mg fesoterodine or an identical placebo pill daily. At 8-week telephone call they were invited to readjust their dose to a maximum of 8 or minimum of 4 mg daily. All clinical efficacy outcomes were measured at baseline, 4 and 12 weeks. Self-reported urgency episodes were documented by 3-day voiding diary. Measurement of PVR volume was performed by bladder ultrasound scanning or catheterization at 12 weeks or early termination. **Power calculation** Sample size of 636	**Results** **Week 4 results** Not reported **Week 12 results** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day Incontinence episodes - change from baseline (mean ± SD, N) FES: - 2.9 ± 2.7 N = 303 PLA: -2.1 ± 2.9 N = 301 Urgency episodes FES: -2.1 ± 3.8 N = 303 PLA: -1.4 ± 3.9 N = 301 Continence status (zero episodes per day) Incontinence epipsodes FES: 79/322 (24.5%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - yes A2 - Was there adequate concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To examine the efficacy and safety of initiating pharmacologic therapy for urgency incontinence in women **Study dates** February 2009 - Januaruy 2010 **Source of funding** Pfizer Inc provided funding for the study and study medication but did not provide input into design of study, collection, analysis or interpretation of data, writing of report or decision to submit paper for publication	**Inclusion criteria** 1] ≥ 18 years old 2] ≥ 7 incontinence episodes per week in past 3 months 3] Self-diagnosed with urgency-predominant incontinence on the 3 Incontinence Questionons (3IQ) questionnaire **Exclusion criteria** 1] Anti-incontinence surgery in past 5 years 2] Other pelvic surgery in past 6 months 3] > 3 urinary tract infections in past year 4] Lower urinary tract or rectal fistula 5] Interstitial cystitis 6] Symptomatic pelvic organ prolapse 7] Urogenital cancer or radiation 8] Congenital abnormality leading to incontinence 9] Major neurologic disorder 10] Urinary or gastric retention 11] Uncontrolled narrow-angle glaucoma 12] Myasthenia gravis 13] Severe ulcerative colitis 14] Clinically significant hepatic or renal disease 15] Toxic megacolon 16] Potent CYP3A4 inhibitor treatment in the last 2 weeks 17] Pregnancy or nursing		participants was estimated to provide 90% power to detect a net reduction in urgency incontinence frequency with a 2 sample t test and the assumption of a 15% drop-out rate. The effect size was based on pooled data from 2 previous trials that reported an average effect size of 0.92 episodes per day and a standard deviation of 3.2 episodes per day. **Intention to treat analysis** Sensitivity analysis was performed to address potential bias - missing imputation analyses were performed on all participants with intent to treat	PLA: 34/323 (10.5%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Scale used - Overactive Bladder Questionnaire Change from baseline (mean ± SD) FES: -17.1 ± 17.6 N = 303 PLA: -12.0 ± 16.6 N = 301 <u>Adverse effects</u> Any adverse effect FES: 187/322 (58.1%) PLA: 149/323 (46.1%) Dry mouth Not reported Dropouts for any reason FES: 29/322 (9.0%) PLA: 30/323 (9.3%) Dropouts for	C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				adverse effects FES: 11/322 (3.4%) PLA: 8/323 (2.5%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume at end point (mean ± SD) FES: 39.1 ± 48.0 N = 303 PLA: 31.2 ± 39.0 N = 301	
Full citation Oreskovic,S., But,I., Banovic,M., Goldstajn,M.S., The efficacy and safety of solifenacin in patients with overactive bladder syndrome, Collegium Antropologicum, 36, 243-248, 2012 **Ref Id** 215468 **Country/ies where the study was carried out** Croatia	**Sample size** N = 171 Solifenacin (SOL) = 77 Placebo (PLA) = 80 **Characteristics** Gender - Female/N (% female) SOl: 77/77 (100%) PLA: 80/80 (100%) Age (years) - Mean ± SD SOL: 56.77 ± 10.16 PLA: 57.03 ± 10.95 Incontinence episodes/day -	**Interventions** Following a single blind 2-week placebo run in period, patients were randomized to 4 weeks of solifenacin in 5 mg once daily doses or placebo.	**Details** Treatment efficacy was evaluated after one and four weeks treatment periods according to subjective assesment using data recorded in patient diaries in the one and four week periods preceding the scheduled clinical visits. **Power calculation** Not reported	**Results** **Week 4** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes SOL: 0.96 ± 0.57 N = 77 PLA: 2.75 ± 0.43 N = 80 Urgency episodes	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Randomised controlled trial **Aim of the study** To evaluate the efficacy, tolerability and safety of solifenacin in patients with overactive bladder syndrome. **Study dates** Not reported **Source of funding** Not reported	Range Not reported Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] Patients who complained from symptoms of OAB for at least 6 months 2] urge incontinence (at least but no more than 50 episodes per week), frequency of micturition (at least eight voids per 24 hours) and urgency (a strong desire to void at least once per day) **Exclusion criteria** 1] contraindications for the use of antimuscarinic drugs (e.g. uncontrolled narrow-angle glaucoma, urinary or gastric retention) 2] clinically significant stress urinary incontinence (more than one episode per week) 3] clinically significant bladder outlet obstruction and /or a post-void residual volume more than		**Intention to treat analysis** Not reported	SOL: 5.77 ± 1.33 N = 77 PLA: 6.54 ± 0.50 N = 80 <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> IIQ used SOL: 36.25 ± 10.34 N = 77 PLA: 46.86 ± 6.81 N = 80 <u>Adverse effects</u> Any adverse effect Not reported Dry mouth Not reported Dropouts for any reason Not reported Dropouts for adverse effects Not reported	differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Unclear C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	200 ml 4] genitourinary condition that could cause urinary symptoms 5] recent urogenital surgery 6] hepatic disease.			<u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported **Week 12** Not reported	Level of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** Baseline data incomplete (not available for dropouts)
Full citation Homma,Y., Paick,J.S., Lee,J.G., Kawabe,K., Japanese and Korean Tolterodine Study Group, Clinical efficacy and tolerability of extended-release tolterodine and immediate-release oxybutynin in Japanese and Korean patients with an overactive bladder: a randomized, placebo-controlled trial, BJU International, 92, 741-747,	**Sample size** N = 608 Tolterodine ER (TOL ER) = 240 Oxybutynin IR (OXY IR) = 246 Placebo (PLA) = 122 **Characteristics** Gender - Female/N (% female) TOL ER: 162/240 (68%) OXY IR: 177/246 (73%) PLA: 69/122 (69%) Age (years) - Mean ± SD TOL ER: 61.2 ± 11.8	**Interventions** Patients randomized in a 2:2:1 ratio to treatment with tolterodine ER 4 mg capsules once daily (Detrol® capsule/Detrusitol, Pharmacia Corporation, USA), oxybutynin IR 3 mg tablets three times daily (Pollakisu®, Aventis Pharma Ltd, Japan) or placebo. Patients were randomized using the method of random permuted blocks. Because the two active drugs differed in appearance and were administered according	**Details** Eligible patients were enrolled into a 1- or 2-week wash-out/run-in period during which baseline voiding data (incontinence episodes, urinary frequency, volume voided/void, incontinence pad usage) were recorded using voiding diaries. Voiding diaries were completed over 7 consecutive days during the run-in period (baseline) and the final week of treatment.	**Results** **Week 4 results** Not reported **Week 12 results** Patient satisfaction with treatment reported as 'much benefit' at endpoint TOL ER: 90/240 (37.5%) OXY IR: 100/246 (40.7% PLA: 26/122 (21.3%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline -

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
2003 **Ref Id** 220246 **Country/ies where the study was carried out** Japan and South Korea **Study type** Randomised controlled trial **Aim of the study** To compare tolterodine ER and oxybutynin IR with placebo in Japanese and Korean patients with OAB **Study dates** Not reported **Source of funding** Supported by a grant from Pharmacia Corporation	OXY IR: 57.9 ± 12.5 PLA: 58.4 ± 14.0 Incontinence episodes/week - Mean ± SD TOL ER: 20.3 ± 20.6 OXY IR: 21.8 ± 19.8 PLA: 19.0 ± 15.5 Urgency episodes/day Not reported Detrusor overactivity - n/N (%) Not reported Duration of OAB - Mean ± SD Not reported **Inclusion criteria** 1] Men and women aged ≥ 20 years with symptoms of urinary urgency, urinary frequency (≥ 8 voids/24 h), urge incontinence (≥ 5 episodes/week) and symptoms of OAB for ≥6 months **Exclusion criteria** 1] demonstrable stress incontinence 2] total daily urine volume of >3 L 3] average volume voided/void of >200 ml 4] significant hepatic or renal disease 5] any contraindication to	to different daily schedules, blinding was by a variation on the double-dummy technique, so that matching placebos for both tolterodine ER 4 mg and oxybutynin IR 3 mg were provided. Patients were instructed to take one tolterodine ER 4 mg or placebo capsule in the morning plus one oxybutynin IR 3 mg or placebo tablet in the morning, at midday, and in the evening. No dose adjustment was permitted during the study	All incontinence episodes and voids during the 7-day periods were recorded. Volume voided/void and pad usage had to be recorded for at least two complete days. **Power calculation** Based on an assumed sd of 58% in a previous study, the aim was to enrol 600 patients (randomized 2:2:1), to detect a mean difference in efficacy of 20% between tolterodine ER and placebo (at 80% power and 5% significance level) and to show that tolterodine ER was not inferior to oxybutynin IR (at 80% power and 2.5% significance level). **Intention to treat analysis** The efficacy was analysed on an intent-to-treat basis for all randomized patients who received at least one dose of study drug, using the last-observation-carried-forward for any missing 12-week values. ANOVA was used to compare treatment groups, with factors for treatment, country and treatment–country interactions	Self-reported rate of absolute symptom reduction per day Incontinence episodes Not reported Urgency episodes Not reported Continence status (zero episodes per day) Incontinence episodes Not reported Urgency episodes Not reported Incontinence-specific quality of life Not reported Adverse effects Any adverse effect Not reported Dry mouth TOL ER: 80/240 (33.5%) OXY IR: 131/246 (53.3%) PLA: 12/122 (9.8%) Dropouts for any	Yes Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	anticholinergic treatment, e.g. uncontrolled narrow-angled glaucoma, urinary retention or gastric retention 6] symptomatic or recurrent UTI 7] interstitial cystitis 8] haematuria or BOO 9] an indwelling catheter or intermittent self-catheterization 10] electrostimulation or bladder training within 14 days before randomization or expected to commence during the study period 11] Concomitant treatment with any other anticholinergic drug or an unstable dosage of any drug with anticholinergic side-effects, any other drug for OAB (except for oestrogen started > 2 months before inclusion), potent CYP3A4 inhibitors, or any investigational drug, was not permitted during the study or in the 14 days before randomization 12] Pregnant or nursing women and women of childbearing potential not using reliable contraception were also excluded		(removed from the model if P > 0.2). Two-sided t-tests with significance levels of 5% and 95% CIs were calculated based on the least-squares means. If data were not normally distributed, i.e. skewed, a pre-planned nonparametric analysis with ANOVA based on the rank-transformation of the original variable was used.	reason TOL ER: 25/240 (10.4%) OXY IR: 57/246 (23.2%) PLA: 20/122 (16.4%) Dropouts for adverse effects TOL ER: 12/240 (10.4%) OXY IR: 42/246 (23.2%) PLA: 1/122 (16.4%) Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported	Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Data on Oxybutynin IR 3mg not used in reviews or network meta-analysis as it is lower than the recommnended starting dose
Full citation Chapple,C.R., Rechberger,T., Al Shukri,S., Meffan,P., Everaert,K., Huang,M., Ridder,A., Study Group., Randomized, double-blind placebo- and tolterodine-	**Sample size** N = 1081 Solifenacin 5mg (SOL 5) = 279 Solifenacin 10mg (SOL 10) = 269 Tolterodine IR (TOL IR) = 266 Placebo (PLA) = 267	**Interventions** Eligible patients after the run-in period were randmised equally to 12-week double-blind treatment with either tolterodine 2 mg twice daily, placebo, or solifenacin 5 or 10	**Details** At an initial screening visit (week 2) the patients provided a medical history, and had a physical examination, postvoid bladder ultrasonography,	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
controlled trial of the once-daily antimuscarinic agent solifenacin in patients with symptomatic overactive bladder, BJU International, 93, 303-310, 2004 **Ref Id** 220250 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial **Aim of the study** To assess the efficacy of solifenacin 5mg and 10mg once-daily compared with placebo in a large sample of patients with symptoms of OAB **Study dates** Not reported **Source of funding** Supported by a grant from Yamanouchi Pharmaceuticals Co. Ltd. Tokyo, Japan	**Characteristics** Gender - Female/N (% female) SOL 5: 194/266 (72.6%) SOL 10: 188/264 (71.2%) TOL IR: 200/250 (80.0%) PLA: 193/253 (76.3%) Age (years) - Mean ± SD SOL 5: 58.1 ± 13.4 SOL 10: 57.2 ± 13.4 TOL IR: 56.9 ± 1.8 PLA: 57.8 ± 13.7 Incontinence episodes/day: Mean ± SD SOL 5: 2.54 ± 2.56 SOL 10: 2.59 ± 2.88 TOL IR: 2.2 ± 1.94 PLA: 2.71 ± 2.83 Urgency episodes/day: Mean ± SD SOL 5: 5.77 ± 4.89 SOL 10: 5.82 ± 4.45 TOL IR: 5.45 ± 3.87 PLA: 5.30 ± 3.92 Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] Men and women aged ≥ 18	mg once daily.	blood and urine laboratory analyses (including urine culture), and an electrocardiogram (ECG). Eligible patients received placebo twice daily (morning and evening) over a 2-week run-in period; during the 3 days before the next visit (week 0), patients recorded in a voiding diary episodes of urgency and incontinence, the times of voiding, volumes voided/void, pad use, and episodes of sleep disturbance **Power calculation** Based on a projected difference of 1.0 in the change from baseline in voiding frequency/24 h for solifenacin vs placebo, with a sd = 3, a significance level of α= 0.05, two-sided, and a power of 90%, 190 evaluable patients per treatment arm were required. To obtain a total of 760 evaluable patients, assuming a discontinuation rate of 20% during the run-in and treatment periods, 1180 patients had to be enrolled.	Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes - Mean ± SD change from baseline SOL 5: -1.42 ± 1.82 N = 141 SOL 10: -1.45 ± 2.24 N = 158 TOL IR: -1.14 ± 2.15 N = 157 PLA: -0.76 ± 2.26 N = 153 Urgency episodes SOL 5: -2.85 ± 3.74 N = 264 SOL 10: -3.07 ± 3.90 N = 261 TOL IR: -2.05 ± 3.58 N = 250 PLA: -1.41 ± 3.67 N = 248 <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported	A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Medium B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	years with symptoms of OAB (including urgency, urge incontinence, or frequency) for ≥ 3 months 2] average frequency of ≥ 8 voids/24 h and have experienced at least three episodes of urgency and/or three episodes of incontinence during the 3-day voiding diary period **Exclusion criteria** 1] clinically significant BOO 2] postvoid residual volume of >200 ml 3] incontinence for which stress was determined to be the predominant factor 4] presence of a neurological cause for detrusor muscle overactivity 5] evidence of UTI or bladder stones 6] previous pelvic irradiation 7] previous or current malignant disease of the pelvic organs 8] Any medical condition contraindicating the use of antimuscarinic medication (including narrow-angle glaucoma and urinary or gastric retention) 9] nonpharmacological treatment for OAB including electrostimulation therapy or start of a bladder training programme during the 2 weeks before or during the study		**Intention to treat analysis** Not reported	<u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect Not reported Dry mouth SOL 5: 39/279 (14.0%) SOL 10: 57/269 (21.2%) TOL IR: 49/266 (18.4%) PLA: 13/267 (4.9%) Dropouts for any reason SOL 5: 28/279 (11.5%) SOL 10: 20/269 (7.8%) TOL IR: 29/266 (12.0%) PLA: 32/267 (12.0%) Dropouts for adverse effects SOL 5: 9/279 (3.2%) SOL 10: 7/269 (2.6%) TOL IR: 5/266 (1.9%) PLA: 10/267	D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Data from Sol 10mg not used in review or network meta-analysis as this is more than the recommended starting dose

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	10] diabetic neuropathy, 11] use of drugs intended to treat incontinence 12] use of any drugs with cholinergic or anticholinergic side-effects 13] participation in a clinical trial within 30 days before study entry 14] Women of child-bearing potential who were pregnant or nursing, intending to become pregnant during the study, or who were not using reliable contraceptive methods, were ineligible			(2.7%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported	
Full citation Chapple,C.R., Arano,P., Bosch,J.L., De Ridder,D., Kramer,A.E., Ridder,A.M., Solifenacin appears effective and well tolerated in patients with symptomatic idiopathic detrusor overactivity in a placebo- and tolterodine-controlled phase 2 dose-finding study.[erratum appears in BJU Int. 2004 May;93(7):1135], BJU International, 93, 71-77, 2004 **Ref Id** 220251 **Country/ies where the**	**Sample size** N = 225 Solifenacin 2.5mg (SOL 2.5) = 41 Solifenacin 5mg (SOL 5) = 37 Solifenacin 10mg (SOL 10) = 35 Solifenacin 20mg (SOL 20) = 37 Tolterodine IR (TOL IR) = 37 Placebo (PLA) = 38 **Characteristics** Solifenacin 2.5mg (SOL 2.5) = 41 Solifenacin 5mg (SOL 5) = 37 Solifenacin 10mg (SOL 10) = 35 Solifenacin 20mg (SOL 20) = 37 Tolterodine IR (TOL IR) = 37 Placebo (PLA) = 38	**Interventions** Eligible patients received placebo for 2 weeks as a run in and then were randomized to oral therapy with solifenacin once daily (2.5mg, 5mg, 10mg or 20mg), tolterodine IR capsules 2 mg twice daily, or placebo for 4 weeks. No dosage adjustment was allowed during the study	**Details** During the single-blind placebo run-in period all patients received two placebo capsules in the morning and one in the evening. Eligible patients were randomized to receive placebo or one of five active treatments: solifenacin 2.5, 5, 10, or 20 mg once daily, or immediate-release tolterodine 2 mg twice daily. **Power calculation** With 40 patients per treatment group it was considered possible to detect	**Results** **Week 4** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes - Mean (No SD reported) SOL 2.5: -0.66 N = 40 SOL 5: -0.83 N = 37 SOL 10: -0.79 N = 33 SOL 20: -0.58 N =	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Yes - identical packaging used A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
study was carried out UK **Study type** Randomised controlled trial **Aim of the study** To evaluate the dose-repsonse relationship of solifenacin in patients with OAB. **Study dates** Not reported **Source of funding** Not reported	Gender Not reported Age (years) Not reported Incontinence episodes/day - Mean SOL 2.5: 1.6 (No SD reported) SOL 5: 1,5 (No SD reported) SOL 10: 1.7 (No SD reported) SOL 20: 1.0 (No SD reported) TOL IR: 1.5 (No SD reported) PLA: 1.7 (No SD reported) Urgency episodes/day SOL 2.5: 5.9 (No SD reported) SOL 5: 5.8 (No SD reported) SOL 10: 5.3 (No SD reported) SOL 20: 5.2 (No SD reported) TOL IR: 5.7 (No SD reported) PLA: 5.2 (No SD reported) Detrusor overactivity SOL 2.5 = 41/41 (100%) SOL 5 = 37/37 (100%) SOL 10 = 35/35 (100%) SOL 20 = 37/37 (100%) TOL IR = 37/37 (100%) PLA = 38/38 (100%) Duration of OAB Not reported **Inclusion criteria** 1] Men and women aged 18–80 years were eligible to enter the study if they had idiopathic		a difference of 0.63 sds/24 h for changes between the solifenacin and placebo group, with 80% power at a significance level of $P < 0.05$. Considering a sd of 2.9 voids/24 h, the detectable difference was 1.8 voids/24 h (with no adjustment for multiple comparisons). **Intention to treat analysis** Not reported	34 TOL IR: -0.41 N = 37 PLA: -0.28 N = 36 Urgency episodes - Mean (No SD reported) SOL 2.5: -1.07 N = 40 SOL 5: -2.35 N = 37 SOL 10: -2.46 N = 33 SOL 20: -2.24 N = 34 TOL IR: -1.62 N = 37 PLA: -1.03 N = 36 <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Contiliffe QoL scale - Mean ± SD endpoint SOL 2.5: 50.3 ± 18.0 N = 39 SOL 5: 48.5 ± 15.3	Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	detrusor overactivity (defined in this study as phasic contractions of ≥10 cmH_2O, as assessed by filling cystometry) within 6 months of study initiation **Exclusion criteria** 1] neurogenic detrusor overactivity 2] significant outlet obstruction 3] urinary retention 4] urodynamic stress incontinence 5] bladder stones 6] Urinary tract infection 7] interstitial cystitis 8] previous or current malignant disease of the pelvic organs 9] previous pelvic radiation 10] diabetic neuropathy 11] concomitant anticholinergic medications 12] had known or suspected hypersensitivity to anticholinergic medications or lactose. 13] Women could not be pregnant or breast-feeding and had to use approved contraception methods throughout the study and for 1 month after completion.			N = 35 SOL 10: 44.4 ± 15.0 N = 30 SOL 20: 39.1 ± 12.8 N = 29 TOL IR: 50.8 ± 19.4 N = 32 PLA: 57.9 ± 21.7 N = 33 <u>Adverse effects</u> Any adverse effect SOL 2.5: 6/41 (14.6%) SOL 5: 12/37 (32.4%) SOL 10: 12/35 (34.3%) SOL 20: 21/37 (56.8%) TOL IR: 12/37 (32.4%) PLA: 6/38 (15.8%) Dry mouth SOL 2.5: 0/41 (0%) SOL 5: 5/37 (13.5%) SOL 10: 5/35 (14.3%) SOL 20: 14/37 (37.8%) TOL IR: 9/37 (24.3%) PLA: 0/38 (0%) Dropouts for any reason	**Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** Data from SOl 2.5mg, SOL 10mg and SOL 20mg not used in review or network meta-analysis not used as these are not the recommended starting dose

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				SOL 2.5: 5/41 (12.2%) SOL 5: 3/37 (8.1%) SOL 10: 7/35 (20.0%) SOL 20: 7/37 (18.9%) TOL IR: 5/37 (13.5%) PLA: 6/38 (15.8%) Dropouts for adverse effects SOL 2.5: 1/41 (2.4%) SOL 5: 1/37 (2.7%) SOL 10: 3/35 (8.6%) SOL 20: 5/37 (13.5%) TOL IR: 1/37 (2.7%) PLA: 0/38 (0%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported **Week 12** Not applicable	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Steers,W., Corcos,J., Foote,J., Kralidis,G., An investigation of dose titration with darifenacin, an M3-selective receptor antagonist, BJU International, 95, 580-586, 2005 **Ref Id** 220252 **Country/ies where the study was carried out** United States **Study type** Randomised controlled trial **Aim of the study** To determine the efficacy, tolerability and safety of a flexible-dosing strategy with darifenacin, in which the dose could be adjusted from 7.5 to 15 mg once daily after 2 weeks of treatment if additional efficacy was required by both the patient and physician, and if the current dose was well tolerated	**Sample size** N = 395 Darifenacin (DAR) = 268 Placebo (PLA) = 127 **Characteristics** Gender - Female/N (% female) DAR: 227/268 (84.7%) PLA: 106/127 (83.5%) Age (years) - Mean DAR: 57.5 (No SD reported) PLA: 58.5 (No SD reported) Incontinence episodes/day - Median DAR: 2.7 (No SD reported) PLA: 2.0 (No SD reported) Urgency episodes/day - Median DAR: 8.3 (No SD reported) PLA: 8.0 (No SD reported) Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] patients aged ≥18 years with symptoms of OAB for at least 6 months	**Interventions** Patients with confirmed eligibility for study inclusion were then randomized (2 : 1) to 12 weeks of oral once-daily treatment with darifenacin controlled-release tablets 7.5 mg (269 patients) or matching placebo (129).	**Details** After a pre-screening visit to assess eligibility, patients entered a 2-week washout phase (if required) before screening assessments, i.e. a physical examination, including a 12-lead electrocardiogram recording, measurement of vital signs and PVR, and clinical laboratory tests. Patients then entered a 2-week, single-blind, placebo run-in period, during which urinary symptoms were recorded over the final 7 days using an electronic daily diary (MiniDoc AB, Stockholm, Sweden). Blinding was maintained by a double-dummy design. Repeat clinic visits were after 2, 6 and 12 weeks of treatment, patients having completed daily diaries for 7 days before the 2-week and 12-week visits. Patients were permitted to double their dose of study medication after 2 weeks of treatment if additional efficacy was required by both the patient and physician, and if the current dose was well tolerated. Thereafter the dose could not be adjusted; compliance with treatment	**Results** **Week 4** Not reported **Week 12** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes - Median change from baseline DAR: -3.0 (No other data reported) PLA: -1.86 (No other data reported) Urgency episodes DAR: -2.3 (No other data reported) PLA: -0.9 (No other data reported) <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Medium B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout -

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Study was funded by Pfizer	2] capable of independent toileting 3] urge incontinence (at least five episodes per week), voiding frequency (at least eight voids per day), and urgency (a strong desire to void at least once per day) **Exclusion criteria** 1] Patients with contraindications to anticholinergic therapy (e.g. uncontrolled narrow-angle glaucoma, urinary retention or gastric retention) 2] clinically significant stress incontinence 3] BOO and/or a postvoid residual urinary volume (PVR) of > 200 ml 4] pregnancy and lactation 5] genitourinary conditions that could cause urinary symptoms 6] fecal impaction or severe constipation (two or fewer bowel movements per week) 7] urogenital surgery within the previous 6 months 8] bladder biopsy in the previous 30 days 9] patients with an indwelling catheter and those using intermittent self-catheterization 10] presence of clinically significant disease 11] patients who intended to start a bladder-training programme during the study Concomitant treatment with		was evaluated from returned tablet counts **Power calculation** Sample size was determined using bootstrap simulation techniques based on efficacy data observed for the primary variable (number of incontinence episodes per week) from a previous placebo-controlled study of darifenacin. From the results of the simulation it was calculated that 312 patients were required (darifenacin 208, placebo 104) for a two-sided Wilcoxon rank-sum test to have 90% power to detect a between-group difference at the 5% significance level. Allowing for a 15% withdrawal rate, 372 patients were required to be randomized (darifenacin 248, placebo 124). **Intention to treat analysis** Not reported	Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect Not reported Dry mouth DAR: 10/269 (3.7%) PLA: 18/129 (14.2%) Dropouts for any reason DAR: 26/269 (9.7%) PLA: 12/129 (9.3%) Dropouts for adverse effects DAR: 18/269 (6.7%) PLA: 4/129 (3.1%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u>	Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Of the 268 patients treated with darifenacin, 158 (59%) increased the dose to 15 mg after

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	anticholinergic or antispasmodic drugs (including drugs with significant anticholinergic effects, e.g. imipramine), opioids and other drugs known to cause significant constipation, hormone-replacement therapy (unless taken for > 2 months), and drugs known to be potent cytochrome P450 3A4 inhibitors (e.g. ketoconazole) was not permitted. Men receiving finasteride for BPH were required to have been on a stable dose for ≥6 months before study inclusion. Other medications considered necessary for the patient's welfare were permitted, provided the treatment regimen remained stable during the study.			Not reported	2 weeks of treatment, compared with 86 (68%) of the 127 who had a pseudo-dose increased in the placebo group (no significant difference). Average dose at endpoint = 11.9 mg
Full citation Abrams,P., Freeman,R., Anderstrom,C., Mattiasson,A., Tolterodine, a new antimuscarinic agent: as effective but better tolerated than oxybutynin in patients with an overactive bladder, British Journal of UrologyBr.J.Urol., 81, 801-810, 1998 **Ref Id** 220263	**Sample size** N = 293 Tolterodine immediate release 2mg (TOL IR) = 118 Oxybutynin immediate release 5mg (OXY IR) = 118 Placebo (PLA) = 57 **Characteristics** Gender - Female/N (% female) TOL IR: 91/118 (77.1%) OXY IR: 88/118 (74.6%) PLA: 43/57 (75.4%)	**Interventions** Patient were randomised to tolterodine immediate release (2mg twice daily), oxybutynin immediate release (5mg three time daily) and placebo	**Details** Efficacy was measure by a 6-point rating scale documenting problems and severity of problems at baseline and at 12 weeks Adverse effects were noted and severity recorded **Power calculation** The number of patients required to detect a true difference between placebo	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment OXY IR: 58/118 (49%) TOL IR: 59/118 (50%) PLA: 27/57 (47%) Self-reported rate of absolute symptom	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Yes - identical packaging used A3 - Were groups

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out UK, Ireland & Sweden **Study type** Randomised controlled trial **Aim of the study** To compare the efficacy and safety of tolterodine with that of oxybutynin in patients with overactive bladder **Study dates** July 1995 to July 1996 **Source of funding** Supported by Pharmacia & Upjohn AB	Age (years) - Range TOL IR: 19 - 80 OXY IR: 21 - 80 PLA: 26 - 78 Incontinence episodes/day - Range TOL IR: 0.1 - 24.0 OXY IR: 0.1 - 24.0 PLA: 0.1 - 23.5 Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] 18 years or older 2] urodynamically proven bladder overactivity 3] increased frequency of micturition (≥ micturition / 24 hours) and urge incontinence (≥ 1 incontinent episode / 24 hours) and/or urgency during a 2 week washout period **Exclusion criteria** Not reported		and active treatment of a reduction in 1.5 in the mean frequency of micturition / 24 hours using a significance level of 5% and a power of 80% was estimated to be 47 in the placebo group and 95 in each active treatment group. **Intention to treat analysis** Reported but no details provided	reduction per day Incontinence episodes - Mean ± SD change from baseline OXY IR: -1.7 ± 3.1 N = 88 TOL IR: -1.3 ± 3.2 N = 92 PLA: -0.9 ± 1.5 N = 57 Urgency episodes Not reported Continence status (zero episodes per day) Incontinence episodes Not reported Urgency episodes Not reported Incontinence-specific quality of life Not reported Adverse effects Any adverse effect OXY IR: 114/118 (97%) TOL IR: 105/118 (89%) PLA: 46/57 (81%) Dry mouth	comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Unclear - no dropouts reported C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				OXY IR: 102/118 (86%) TOL IR: 59/118 (50%) PLA: 12/57 (21%) Dropouts for any reason Not reported Dropouts for adverse effects OXY IR: 20/118 (17%) TOL IR:10/118 (8%) PLA: 7/57 (12%) Psychological outcomes Not reported Clinical measures Not reported	D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** None
Full citation Jacquetin,B., Wyndaele,J., Tolterodine reduces the number of urge incontinence episodes in patients with an overactive bladder, European Journal of Obstetrics, Gynecology and Reproductive BiologyEur J Obstet Gynecol Reprod Biol,	**Sample size** N = 251 Tolterodine immediate release 1mg (TOL IR 1) = 97 Tolterodine immediate release 2mg (TOL IR 2) = 103 Placebo (PLA) = 51	**Interventions** Eligible patients were randomised to 4-week treatment with either placebo or tolterodine 1 or 2mg twice daily (bd)	**Details** Eligible patients were randomised to tolterodine 1mg or 2mg twice daily or placebo. Dosage reduction was not permitted. **Power calculation** A power analysis (χ = 5%,	**Results** **Week 4** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptoms reduction/day - Mean ± SD	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes -

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
98, 97-102, 2001 **Ref Id** 220282 **Country/ies where the study was carried out** Belgium, France **Study type** Randomised controlled trial **Aim of the study** To compare the efficacy and tolerability of tolterodine at fixed doses with placebo in patients with overactive bladder **Study dates** Not reported **Source of funding** Supported by Pharmacia Corporation	**Characteristics** Gender - Female/N (% female) TOL IR 1: 74/97 (76.3%) TOL IR 2: 84/103 (81.6%) PLA: 41/51 (80.4%) Age (years) - Range TOL IR 1: 18 - 85 TOL IR 2: 21 - 88 PLA: 19 - 89 Incontinence episodes/week - Range TOL IR 1: 0.1 - 24.0 TOL IR 2: 0.1 - 24.0 PLA: 0.1 - 8.4 Urgency episodes/day Not reported Detrusor overactivity TOL IR 1: 97/97 (100%) TOL IR 2: 103/103 (100%) PLA: 51/51 (100%) Duration of OAB Not reported **Inclusion criteria** 1] 18 years and older 2] urodynamicall proven overactive bladder 3] symptoms of urgency and/or urge incontinence (≥ 1 incontinence episode / 24 hours) with increased frequency of		80% power) indicated that 250 patients would be required **Intention to treat analysis** Not reported	Incontinence episodes TOL IR 1: -1.1 ± 2.2 N = 78 TOL IR 2: -1.3 ± 1.8 N = 79 PLA: -0.4 ± 1.9 n = 39 Urgency episodes Not reported Continence status (Zero episodes per day) Incontinence episodes Not reported Urgency episodes Not reported Incontinence-specific quality of life Not reported Adverse effects Any adverse effect TOL IR 1: 39/97 (40%) TOL IR 2: 55/103 (53%) PLA: 16/51 (31%) Dry mouth TOL IR 1: 20/97 (21%) TOL IR 2: 35/103	computerised randomisation A2 - Was there adequate concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	miturition (≥ 8 micturitions / 24 hours) during a 2 week washout period **Exclusion criteria** 1] significant stress incontinence 2] hepatic or renal disease 3] symptomatic or recurrent urinary tract infection 4] interstitial cystitis 5] haematuria 6] clinical significant voiding difficulty 7] patients receiving bladder training, electrostimulation therapy or indwelling catheter or intermittent catheterisation 8] pregnant or nursing women 9] women of childbearing age not using reliable contraception			(34%) PLA: 3/51 (6%) Dropout for any reason Not reported Dropouts for adverse effects TOL IR 1: 3/97 (3%) TOL IR 2: 2/103 (2%) PLA: 1/51 (%) Psychological outcomes Not reported Clinical measures Not reported **Week 12** Not applicable	D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Data from TOL IR 2 arm used in review
Full citation Dorschner,W., Stolzenburg,J.U., Griebenow,R., Halaska,M., Schubert,G., Murtz,G., Frank,M., Wieners,F., Efficacy and cardiac safety of propiverine in elderly patients - a double-blind, placebo-	**Sample size** N = 98 Propiverine (PRO) = 49 Placebo (PLA) = 49 **Characteristics** Gender - Female/N (% female)	**Interventions** Following a week placebo run-in, patients were randomised to propiverine (15mg three times a day) or placebo (three times a day) for a 4 week period.	**Details** Efficacy was measured using a mictrition diary, uroflow, ultrasound and an urge score **Power calculation** Not reported	**Results** **Week 4** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
controlled clinical study, European UrologyEur.Urol., 37, 702-708, 2000 **Ref Id** 220285 **Country/ies where the study was carried out** Germany **Study type** Randomised controlled trial **Aim of the study** To confirm the efficacy of propiverine in patients with detrusor instability **Study dates** Not reported **Source of funding** Supported by Apogepha	TOL IR: 40/49 (81.6%) PLA: 37/49 (75.5%) Age (years) - Range PRO: 68.4 ± 6.5 PLA: 66.5 ± 6.0 Incontinence episodes/day - Range Not reported Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] Aged > 60 years 2] frequency more than 7 episodes per day 3] urinary incontinence more than 0 episodes per day 4] micturition volume less than 300ml/micturition **Exclusion criteria** 1] acute urinary tract infection 2] mechanical or functional bladder emptying disorers 3] residual volume of more than		**Intention to treat analysis** Not reported	<u>reduction per day</u> Incontinence episodes - Mean (No SD) change from baseline PRO IR: -0.6 (No SD) N not reported PLA: -0.1 (No SD) N not reported Urgency episodes Not reported <u>Continence status (zero episodes per day)</u> Incontinence episodes - reported as symptom free PRO IR: 18/43 (41.9%) PLA: 13/45 (28.9%) Urgency episodes - reported as symptom free PRO IR = 15/49 (30.6%) PLA: 5/49 (10.2%) <u>Incontinence-specific quality of life</u> Nor reported <u>Adverse effects</u> Any adverse effect	appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Medium B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Unclear - not reported which group the 9 dropouts were in C3 - Were groups comparable for missing data - No Level of bias: Medium D Detection bias D1 - Was follow-up appropriate length - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	0% of the voided volume 4] renal insufficiency 5] concomitant medication interfering with drug studied			Not reported Dry mouth Not reported Dropouts for any reason Not reported Dropouts for adverse effects Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Post-void residual volume PRO IR: 7.2 ± 12.4 ml N = 49 PLA: 5.9 ± 8.0 ml N = 49 **Week 12** Not reported	D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** A total of 107 were enrolled but 9 were excluded from efficacy analysis but not reported from which group.
Full citation Haab,F., Stewart,L., Dwyer,P., Darifenacin, an M3 selective receptor antagonist,	**Sample size** N = 561 Darifenacin 3.75mg (DAR 3,75) =	**Interventions** After a week placebo run-in, patients were randomised using unequal allocation	**Details** Efficacy was evaluated at weeks, 6 and 1 using electronic patient diaries in	**Results** **Week 4 results** Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
is an effective and well-tolerated once-daily treatment for overactive bladder., European UrologyEur.Urol., 45, 420-429, 2004 **Ref Id** 220287 **Country/ies where the study was carried out** France **Study type** Randomised controlled trial **Aim of the study** To evaluate the clinical efficacy of darifenacin over a broad range of OAB parameters as well as to assess its tolerability and safety profile **Study dates** Not reported **Source of funding** Study funded by Pfizer Inc	53 Darifenacin 7.5mg (DAR 7.5) = 229 Darifenacin 15mg (DAR 15) = 115 Placebo (PLA) = 164 **Characteristics** Gender - Female/N (% female) DAR 3.75: 44/53 (83.0%) DAR 7.5: 194/229 (84/7%) DAR 15: 100/115 (87.0%) PLA: 138/164 (78.4%) Age (years) - Mean ± SD DAR 3.75: 56.7 (No SD reported) DAR 7.5: 57.7 (No SD reported) DAR 15: 56.6 (No SD reported) PLA: 56.5 (No SD reported) Incontinence episodes/day - Median (95% CI) DAR 3.75: 9.6 (7.0 to 13.0) DAR 7.5: 9.3 (8.0 to 11.0) DAR 15: 8.0 (6.0 to 11.0) PLA: 11.0 (9.5 to 14.9) Urgency episodes/day DAR 3.75: 7.5 (No CI reported) DAR 7.5: 7.7 (No CI reported) DAR 15: 8.0 (No CI reported) PLA: 8.30 (No CI reported) Detrusor overactivity Not reported Duration of OAB Not reported	(1:4:2:3) to darifencain 3.75mg, 7.5mg, 15mg or placebo using blocks of 10.	the 1-week period before each clinic visit **Power calculation** Sample size was determined by a computer-generated simulation analysis using a bootstrap re-sampling technique, whereby data are used repeatedly to simulate the inference based on the primary coparison of 15mg and 7.5mg darifenacin versus placebo. Based on assumptions and calculation, 200 patients were requiredto complete the study in the 7.5mg group and 150 in the placebo group to detect a difference at 80% power. **Intention to treat analysis** Full analysis set used.	**Week 12 results** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day - Median (95% CI) change from baseline Incontinence episodes DAR 3.75: -8.6 (No CI) DAR 7.5: -9.0 (No CI) DAR 15: -10.4 (No CI) PLA: -7.6 (No CI) Urgency episodes DAR 3.75: -1.8 (No CI) DAR 7.5: -2.0 (No CI) DAR 15: -2.0 (No CI) PLA: -0.9 (No CI) Continence status (zero episodes per day) Not reported Incontinence-specific quality of life	Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yesr - random blocks used A2 - Was there adequate concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Inclusion criteria 1] urge incontinence (at least 5 but no more that 50 per week) 2] frequency of micturition (a mean of least 8 voids per 4 hours) 3] urgency (a strong desire to void at least once a day) **Exclusion criteria** 1] contraindications ot antimuscarinic drugs 2] clinically significant stress incontinence 3] clinically significant bladder outlet obstruction and/or a post-void residual volume > 200ml 4] geniturinary conditions that could cause urinary symptoms 5] recent urogenital surgery or hepatic disease			Not reported Adverse effects Any adverse effect DAR 3.75: 24/53 (45.3%) DAR 7.5: 120/229 (52.4%) DAR 15: 61/115 (53%) PLA: 66/164 (40.2%) Dry mouth DAR 3.75: 7/53 (13.2%) DAR 7.5: 43/229 (18.8%) DAR 15: 36/115 (31.3%) PLA: 14/164 (8.5%) Dropouts for any reason DAR 3.75: 4/53 (7.5%) DAR 7.5: 10/229 (4.4%) DAR 15: 8/115 (7.8%) PLA: 12/164 (7.3%) Dropouts for adverse effects DAR 3.75: 0/53 (0%) DAR 7.5: 3/229	Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				(1.3%) DAR 15: 3/115 (2.6%) PLA: 2/164 (1.2%) Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported	
Full citation Drutz,H.P., Appell,R.A., Gleason,D., Klimberg,I., Radomski,S., Clinical efficacy and safety of tolterodine compared to oxybutynin and placebo in patients with overactive bladder, International Urogynecology Journal, 10, 283-289, 1999 **Ref Id** 220304 **Country/ies where the study was carried out** United states & Canada **Study type**	**Sample size** N = 277 Tolterodine IR (TOL IR) = 109 Oxybutynin IR (OXY IR) = 112 Placebo (PLA) = 56 **Characteristics** Gender - Female/N (% female) TOL IR: 88/109 (80.7%) OXY IR: 81/112 (72.3%) PLA: 45/56 (80.4%) Age (years) - Mean TOL IR: 63.0 OXY IR: 66.3 PLA: 62.1 Incontinence episodes/day -	**Interventions** Patients completed a 2 week placebo run in before randomisation to either tolterodine mg bid, oxybutynin 5mg tid or placebo	**Details** Patients were seen at study entry, at baseline and after 2, 4, 8 and 12 weeks of treatment **Power calculation** Preliminary micturition diary data suggested a standard deviation of three micturitions per 24 hours. In order to have an 80% chance of detecting a difference of 1.5 in reduction of micturition per 24 hours (x = 5%) using a 1:2:2 randomisation ratio. It was necessary to recruit 47 into the placebo group and 95 into the tolterodine and oxybutynin groups.	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day Incontinence episodes - Mean ± SD change from baseline TOL IR: -1.7 ± 2.0 N = 60 OXY IR: -1.7 ± 1.7 N = 39 PLA: -1.0 ± 2.2 N	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Medium

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Randomised controlled trial **Aim of the study** To compare the efficacy and safety of tolterodine 2mg bid, oxybutynin 5mg tid and placebo in patients with detrusor overactivity and symptoms of frequency and either urge incontinence and/or urgency **Study dates** Not reported **Source of funding** Funded by Pharmacia & Upjohn, AB	Range TOL IR: 7.7 - 22.0 OXY IR: 7.1 - 31.4 PLA: 6.6 - 21.9 Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] aged 18 years or more 2] postmenopausla, surgically sterile or using using an adequate contraceptive method 3] evidence of detrusor instability or subtracted cystometry 4] urinary frequency (at leats 8 times per day) and either urge incontinence or urinary urgency **Exclusion criteria** 1] clinically significant stress incontinence 2] hepatic or renal disease 3] recurrent urinary tract infection 4] interstitial cystitis 5] uninvestiagted hematuria or hematuria secondary to malignant disease 6] indwelling catheter or		**Intention to treat analysis** Not reported	= 33 Urgency episodes Not reported <u>Continence status (zero episodes per day)</u> Incontinence episodes TOL IR: 23/103 (22.3%) OXY IR: 19/90 (21.1%) PLA: Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect TOL IR: 85/109 (78.0%) OXY IR: 101/112 (90.2%) PLA: 42/56 (75.0%) Dry mouth TOL IR: 33/109 (30.3%) OXY IR: 77/112 (68.8%) PLA: 8/56 (14.3%)	B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	intermittent catheterisation 7] treatemnt with an investigational drug in 2 months prior to study 8] previous treatment with tolterodine 9] electrostimulation therapy, antimuscarininc or bladder training with 14 days of entry to study 10] clinically significant voiding difficulty			Dropouts for any reason TOL IR: 12/109 (11.0%) OXY 35/112 (31.3%) PLA: 8/56 (14.3%) Dropouts for adverse effects TOL IR: 7/109 (6.4%) OXY IR: 23/112 (20.5%) PLA: 4/56 (7.1%) Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported	**Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information**
Full citation Malone-Lee,J.G., Walsh,J.B., Maugourd,M.F., Tolterodine: a safe and effective treatment for older patients with overactive bladder., Journal of the American Geriatrics SocietyJ.Am.Geriatr.Soc., 49, 700-705, 2001	**Sample size** N = 177 Tolterodine IR 1mg bid (TOL IR 1) = 61 Tolterodine IR 2mg bid (TOL IR 2) = 73 Placebo (PLA) = 43	**Interventions** Patients were randomised in a 3:3:2 ration to tolderodine IR img, tolterodine IR mg or placebo for a 4 week period	**Details** Efficay was assessed by way of a week's micturition diary completed before the week 4 assessment. **Power calculation** A sample size of 160 patients	**Results** **Week 4** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 220325 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial **Aim of the study** To compare the clinical saftey and efficacy of two doses of tolterodine versus placebo in older patients with overactive bladder presenting with urgency, frequency and/or urge incontinence **Study dates** Not reported **Source of funding** Supported by Pharmacia & Upjohn	**Characteristics** Gender - Female/N (% female) TOL IR 1: 38/61 (62.3%) TOL IR 2: 45/73 (61.6%) PLA: 32/43 (74.4%) Age (years) - Range TOL IR 1: 65 - 90 TOL IR 2: 62 - 92 PLA: 66 - 88 Incontinence episodes/day - Mean ± SD TOL IR 1: 2.3 (No SD reported) OXY IR: 2.8 (No SD reported) PLA: 5.1 (No SD reported) Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] aged 65 or older with urgency, urinary frequency (8 or more micturitions per day) and/or urge incontinence (1 or more incontinence episodes per day) 2] mobile and able to attend an outpatient clinic		was chosen to have at least 100 older patients on active treatment. All statistical tests were two-sided and had a significance level of 0.05 **Intention to treat analysis** Not reported	Incontinence episodes - Median change 95% CI from baseline TOL IR 1: -0.3 (-0.8 to -0.1) N not reported TOL IR 2: -0.7 (-1.3 to -0.2) N not reported PLA: 0.0 (-0.4 to -0.3) N not reported Urgency episodes Not reported <u>Continence status (zero episodes per day)</u> Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect TOL IR 1: 43/61 (70.5%) TOL IR 2: 53/73 (47.9%) PLA: 27/43 (62.8%) Dry mouth TOL IR 1: 18/61 (29.5%) TOL IR 2: 35/73	randomisation - Unclear - not reported A2 - Was there adequate concealment - Yes - identical packaging used A3 - Were groups comparable at baseline - No - Nean number of incontinence episodes per day in placebo group was twice the other groups Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria 1] significant stress incontinence 2] urinary outflow obstruction 3] urinary retention 4] symptomatic urinary infection 5] interstitial cystitis 6] unexplained hematuria 7] use of urinary catheterisation or electrostimulation 8] hepatic and renal disease with markers twice the upper limit of normal reference range 9] concomitant antimuscarinic medication 10] previous treatment iwth tolterodine 11] exposure to any other investigational drug in preceding 3 months			(47.9%) PLA: 4/43 (9.3%) Dropouts for any reason TOL IR 1: 8/61 (13.1%) TOL IR 2: 9/73 (12.3%) PLA: 4/43 (9.3%) Dropouts for adverse effects TOL IR 1: 4/61 (6.6%) TOL IR 2: 7/73 (9.6%) PLA: 1/43 (2.3%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported **Week 12** Not reported	defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information**
Full citation Dmochowski,R.R., Davila,G.W., Zinner,N.R., Gittelman,M.C., Saltzstein,D.R., Lyttle,S., Sanders,S.W., For The Transdermal Oxybutynin	**Sample size** N = 520 Oxybutynin transdermal 1.3mg (OXY TD 1.3) = 130 Oxybutynin transdermal 2.8mg (OXY TD 2.8) = 133	**Interventions** Following symptom stabilization or treatment withdrawal 520 adult patients were randomized to 12 weeks of double-blind daily treatment with 1.3, 2.6 or 3.9	**Details** Evaluations included patient urinary diaries, incontinence specific quality of life and safety. Patients received basic	**Results** **Week 4** Not reported **Week 12** <u>Patient satisfaction with treatment</u>	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study Group., Efficacy and safety of transdermal oxybutynin in patients with urge and mixed urinary incontinence, Journal of UrologyJ.Urol., 168, 580-586, 2002 **Ref Id** 220334 **Country/ies where the study was carried out** United States **Study type** Randomised controlled trial **Aim of the study** To evaluate the efficacy and safety of a transdermal oxybutynin formulation in a general population of patients with moderate to severe overactive bladder. **Study dates** Not reported **Source of funding** Not reported but all authors have interest in Watson	Oxybutynin transdermal 3.9mg (OXY TD 3.9) = 125 Placebo (PLA) = 13 **Characteristics** Gender - Female/N (% female) OXY 1.3: 120/130 (92.3%) OXY 2.8: 123/133 (92.5%) OXY 3.9: 114/125 (91.2%) PLA: 121/132 (91.7%) Age (years) - Mean ± SD OXY 1.3: 61.5 ± 11.3 OXY 2.8: 61.9 ± 13.5 OXY 3.9: 59.4 ± 14.5 PLA: 62.7 ± 13.1 Incontinence episodes/week Unclear Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB OXY 1.3: 9.1 ± 10.3 OXY 2.8: 8.9 ± 8.8 OXY 3.9: 9.9 ± 9.8 PLA: 9.1 ± 9.1 **Inclusion criteria** 1] 18 years or more with overactive bladder	mg. oxybutynin TDS or placebo administered twice weekly, followed by a 12-week open-label, dose titration period to assess efficacy and safety further.	information on bladder function, bladder control and fluid management and were instruucted to maintain usual fluid intake. **Power calculation** Sample size was calculated based on data from a previos study. Assuming a common standard deviation of 17 episodes per week and 90 patients per treatment group, a difference of 10 episodes could be detected with 95% power. All statistical tests were conducted as 0.05 **Intention to treat analysis** Last observation carried forward (LOCF) used.	Not reported <u>Self reported rate of absolute symptom reduction per day</u> Incontinence episodes OXY TD 1.3mg: -2.6 ± 2.8 N = 128 OXY TD 2.8mg: -2.4 ± 2.6 N = 131 OXY TD 3.9mg: -3.1 ± 2.5 N = 123 PLA: -2.7 ± 3.0 N = 130 Urgency episodes Not reported <u>Continence status</u> Incontinence epsiodes OXY TD 1.3mg: 12/130 (10.0%) OXY TD 2.8mg: 7/133 (5.2%) OXY TD 3.9mg: 16/125 (12.8%) PLA: 10/132 (7.6%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported	A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Pharmaceuticals	2] 10 or more urinary incontinence episodes over a 7-day diary with either pure urge or predominant urge 3] 56 or more voids per week 4] average recorded void volume of less than 350ml **Exclusion criteria** 1] incontinence due to chronic illness, anatonomical weakness or concomitant medications 2] lower urinary tract surgery in previos 8 months 3] interstitial cystitis 4] urethral syndrome 5] painful bladder syndrome and overflow urinary incontinence 6] alcohol/drug abuse in previous year 7] known hypersensitivity to oxybutynin 8] active skin disorder 9] narrow angle glaucoma or or shallow anterior chamber 10] prostate specific antigen 11] excessive caffeine consumption			<u>Adverse effects</u> Dropouts for any reason Not reported Dropouts for adverse effects Not reported Any adverse effects Not reported Dry mouth OXY TD 1.3mg: 6/120 (5.0%) OXY TD 2.8mg: 9/133 (6.8%) OXY TD 3.9mg: 12/125 (9.6%) PLA: 11/132 (8.3%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported	D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information**
Full citation	**Sample size**	**Interventions**	**Details**	**Results**	**Limitations**
Cardozo,L., Lisec,M., Millard,R., van Vierssen,Trip	N = 911	Patients were allocated to once-daily solifenacin 5mg,	Efficacy was assessed by by 3-day micturition diaries for	**4 weeks** Not reported	NICE guidelines manual. Appendix D:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
O., Kuzmin,I., Drogendijk,T.E., Huang,M., Ridder,A.M., Randomized, double-blind placebo controlled trial of the once daily antimuscarinic agent solifenacin succinate in patients with overactive bladder, Journal of UrologyJ.Urol., 172, 1919-1924, 2004 **Ref Id** 220336 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial **Aim of the study** To assess the efficacy of once daily solifenacin in patients with OAB **Study dates** Not reported **Source of funding** Not reported	Solifenacin 5mg (SOL 5) = 286 Solifenacin 10mg (SOL 10) = 290 Placebo (PLA) = 281 *4 did not receive any drugs but no indication on which group they were randomised to **Characteristics** Gender - Female/N (% female) SOL 5: 237/286 (82.9%) SOL 10: 238/290 (82.1%) PLA: 227/281 (80.8%) Age (years) - Range SOL 5: 19 - 85 SOL 10: 18 - 83 PLA: 18 - 8 Incontinence episodes/day Not reported Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] 18 years of age or older with symptoms of OAB 2] average micturition frequency of	solifenacin 10mg, or placebo for a 1 week period	3-day before each assessment at 4 week intervals. Primary outcome was change in the number of micturitions per 4 hours **Power calculation** Based on the projected difference from baseline to endpoint of 1 micturition episode per 24 hours, with a standard deviation of 3, significance level of 0.05, -sided and a power of 90%, 190 evaluable patients per arm were required. Assuming a dropout rate of 20%, 894 patiemnts were required **Intention to treat analysis** Last observation carried forward (LOCF) was used	**12 weeks results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Episodes of incontinence / day - Mean change scores (95% CI) SOL 5mg: -1.63 (No CI reported) SOL 10mg: -1.57 (No CI reported) PLA: -1.35 (No CI reported) Episodes of urgency SOL 5mg: -2.94 (-1.44 to -0.28) N = 267 SOL 10mg: -2.90 (-1.49 to -0.35) N = 283 PLA: -1.98 (No CI reported) Continence status Not reported Incontinence-specific quality of life Not reported	Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Unclear - Not reported A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Unclear <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - LOCF used Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	at least 8 per day 3] at least 3 episodes of urgency and/or 3 episodes of urinary incontinence durnig 3 days **Exclusion criteria** 1] neurogenic bladder 2] stress urinary incontinence 3] Bladder outlet obstruction 4] Post-void residual volume >200ml 5] urinary tract infection 6] contrindication to antimuscarinic drugs,			Adverse effects of treatment Any adverse effect Not reported Dry mouth SOL 5mg: 23/299 (87.7%) SOL 10mg: 71/307 (243.1%) PLA: 7/301 (2.3%) Dropout for any reason SOL 5mg: 22/299 (7.4%) SOL 10mg: 24/307 (7.8%) PLA: 31/301 (10.3%) Dropout for adverse event SOL 5mg: 7/299 (2.3%) SOL 10mg: 12/307 (3.9%) PLA: 10/301 (3.3%) Psychological outcomes Not reported Clinical measures Post-void residual volume Not reported	<u>D Detection bias</u> D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable method used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of; 1] Population: Yes 2] Intervention: Yes 3] Outcomes: Yes Indirectness: None **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Zinner,N., Gittelman,M., Harris,R., Susset,J., Kanelos,A., Auerbach,S., Trospium Study Group., Trospium chloride improves overactive bladder symptoms: a multicenter phase III trial, Journal of UrologyJ.Urol., 171, 2311-2315, 2004 **Ref Id** 220337 **Country/ies where the study was carried out** United States **Study type** Randomised controlled trial **Aim of the study** To examine the effect of trospium chloride at 20mg twice daily versus placebo in patients presenting with overactive bladder associated with urge incontinence	**Sample size** N = 523 Trospium (TRO) = 262 Placebo (PLA) = 261 **Characteristics** Gender - Female/N (% female) TRO: 203/262 (77.5%) PLA: 188/261 (71.3%) Age (years) - Mean ± SE TRO: 63 ± 0.8 PLA: 61.5 ± 0.8 Incontinence episodes/day - Mean ± SD TRO: 3.9 (No SD reported) PLA: 4.3 (No SD reported) Urgency episodes/day - Mean ± SD TRO: 11.29 (No SD reported) PLA: 11.72 (No SD reported) Detrusor overactivity Not reported Duration of OAB Not reported	**Interventions** Patients were randmised on a 1:1 basis to either trospium 0mg twice daily or matching placebo for 1 weeks	**Details** Patient treated with OAB drugs at screening underwent a 2-week washout. At baseline patient were given 7-day baseline urinary diary that included measurement of volume voided on days 6 and 7. 7-day diaries were completed prior to each study visit at weeks 1, 4 and 12. Primary efficacy outcomes were change in the average number of voids per 24 hours and change in average number of urge incontinence episodes per 24 hours. **Power calculation** Not reported **Intention to treat analysis** Last observation carried forward (LOCF) was used	**Results** **Week 4 results** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptoms reduction/day - Mean ± SD UUI episodes - change from baseline reported TRO: -2.3 (No SD) N = 256 PLA: -1.8 (No SD) N = 256 Urgency episodes TRO: -2.1 (No SD) N = 256 PLA: -1.0 (No SD) N = 256 Continence status (Zero episodes per day) Not reported Incontinence-specific quality of life Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - Not reported A2 - Was there adequate concealment - unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Medium B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Supported by Indevus Corporation	**Inclusion criteria** 1] 18 years of age or older 2] OAB symptoms for at least 6 months 3] urinary urgency, a minimum voiding frequency of 70 or more voids per week with at least 7 urge incontinence episodes per week **Exclusion criteria** 1] stress incontinence 2] insensate or overflow in nature 3] neurogenic bladder disorders 4] significant renal disease 5] uninvestigated hematuria 6] urinary tract infection at washout or more than twice in previous year 7] significant bladder outlet obstruction 8] current use of an anticholinergic drug or drug therapy for OAB in previous 21 days 9] bladder cancer 10] interstitial cystitis			Adverse effects Not reported at 4 weeks Psychological outcomes Not reported Clinical measures Not reported **Week 12 results** Patient satisfactiopn with treatment Not reported Self-reported rate of absolute symptoms reduction/day - Mean (No SD reported) UUI episodes - change from baseline reported TRO: -2.3 (No SD) N = 256 PLA: -1.9 (No SD) N = 256 Urgency episodes TRO: -2.3 (No SD) N = 256 PLA: -1.1 (No SD) N = 256 Continence status (Zero episodes per	C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				day) TRO: 46/262 (17.6%) PLA: 24/261 (9.2%) Incontinence-specific quality of life (using Incontinence Impact Questionnaire) TRO: -54.0 ± 85.8 N = 235 PLA: -36.0 ± 86.0 N = 236 Adverse effects Any adverse effect Not reported Dry mouth TRO: 57/262 (21.8%) PLA: 17/261 (6.5%) Dropout for any reason TRO: 43/262 (16.4%) PLA: 43/261 (16.4%) Dropouts for adverse effects TRO: 23/262 (8.8%)	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				PLA: 15/261(5.7%) Psychological outcomes Not reported Clinical measures Not reported	
Full citation Appell,R.A., Sand,P., Dmochowski,R., Anderson,R., Zinner,N., Lama,D., Roach,M., Miklos,J., Saltzstein,D., Boone,T., Staskin,D.R., Albrecht,D., Overactive Bladder: Judging Effective Control and Treatment Study Group., Prospective randomized controlled trial of extended-release oxybutynin chloride and tolterodine tartrate in the treatment of overactive bladder: results of the OBJECT Study., Mayo Clinic ProceedingsMayo Clin.Proc., 76, 358-363, 2001 **Ref Id** 220347 **Country/ies where the**	**Sample size** N = 378 Oxybutynin extended release (OXY ER) = 185 Tolterodine immediate release (TOL IR) = 193 **Characteristics** Gender - Female/N (% female) TOL IR: 163/193 (84.5%) OXY ER: 152/185 (82.2%) Age (years) - Range TOL IR: 21 - 85 OXY ER: 26 - 87 Incontinence episodes/week - Mean ± SD TOL IR: 28.0 ± 18.3 OXY ER: 28.4 ± 17.8 Urgency episodes/day Not reported	**Interventions** Patients were randomised to 10mg/day of extended release oxybutynin or 4mg/day (mg twice daily) of immediate release tolterodine	**Details** Primary efficacy outcome was the numbe rof urge incontinence episodes at 1 weeks as determied by a 7-day urinary diary completed at baseline, weeks 2, 4, 8 and 12 weeks **Power calculation** Not reported **Intention to treat analysis** Not reported	**Results** **4 weeks** Not reported **12 weeks** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day - Mean ± SD endpoint</u> Incontinence episodes OXY ER: 1.1 ± 1.7 N = 160 TOL IR: 1.3 ± 1.9 N = 172 Urgency episodes Not reported <u>Continence status</u>	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - randomisation stratified for urge incontinence A2 - Was there adequate concealment - yes - identical packaging used A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
study was carried out United States **Study type** Randomised controlled trial **Aim of the study** To compare the efficacy and tolerability of tolterodine and extended release oxybutynin in patients with overactive bladder **Study dates** Not reported **Source of funding** Funded by ALZA Corporation	Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] OAB with at between 7 and 50 episodes of urge incontinence per weeks and 10 or more voids per 4 hours **Exclusion criteria** 1] Incontinence related to urinary tract infection, prostatitis, interstitial cystitis, urinary tract obstruction, urethral diverticulum, bladder minor, bladder tumor, bladder stone or prostate cancer 2] undergone pelvioc, vaginal, bladder or prostate surgery in previous 6 months or delivered a bay in previous 6 months 3] post-void residual volume of more than 150ml or at risk of developing complete urinary retention 4] clinically important medical problems 5] hematuria or positive urine culture or narrow angle glaucome, obstructive uropathy, myasthenia gravis, pelvic organ prolapse to the hymenal ring, or gastrointestinal			<u>(zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not measured <u>Adverse effects</u> Any adverse effect Not reported Dry mouth OXY ER: 52/185 (28.1%) TOL IR: 64/193 (33.2%) Dropouts for any reason OXY ER: 25/185 (13,5%) TOL IR: 22/193 (11.4%) Dropouts for adverse effects OXY ER: 14/185 (7.6%) TOL IR: 15/193 (7.8%) <u>Psychological</u>	B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - yes Level of bias: High C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear - not reportedl D5 - Were investigators blinded to confounding factors - Unclear - Not reported Level of bias: Low **Indirectness** Does the study match the protocol in terms of:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	conditions.			outcomes Not reported Clinical measures - Post-void residual volume Not reported	1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information**
Full citation Diokno,A.C., Appell,R.A., Sand,P.K., Dmochowski,R.R., Gburek,B.M., Klimberg,I.W., Kell,S.H., OPERA Study Group., Prospective, randomized, double-blind study of the efficacy and tolerability of the extended-release formulations of oxybutynin and tolterodine for overactive bladder: results of the OPERA trial., Mayo Clinic ProceedingsMayo Clin.Proc., 78, 687-695, 2003 **Ref Id** 220348 **Country/ies where the study was carried out** United States **Study type**	**Sample size** N = 790 Oxybutynin extended release (OXY ER) = 291 Tolterodine extended release (TOL ER) = 399 **Characteristics** Gender - Female/N (% female) TOL ER:399/399 (100%) OXY ER: 391/391 (100%) Age (years) - Mean ± SD TOL ER: 60 (No SD reported) OXY ER: 60 (No SD reported) Incontinence episodes/day- Mean ± SD TOL ER: 36.9 ± 14.1 OXY ER: 37.2 ± 15.2 Urgency episodes/day Not reported	**Interventions** Patients were allocated on a 1:1 basis to take either extended release oxybutynin at 10mg/day or extended release tolterodine at 4mg/day orally at 8.00am for 12 weeks	**Details** Efficacy assessments were based on 7-day diaries at the baseline week abd at weeks 2, 4, 8 and 12 **Power calculation** Not reported **Intention to treat analysis** Intention to treat analysis used but no details reported	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day Incontinence episodes Not reported Urgency episodes Not reported Continence status (zero episodes per day) Incontinence episodes TOL ER: 60/399 (15.0%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Yes - overencapsulation used A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Randomised controlled trial **Aim of the study** To compare extended release fromulation of both tolterodine and oxybutynin **Study dates** November 21, 2000 to October 18, 2001 **Source of funding** Supported by ALZA Corporation	Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] women with OAB, aged 18 or older 2] document 21 to 60 urge urinary incontinence episodes per week 3] an average of 10 or more voids per 24 hours **Exclusion criteria** 1] treatable urinary conditions that could cause incontinence 2] 2 post-void residual volumes shown by ultrasonography to exceed 150ml 3] pronounced risk of developing complete urinary retention 4] clinically important medical problems, 5] hematuria 6] uncontrolled narrow angle glaucome 7] obstructive uropathy 8] reduced gastrointestinal motility 9] known hypersensitivity to study medications			OXY ER: 78/391 (19.9%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect Not reported Dry mouth TOL ER: 89/399 (22.3%) OXY ER: 116/391 (29.7%) Dropouts for any reason TOL ER: 42/399 (10.5%) OXY ER: 52/391 (13.3%) Dropouts for adverse effects TOL ER: 19/399 (4.8%) OXY ER: 20/391 (5.1%) <u>Psychological outcomes</u> Not reported	was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Clinical measures Not reported	Intervention: Yes Outcome: Yes Indirectness: None **Other information**
Full citation Van Kerrebroeck,P., Kreder,K., Jonas,U., Zinner,N., Wein,A., Tolterodine Study Group., Tolterodine once-daily: superior efficacy and tolerability in the treatment of the overactive bladder, Urology, 57, 414-421, 2001 **Ref Id** 220399 **Country/ies where the study was carried out** The Netherlands **Study type** Randomised controlled trial **Aim of the study** To evaluate the efficacy and tolerability of the new ER formulation of tolterodine for	**Sample size** N = 1529 Tolterodine ER (TOL ER) = 507 Tolterodine IR (TOL IR) = 514 Placebo (PLA) = 508 **Characteristics** Gender - Female/N (% female) TOL IR: 406/514 (79.4%) TOL ER: 417/507 (82.2%) PLA: 410/508 (80.7%) Age (years) - Range TOL IR: 22 - 92 TOL ER: 20 - 89 PLA: 22 - 93 Incontinence episodes/day - Mean ± SD TOL IR: 23.2 (No SD reported) TOL ER: 22.1 (No SD reported) PLA: 23.3 (No SD reported) Urgency episodes/day Not reported	**Interventions** Eligible patients were subsequently randomized (1:1:1), using the procedure of random permuted blocks, to oral therapy with tolterodine ER capsules 4 mg once daily, tolterodine IR tablets 2 mg twice daily, or placebo for 12 weeks. No dosage adjustment was allowed during the study.	**Details** At an initial screening visit, a complete medical and drug history was taken, along with a full laboratory screen and a midstream specimen of urine for culture/urinalysis. Eligible patients were enrolled into a 1 to 2-week washout/run-in period, during which the number of incontinence episodes and frequency of micturition were recorded for 7 consecutive days using micturition diaries. The volume voided (in milliliters) for every micturition and the use of incontinence pads were recorded for at least 2 complete days. **Power calculation** Not reported **Intention to treat analysis**	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment* Reported as 'improved' TOL ER: 336/507 (66.3%) TOL IR: 313/514 (60.9%) PLA: 218/508 (46.1%) Self-reported rate of absolute symptom reduction per day (Mean ± SD change from baseline) Incontinence episodes TOL ER: -1.7 ± 2.5 N = 507 TOL IR: -1.5 ± 2.4	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - numbered blocks used A2 - Was there adequate concealment - Yes - double-dummy drug packaging used A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
once-daily treatment of over-active bladder **Study dates** Not reported **Source of funding** Sponsored by Pharmacia Corporation	Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] Male and female patients, 18 years of age or older, with urinary frequency (eight or more micturitions every 24 hours), urge incontinence (five or more incontinence episodes per week), and symptoms of an overactive bladder for 6 months or longer were eligible for inclusion. **Exclusion criteria** 1] demonstrable stress incontinence, 2] total daily urine volume greater than 3 L 3] any contraindications to antimuscarinic treatment 4] significant hepatic or renal disease (biochemical markers twice the upper limit of the normal reference range) 5] symptomatic or recurrent urinary tract infections 6] interstitial cystitis 7] hematuria or bladder outlet obstruction~ 8] current electrostimulation or		An analysis of efficacy was performed for all randomized patients on an intent-to-treat basis using the last observation carried forward to estimate the values for patients that dropped out of the study early.	N = 514 PLA: -1.0 ± 2,2 N = 507 Urgency episodes Not reported <u>Continence status (zero episodes per day)</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect Not reported Dry mouth TOL ER: 118/507 (23.3%) TOL IR: 156/514 (30.4%) PLA: 39/508 (7.7%) Dropouts for any reason TOL ER: 56/507 (11.6%) TOL IR: 63/514	was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	bladder training therapy 9] indwelling catheter or intermittent selfcatheterization. Pregnant or nursing women and women of childbearing potential not using reliable contraceptive methods were also excluded from enrollment. Other treatments for an overactive bladder such as anticholinergic drugs or drugs that inhibit cytochrome P450 3A4 isoenzymes were not allowed. An exception was made for those receiving estrogen treatment who had started therapy more than 2 months before randomization. Treatment with an investigational drug in the 2 months before study entry was also prohibited by the protocol.			(12.1%) PLA: 68/508 (13.0%) Dropouts for adverse effects TOL ER: 27/507 (5.3%) TOL IR: 28/514 (5.4%) PLA: 5/508 (1.0%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Not reported	2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Data on dropouts for any reason and improvement taken from this paper and "Chancellor et al., 2000" (see excluded studies table) Data on 'Patient satisfaction with treatment' taken from "Zinner et al., 2002" (see excluded studies table)
Full citation Jonas,U., Hofner,K., Madersbacher,H., Holmdahl,T.H., Efficacy and safety of two doses of tolterodine versus placebo in patients with detrusor overactivity and symptoms of frequency, urge incontinence, and urgency: urodynamic evaluation. The International Study Group.[erratum appears in World J Urol	**Sample size** N = 242 Tolterodine IR 1mg (TOL IR 1) = 99 Tolterodine IR 2mg (TOL IR 2) = 99 Placebo (PLA) = 44 **Characteristics** Gender - Female/N (% female)	**Interventions** Following a washout period, patients were randomised to tolterodine 1mg or mg bid or placebo	**Details** Efficacy was assessed at baseline, at weeks or at withdrawal. **Power calculation** Not reported **Intention to treat analysis**	**Results** **Week 4** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptoms reduction/day - Mean ± SD Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - not reported A2 - Was there adequate

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1997;15(3):210], World Journal of UrologyWorld J.Urol., 15, 144-151, 1997 **Ref Id** 220405 **Country/ies where the study was carried out** Germany, Austria & Sweden **Study type** Randomised controlled trial **Aim of the study** To compare the efficacy of tolterodine at 1 or 2 mg bid versus placebo and evaluate the safety over 4 weeks of treatment **Study dates** Not reported **Source of funding** Not reported	TOL IR 1: 73/99 (74%) TOL IR 2: 76/99 (77%) PLA: 33/44 (75%) Age (years) - Range TOL IR 1: 21 - 81 TOL IR 2: 20 - 83 PLA: 23 - 9 Incontinence episodes/day - Range Not reported Urgency episodes/day Not reported Detrusor overactivity TOL IR 1: 99/99 (100%) TOL IR 2: 99/99 (100%) PLA: 44/44 (100%) Duration of OAB Not reported **Inclusion criteria** 1] at least 18 years of age with detrusor overactivity 2] evidence of frequency (8 or more micturitions per 24 hours) in combination with either urge incontinence (1 or more incontinence episodes per 4 hours), urinary urgency or both **Exclusion criteria**		Not reported	Urgency episodes Not reported Continence status (Zero episodes per day) Incontinence episodes Not reported Urgency episodes Not reported Incontinence-specific quality of life Not reported Adverse effects Any adverse effect TOL IR 1: 31/99 (31%) TOL IR 2: 32/99 (32%) PLA: 17/44 (39%) Dry mouth TOL IR 1: 8/99 (8%) TOL IR 2: 10/99 (10%) PLA: 1/44 (2%) Dropout for any reason Not reported Dropouts for adverse effects	concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	1] significant stress incontinence 2] hepatic disease 3] renal disease 4] condition contraindication anticholinergic therapy 5] recurrent urinary tract infections 6] interstitial cystitis 7] uninvestigated hematuria 8] clinically significant voiding difficulty with risk of urinary retention 9] patients on anticolinergic treatment, using an indwelling catheter or electrostimulation or bladder training within 14 days of study			TOL IR 1: 4/99 (4%) TOL IR 2: 3/99 (3%) PLA: 3/44 (6%) Psychological outcomes Not reported Clinical measures Not reported **Week 12** Not applicable	blinded to intervention - Unclear D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** 79 (80%), 83 (84%) and 38 (86) were incontinent in the TOL IR 1, TOL IR 2 and PLA groups respectively
Full citation Madersbacher,H., Halaska,M., Voigt,R., Alloussi,S., Hofner,K., A placebo-controlled, multicentre study comparing the tolerability and efficacy of propiverine and oxybutynin in patients with urgency and	**Sample size** N = 366 Propiverine immediate release (PRO IR) = 149 Oxybutynin immediate release (OXY IR) = 145 Placebo (PLA) = 72	**Interventions** 15 mg propiverine (sugar-coated tablets, registered as Detrunorm®/Mictonorm®, Apogepha Arzneimittel GmbH, Dresden, Germany) were administered three times daily	**Details** In a double-blind, randomized, prospective multicentre clinical trial, the treatment results of propiverine, oxybutynin and placebo were compared in a three-armed parallel-group design. After a 1-week	**Results** **Week 4 results** Patient satisfaction with treatment PRO IR: 104/149 (70.5%) OXY IR: 96/145 (66.2%) PLA: 43/72	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
urge incontinence, BJU International, 84, 646-651, 1999 **Ref Id** 220409 **Country/ies where the study was carried out** Germany **Study type** Randomised controlled trial **Aim of the study** To assess evidence for the equal efficacy of propiverine and oxybutynin in patients with urgency and urge incontinence **Study dates** Not reported **Source of funding** Not reported	**Characteristics** Gender - Female/N (% female) PRO IR: 117/126 (92.9%) OXY IR: 113/118 (93.4%) PLA: 59/53 (93.7%) Age (years) - Mean ± SD PRO IR: 49.6 ± 13.0 OXY IR: 50.3 ± 13.5 PLA: 47.6 ± 12.0 Incontinence episodes/day Not reported Urgency episodes/day - Mean ± SD PRO IR: 9.5 (No SD reported) OXY IR: 1.4 (No SD reported) PLA: 11.3 (No SD reported) Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] history of urgency or urge incontinence 2] a maximum cystometric bladder capacity of ≤ 300 ml 3] age ≥ 18 years 4] body weight ≥ 45 kg	5 mg oxybutynin tablets (registered as Ditropan®/Dridase®) twice daily Placebo three times daily	'washout' period, treatments were administered for 4 weeks; 15 mg propiverine (sugar-coated tablets, registered as Detrunorm®/Mictonorm® , Apogepha Arzneimittel GmbH, Dresden, Germany) were administered three times daily (group 1), or 5 mg oxybutynin tablets (registered as Ditropan®/Dridase®) twice daily (group 2), or placebo three times daily (group 3). To ensure the double-blind condition, each of the patients received additional placebos (the double-dummy technique). **Power calculation** Not reported **Intention to treat analysis** Not reported	(59.7%) Self-reported rate of absolute symptom reduction per day Incontinence episodes Not reported Urgency episodes - Mean change from baseline PRO IR: -3.1 (No SD) N not reported OXY IR: -3.0 (No SD) N not reported PLA: - 1.2 (No SD) N not reported Continence status (zero episodes per day) Not reported Incontinence-specific quality of life Not reported Adverse effects Any adverse effect PRO IR: 95/149 (63.8%) OXY IR: 105/145 (71.7%) PLA: 30/72 (41.7%)	appropriate randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear A3 - Were groups comparable at baseline - Yes - No significant difference between groups Level of bias: Medium B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria 1] detrusor hyperreflexia 2] postoperative (bladder) incontinence 3] infravesical obstruction 4] a postvoid residual urine (PVR) of > 15% of the maximal cystometric bladder capacity 5] acute UTIs 6] angina pectoris 7] glaucoma 8] megacolon 9] clinically relevant cardiac, renal or hepatic dysfunctions 10] tachy/dysrhythmias 11] frequency or nocturia due to heart or renal insufficiency 12] overt cerebral sclerosis. The following concomitant medications were considered as exclusion criteria: other spasmolytics or anticholinergics, β-sympathomimetics, calcium antagonists, dopamine agonists, prolactin inhibitors, prostaglandin synthesis inhibitors, striated muscle relaxants, or medication for Parkinsonism.			Dry mouth Not reported Dropouts for any reason PRO IR: 19/149 (12.8%) OXY IR: 16/145 (11.0%) PLA: 7/72 (9.7%) Dropouts for adverse effects Not reported Psychological outcomes Not reported Clinical measures - Post-void residual volume Not reported **Week 12** Not applicable	D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** Baseline data on all patients randomised not reported
Full citation Chapple,C.R., Martinez-Garcia,R., Selvaggi,L., Toozs-Hobson,P.,	**Sample size** N = 1177 Solifenacin (5mg or 10mg) (SOL)	**Interventions** Patients were randomised (stratified by centre) to receive either solifenacin 5	**Details** After 4 weeks of treatment, patients had the option of either continuing with their	**Results** **Week 4 results** Patient satisfaction with treatment	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Warnack,W., Drogendijk,T., Wright,D.M., Bolodeoku,J., A comparison of the efficacy and tolerability of solifenacin succinate and extended release tolterodine at treating overactive bladder syndrome: Results of the STAR trial, European UrologyEur.Urol., 48, 464-470, 2005 **Ref Id** 220410 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial **Aim of the study** To compare the efficacy and tolerability of solifenacin and extended release tolterodine **Study dates** May 2003 to October 2004 **Source of funding** Supported by Yamanouchi Pharmaceutical Co. Ltd	= 578 Tolterodine extended release (TOL ER) = 599 **Characteristics** Gender - Female/N (% female) SOL: 493/578 (85.3%) TOL ER: 529/599 (88.2%) Age (years) - Mean ± SD SOL: 56.5 (No SD reported) TOL ER: 56.4 (No SD reported) Incontinence episodes/day - Range SOL: 2.77 ± 2.65 TOL ER: 2.55 ± 2.37 Urgency episodes/day SOL: 6.01 ± 4.66 TOL ER: 5.84 ± 4.12 Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] Men and women aged at least 18 years who had OAB symptoms (including urinary frequency, urgency or urge incontinence) for 3 months or more and being treated as outpatients	mg OD or tolterodine ER 4 mg OD as double-blind treatment	original dose or requesting a dose increase based on their satisfaction with treatment efficacy and tolerability, and discussions with the investigator. Patients completed the 3-day micturition diary prior to each scheduled visit at weeks 4, 8 and 12. For each episode of urinary symptoms, the patient recorded the date and time of each episode, whether or not they voided, the presence of urgency and/or incontinence, the volume voided (for at least 2 of the 3 days), whether or not the episode disturbed the patient's sleep, and the time of rising from, and retiring to, bed. **Power calculation** The sample size calculation and analytical strategy was based upon CPMP guidelines and enabled the primary efficacy analysis to be performed with a power of 80% as the between-treatment non-inferiority comparison of the change from baseline to endpoint in the mean number of micturitions per 24 hours by	Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes - Mean (No SD) change from baseline SOL: -1.3 (No SD) N not reported TOL ER: -0.9 (No SD) N not reported Urgency episodes SOL: -1.98 (No SD) N not reported TOL ER: -1.67 (No SD) N not reported <u>Continence status (zero episodes per day)</u> Incontinence episodes SOL: 225/593 (37.9%) TOL ER: 204/607 (33.6%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported	Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - remote randmisation A2 - Was there adequate concealment - Yes - randomisation numbers served as packaging for interventions A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind and double-dummy B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	2] an average of 8 micturitions per 24 hours 3] an average of 1 incontinence episode per 24 hours 4] an average of 1 urgency episode per 24 hours **Exclusion criteria** 1] stress incontinence or mixed incontinence where stress was predominant (mixed incontinence was allowed otherwise) 2] patients with a neurological cause of abnormal detrusor activity		using the Per Protocol Set (PPS) population. **Intention to treat analysis** Not reported	<u>Adverse effects</u> Any adverse effect Not reported Dry mouth SOL: 108/593 (18.2%) TOL ER: 91/607 (14.5%) Dropouts for any reason Not reported Dropouts for adverse effects SOL: 18/593 (3.0%) TOL ER: 17/607 (2.8%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported **Week 12 results** <u>Patient satisfaction with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence	data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** 52% of patients in SOL group requested a dose increase from 5mg to 10mg after 4 weeks - average dose at endpoint = 7.9mg

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				episodes - Mean (No SD) change from baseline SOL: -1.6 (No SD) N not reported TOL ER: -1.1 (No SD) N not reported Urgency episodes SOL: -2.85 (No SD) N not reported TOL ER: -2.42 (No SD) N not reported <u>Continence status (zero episodes per day)</u> Incontinence episodes SOL: 341/593 (57.5%) TOL ER: 294/607 (48.4%) Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect Not reported Dry mouth	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				SOL: 174/593 (29.3%) TOL ER: 144/607 (23.7%) Dropouts for any reason SOL: 34/593 (5.7%) TOL ER: 44/607 (7.2%) Dropouts for adverse effects SOL: 20/593 (3.4%) TOL ER: 18/607 (3.0%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	
Full citation Millard,R., Tuttle,J., Moore,K., Susset,J., Clarke,B., Dwyer,P., Davis,B.E., Clinical efficacy and safety of tolterodine compared to placebo in detrusor overactivity., Journal of UrologyJ.Urol., 161, 1551-	**Sample size** N = 316 Tolterodine immediate release 1mg (TOL IR 1) = 123 Tolterodine immediate release 2mg (TOL IR 2) = 129 Placebo (PLA) 64	**Interventions** Patients were randomised to tolterodine immediate release 1mg twice daily, tolterodine immediate release mg twice daily or placebo	**Details** The primary efficacy outcomes were the number of voids per 4 hours, mean volume per void and the number of incontinence episodes per 4 hours	**Results** **Week 4** Not reported **Week 12** Patient satisfaction with treatment TOL IR 1: 48/123 (37.4%) TOL IR 2: 67/129	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1555, 1999 **Ref Id** 220411 **Country/ies where the study was carried out** Australia **Study type** Randomised controlled trial **Aim of the study** To measure the efficacy of 2 doses of tolterodine versus placebo during a 12 week treatment period **Study dates** Not reported **Source of funding** Supported by Pharmacia and Upjohn AB, Uppsala, Sweden	**Characteristics** Gender - Female/N (% female) TOL IR 1: 96/123 (78%) TOL IR 2: 99/129 (77%) PLA: 42/64 (66%) Age (years) - Range TOL IR 1: 24 - 89 TOL IR 2: 24 - 83 PLA: 25 - 84 Incontinence episodes/day - Mean ± SD TOL IR 1: 3.9 (No SD reported) TOL IR 2: 3.6 (No SD reported) PLA: 3.9 (No SD reported) Urgency episodes/day Not reported Detrusor overactivity TOL IR 1: 123/123 (100%) TOL IR 2: 129/129 (100%) PLA: 64/64 (100%) Duration of OAB Not reported **Inclusion criteria** 1] Aged 18 or older with OAB 2] detrusor overactivity withaverage urinary frequency of 8 or more voids per 24 hours 3] urge incontinence (an average of 1 or more incontinence episodes per 24 hours) and/or		**Power calculation** Sample size was chosed to provide an 80% chance of detecting a 15% decrease in the number fo voids daily at 0.05 significance. **Intention to treat analysis** Not reported	(51.9%) PLA: 23/64 (35.9%) Self-reported rate of absolute symptoms reduction/day - Mean ± SD TOL IR 1: -1.7 ± 2.8 N = 109 TOL IR 2: -1.7 ± 2.5 N = 117 PLA: -1.3 ± 2.5 N = 55 Urgency episodes Not reported Continence status (Zero episodes per day) TOL IR 1: 12/108 (11.1%) TOL IR 2: 22/116 (18.9%) PLA: 6/55 (10.9%) Incontinence-specific quality of life Not reported Adverse effects Any adverse effect TOL IR 1: 91/123 (74.0%) TOL IR 2: 94/129 (72.9%)	randomisation - Unclear - not reported A2 - Was there adequate concealment - Unclear - not reported A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Medium B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	urinary urgency **Exclusion criteria** 1] demonstrable stress incontinence 2] clinically significant voiding difficulty 3] proved recurrent urinary tract infections 4] interstitial cystitis 5] uninvestigated hematuria 6] bladder cancer 7] on intermittent catheterisation or indwelling catheter 8] hepatic or renal disease 9] had undergone electrostimulation or bladder training or on antimuscarinic drugs within 14 days of study or during study 10] average total voided volume of greater than 3000ml per 24 hours			PLA: 50/64 (78.1%) Dry mouth TOL IR 1: 30/123 (24.4%) TOL IR 2: 50/129 (38.8%) PLA: 8/64 (12.5%) Dropout for any reason TOL IR 1: 7/123 (5.7%) TOL IR 2: 15/129 (11.6%) PLA: 3/64 (4.7%) Dropouts for adverse effects TOL IR 1: 2/123 (1.6%) TOL IR 2: 8/129 (6.2%) PLA: 0/64 (0%) Psychological outcomes Not reported Clinical measures Not reported	reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information**
Full citation	**Sample size**	**Interventions**	**Details**	**Results**	**Limitations**
Thuroff,J.W., Bunke,B., Ebner,A., Faber,P.,	N = 169	After a 1 week run-in period, patients were given	Efficacy was based on 3-day micturition charts, and self-	**Week 4** Patient satisfaction	NICE guidelines manual. Appendix D:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
de,Geeter P., Hannappel,J., Heidler,H., Madersbacher,H., Melchior,H., Schafer,W., Randomized, double-blind, multicenter trial on treatment of frequency, urgency and incontinence related to detrusor hyperactivity: oxybutynin versus propantheline versus placebo, Journal of Urology, 145, 813-816, 1991 **Ref Id** 220412 **Country/ies where the study was carried out** Germany **Study type** Randomised controlled trial **Aim of the study** To determine the clinical efficacy and possible differences of treatment results between oxybutynin and propantheline in patients with urinary frequency, urgency and/or incontinence related to detrusor hyperactivity	Oxybutynin immediate release (OXY IR) = 63 Propantheline (PRO) = 54 Placebo (PLA) = 52 **Characteristics** Gender - Female/N (% female) OXY IR: 59/63 (93.6%) PRO: 53/54 (98.1%) PLA: 50/52 (96.2%) Age (years) - Range OXY IR: 17 - 83 PRO: 16 - 78 PLA: 20 - 83 Incontinence episodes/week Not reported Urgency episodes/day Not reported Detrusor overactivity Not reported Duration of OAB Not reported **Inclusion criteria** 1] 15 years of age and older 2] frequency, urgency and/or incontinence related to detrusor hyperactivity 3] not be taking drugs affecting lower urinary tract function	Oxybutynin immediate release (5mg three times daily), propantheline (15mg three times daily) and placebo. Patients were instructed to take the tablets 30m mins before meals	report of urinary symptoms **Power calculation** Not reported **Intention to treat analysis** Not reported	<u>with treatment</u> Not reported <u>Self-reported rate of absolute symptom reduction per day</u> Incontinence episodes Not reported Urgency episodes Not reported <u>Continence status (zero episodes per day)</u> Incontinenec episodes Not reported Urgency episodes Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects</u> Any adverse effect OXY IR: 40/63 (63.5%) PRO: 24/54 (44.4%) PLA: 17/52 (32.7%) Dry mouth	Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - computerised randomisation used A2 - Was there adequate concealment - Yes - opaque packaging used A3 - Were groups comparable at baseline - Yes - No apparent differences between groups at baseline Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes - Study was double-blind B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Not reported Pharmacia Leo Therapuetics, Helsingborg, Sweden provided the pharmaceutical preparations	**Exclusion criteria** 1] pregnancy 2] congestive heart failure 3] severe renal / liver disease 4] myasthenia gravis 5] unable to swallow / uncooperative patient 6] hiatal hernic / reflux esophagitis 7] gastrointestinal tract obstruction 8] urnary tract obstruction 9] residual urine > 50ml 10] untreated urinary tract infection 11] hyperreflexia without urge			OXY IR: 30/63 (47.6%) PRO: 17/54 (31.5%) PLA: 6/52 (11.5%) Dropouts for any reason OXY IR: 8/63 (6.3%) PRO: 6/54 (11.1%) PLA: 5/52 (9.6%) Dropouts for adverse effects OXY IR: 2/63 (3.2%) PRO: 3/54 (5.6%) PLA: 0/52 (0%) <u>Psychological outcomes</u> Not reported <u>Clinical measures - Post-void residual volume</u> Mean ± SE change at endpoint OXY IR: 27.0 ± 11.6 N = 59 PRO: - 2.2 ± 2.0 N = 48 PLA: -1.9 ± 1.6 N 46 **Week 12**	Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes D2 - Were outcomes defined precisely - Yes D3 - Was a valid and reliable methods used to assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of: 1] Population: Yes 2] Interventions: Yes 3] Outcome: Yes Indirectness: None **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Not applicable	

What is the effectiveness of Botulinum toxin A (200U) when compared to placebo

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Dmochowski,R., Chapple,C., Nitti,V.W., Chancellor,M., Everaert,K., Thompson,C., Daniell,G., Zhou,J., Haag-Molkenteller,C., Efficacy and safety of onabotulinumtoxinA for idiopathic overactive bladder: a double-blind, placebo controlled, randomized, dose ranging trial, Journal of Urology, 184, 2416-2422, 2010 **Ref Id** 100191 **Country/ies where the study was carried out** USA, Canada, Europe **Study type** Randomised controlled trial **Aim of the study** "To assess the safety and efficacy of a range of	**Sample size** N = 313 BoNT-A 50U = 57 BoNT-A 100U = 54 BoNT-A 150U = 49 BoNT-A 200U = 53 BoNT-A 300U = 56 Placebo = 44 **Characteristics** <u>Gender - Female/N (% female)</u> BoNT-A 50U = 53/57 (93.0%) BoNT-A 100U = 50/54 (92.6%) BoNT-A 150U = 47/49 (95.9%) BoNT-A 200U = 46/53 (86.8%) BoNT-A 300U = 52/56 (92.9%) Placebo = 40/44 (90.9%) <u>Age - Mean ± SD</u> BoNT-A 50U = 58.2 ± 15.1 years BoNT-A 100U = 60.8 ± 12.1 years BoNT-A 150U = 56.9 ± 13.3 years	**Interventions** BoNT-A as 20 intradetrusor injections of 0.5 ml, avoiding the trigone and dome The BoNT-A concentration per ml in the 10ml dosing syringe was 5U/ml for 50U, 10U/ml for 100U, 15U/ml for 150U, 20U/ml for 200U and 30U/ml for 300U Placebo as 20 intradetrusor injections of 0.5 ml, avoiding the trigone and dome	**Details** Anticholinergic medication was not permitted within 21 days of entry into the study or after treatment. Injections were administered via flexible or rigid cystocope under local anesthesia (with or without sedation as per local practice). Before injection the bladder was instilled with 1% to 2% lidocaine (or similar agent) to achieve sufficient anesthesia. The bladder was drained, rinsed and then instilled with enough saline to achieve adequate visualization for the injections. **Power calculation** A formal power calculation was not done but a power of 61% to 92% to detect a between group difference of 4 to 6	**Results** Patient satisfaction with treatment (Week 12) Not reported Self reported rate of absolute symptom reduction per day - Assessed at Week 24 Episodes of incontinence - weekly - Mean - no sd reported BoNT-A 300U: 7.8 BoNT-A 200U: 4.1 BoNT-A 150U: 5.6 BoNT-A 100U: 8.6 BoNT-A 50U: 11.4 Placebo: 15.3 Episodes of urgency BoNT-A 300U: 24.9 BoNT-A 200U: 29.8 BoNT-A 150U: 41.0 BoNT-A 100U: 38.7 BoNT-A 50U: 41.3 Placebo: 44.2 Continence status (zero episodes at week 24) BoNT-A 300U: 30/56 (53.6%) BoNT-A 200U: 29/53 (54.7%) BoNT-A 150U: 21/49 (42.9%) BoNT-A 100U: 15/54 (27.8%) BoNT-A 50U: 16/57 (28.1%) Placebo: 6/44 (13.6%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Unclear - Method was not reported A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes Level of bias: Unclear <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>doses of a single treatment of intradetrusor onabotulinumtoxinA versus placebo in patients with idiopathic OAB and UUI whose symptoms were not adequately managed with anticholinergics"

Study dates

July 2005 to June 2008

Source of funding

"Supported by Allergan, Inc"</td>
<td>BoNT-A 200U = 59.6 ± 14.9 years
BoNT-A 300U = 58.7 ± 13.0 years
Placebo = 58.7 ± 12.3 years

<u>Incontinence episodes / day - Mean ± SD</u>
BoNT-A 50U = 4.33 ± 2.7
BoNT-A 100U = 3.97 ± 3.2
BoNT-A 150U = 4.04 ± 3.8
BoNT-A 200U = 3.44 ± 2.5
BoNT-A 300U = 3.8 ± 3.0
Placebo = 4.64 ± 2.9

<u>Urgency episodes / day - Mean ± SD</u>
Not reported

<u>Detrusor overactivity - n/N (%)</u>
BoNT-A 50U = 44/57 (77.2%)
BoNT-A 100U = 44/54 (81.5%)
BoNT-A 150U = 34/49 (69.4%)
BoNT-A 200U = 42/53 (79.2%)
BoNT-A 300U = 40/56 (71.4%)
Placebo = 34/44 (77.3%)

<u>Duration of OAB - Mean ± SD</u>
BoNT-A 50U = 106.2 ± 92.2 months
BoNT-A 100U = 99.1 ± 77.2 months
BoNT-A 150U = 127.6 ± 107.4 months</td>
<td></td>
<td>weekly UUI episodes was the basis for the sample size of 42 patients per group.

Intention to treat analysis

Missing values up to week 12 weere replaced by the last observation adjusted by the ratio of means for the preceding and current visit for all non-missing values for all patients.</td>
<td>Incontinence-specific quality of life - Endpoint week 12
Scale used - I-QOL- No SD's reported
BoNT-A 300U: 39.7
BoNT-A 200U: 37.1
BoNT-A 150U: 35.2
BoNT-A 100U: 32.9
BoNT-A 50U: 29.8
Placebo: 17.9

Adverse effects of treatment
Post-void residual-related catherisation (CIC or indwelling)
BoNT-A 300U: 9/55 (16.4%)
BoNT-A 200U: 11/52 (21.2%)
BoNT-A 150U: 10/50 (20.0%)
BoNT-A 100U: 8/55 (14.5%)
BoNT-A 50U: 7/56 (12.5%)
Placebo: 0/43 (0%)

Psychological outcomes
Not reported

Clinical measures
Post-void residual volume
Not reported

Incontinence episodes
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>-2.87</td><td>2.10</td><td>53</td></tr>
<tr><td>Control</td><td>-2.46</td><td>2.47</td><td>44</td></tr>
</table>
</td>
<td>comparable for dropout - Yes
C3 - Were groups comparable for missing data - Yes
Level of bias: Low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length - Yes
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear
Level of bias: Low

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes
2] Intervention - Yes
3] Outcome - Yes
Indirectness: None

Other information

Some baseline data taken from a secondary publication Rovner 2011 - see excluded studies</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>BoNT-A 200U = 107.3 ± 107.2 months
BoNT-A 300U = 114.3 ± 112.1 months
Placebo = 130.8 ± 112.9 months

Inclusion criteria

1] symptoms of OAB with UUI for at least 6 months immediately prior to screening
2] ≥ 8 UUI epiisodes/week with no more than 1 incontinence-free day/week
3] urinary frequency (defined as an average ≥ 8 micturitions/day)
4] to have not been adequately managed with ≥ 1 anticholinergic drug (defined as an inadequate response to or intolerable side effects after ≥ 1 month of therapy on an optimized dose) in the investigators opinion

Exclusion criteria

1] stress-predominant urinary incontinence
2] used clean intermittent catheterization (CIC)
3] history or evidence of pelvic or urologic abnormalities
4] disease affecting bladder</td>
<td></td>
<td></td>
<td>Urgency episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>-4.34</td><td>3.49</td><td>53</td></tr><tr><td>Control</td><td>-2.54</td><td>4.10</td><td>44</td></tr></table>Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>29</td><td>53</td></tr><tr><td>Control</td><td>6</td><td>44</td></tr></table>Adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>11</td><td>53</td></tr><tr><td>Control</td><td>0</td><td>44</td></tr></table></td>
<td>table.

Addition supplemetary data on 24 week continence status taken from www.clinicaltrials.gov (NCT00168454) and from supplementary information from the triallist (as suggested in text)

Means and standard deviations were divided by 7 from weekly totals for meta-analysis.</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	function 5] ≥ 2 UTIs within 6 months 6] 24-hr total urine volume voided > 3,000 ml or post-void residual (PVR) urine volume > 200 ml at screening				
Full citation Flynn,M.K., Amundsen,C.L., Perevich,M., Liu,F., Webster,G.D., Outcome of a randomized, double-blind, placebo controlled trial of botulinum A toxin for refractory overactive bladder, Journal of Urology, 181, 2608-2615, 2009 **Ref Id** 100214 **Country/ies where the study was carried out** USA **Study type** Randomised controlled trial **Aim of the study** Not reported	**Sample size** N = 28 BoNT-A 200U = 11 BoNT-A 300U = 10 Placebo = 7 **Characteristics** <u>Gender - Female/N (% female)</u> BoNT-A 200U = 11/11 (100%) BoNT-A 300U = 10/10 (100%) Placebo = 7/0 (100%) <u>Age - Mean ± SD</u> BoNT-A 200U = 76.2 ± 10.7 years BoNT-A 300U = 61.7 ± 13.0 years Placebo = 74.1 ± 11.0 years <u>Incontinence episodes / day - Mean ± SD</u> Not reported <u>Detrusor overactivity -n/N (%)</u> Not reported	**Interventions** BoNT-A was reconstituted in 3 cc saline according to manufacturers instructions and approximately 0.2cc study solution was injected. Placebo was 3cc saline. The detrusor was injected in parallel lines approximately 1 cm apart along the posterior bladder wall, staying superior to the trigone and medial to the ureteral orifices, beginning 1 cm above the interureteral ridge. Three to five injections per line were performed with approximately 1 cm between injections.	**Details** The bladder was filled with 40cc 2% lidocaine and 1% viscous lidocaine administered to the urethra for 20 mins. A 14Fr operating sheath with 12 degree cystoscope and a 22 gauge injection needle was inserted into the bladder which was filled with enough saline to smoth the bladder mucosa (approxinnately 100cc) **Power calculation** "Based on values and standard deviations from our earlier study, an a priori power analysis indicated that we needed 7 subjects per group for a 90% power and a significance of 0.05 to detect a 40% improvement in IE per day at 6 weeks. We assumed	**Results** Patient satisfaction with treatment (Week 12) Not reported Self reported rate of absolute symptom reduction per day - endpoint at 9 months Episodes of incontinence BoNT-A 200U: 6.6 ± 3.12 BoNT-A 300U: 3.52 ± 3.0 Placebo: 8.7 ± 3.76 Episodes of frequency Not reported Continence status (zero episodes per day) Not reported Incontinence-specific quality of life Not reported Adverse effects of treatment BoNT-A 300U: 0/11 (0%) BoNT-A 200U: 1/10 (10.0%) Placebo: 0/7 (0%) Psychological outcomes Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Yes A2 - Was there adequate concealment - Yes A3 - Were groups comparable at baseline - Yes Level of bias: Low <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Unclear Level of bias: Low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study dates

May 2005 - end date not given as study was ongoing at time of publication

Source of funding

"Supported by the National Institutes of Health National Institute of Aging grant #R21 AG25490-01"</td>
<td><u>Duration of OAB - Mean ± SD</u>
Not reported

Inclusion criteria

1] > 2 incontinence episodes per day occurring with urge on a 3-day bladder diary
2] 24 hour pad weight > 100gm
3] failed at least 1 anti-cholinergic medicine and behavioral modifications
4] negative urine culture

Exclusion criteria

1] cough leak point pressure < 100cm H_2O
2] known neurological condition
3] gross fecal incontinence
4] absent detrusor contraction on pressure flow</td>
<td></td>
<td>a 10% dropout rate"

Intention to treat analysis

"Analysis was performed on an intent to treat basis"

Method not reported</td>
<td>Clinical measures
Post-void residual volume
Not reported

Incontinence episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>6.60</td><td>3.12</td><td>11</td></tr><tr><td>Control</td><td>8.70</td><td>3.76</td><td>7</td></tr></table>
Adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>1</td><td>11</td></tr><tr><td>Control</td><td>0</td><td>7</td></tr></table></td>
<td>C2 - Were groups comparable for dropout - Yes
C3 - Were groups comparable for missing data - Yes
Level of bias: Low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length - No - study duration was 6 weeks
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear
Level of bias: Low

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes
2] Intervention - Yes
3] Outcome - Yes
Indirectness: None

Other information

Additional data on mean</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					age and gender incontinence episodes at endpoint taken from www.clinicaltrials.gov (NCT00178191)
Full citation Sahai,A., Khan,M.S., Dasgupta,P., Efficacy of botulinum toxin-A for treating idiopathic detrusor overactivity: results from a single center, randomized, double-blind, placebo controlled trial, Journal of Urology, 177, 2231-2236, 2007 **Ref Id** 100421 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial **Aim of the study** Not reported	**Sample size** N = 34 BoNT-A 200U = 16 Placebo = 18 **Characteristics** Gender - Female/N (% female) BoNT-A 200U = 9/16 (56.3%) Placebo = 10/18 (55.6%) Age - Mean BoNT-A 200U = 49.8 years SD not reported Placebo = 50.8 years SD not reported Incontinence episodes / day - Mean ± SD BoNT-A 200U = 4.98 ± 2.56* Placebo = 3.91 ± 1.91* Detrusor overactivity - n/N (%) BoNT-A = 16/16 (100%) Placebo = 18/18 (100%)	**Interventions** BoNT-A 200U was reconstituted in 20 ml 9% normal saline and involved 20 injections of 10U/ml per injection site into the bladder wall sparing the trigone Placebo as 20ml 9% normal saline	**Details** Patients were cleaned and draped, and 20ml 2% lidocaine gel was applied intraurethrally. BoNT-A or placebo was administered with a flexible injection needle via a flexible cystoscope. Patients were observed for 30 minutes and then discharged home witha 3-day prescription of 250mg oral ciprofloxacin twice daily. Patients taking anticholinergics, despite poor treatment efficacy, were asked to continue unless they believed it unnecessary and to inform the investigators when this happened. Those not taking anticholinergics were advised not to restart.	**Results** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom/day - endpoint at 12 weeks - no sd reported Incontinence episodes - 3 days BoNT-A 200U: 1.48 Placebo: 3.20 Urgency episodes - 3 days BoNT-A 200U: 3.50 Placebo: 6.39 Continence status BoNT-A 200U: 8/16 (50.0%) Placebo: 0/16 (0%) Incontinence-specific quality of life - change to week 12 Scale used = IIQ-7 - No SD's reported BoNT-A 200U: -10.38 (16) Placebo: 0.61 (18) Adverse effects of treatment Post-void residual volume (> 150ml) requiring CISC BoNT-A 200U: 6/18 (33.3%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes A2 - Was there adequate concealment - Yes A3 - Were groups comparable at baseline - Yes Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study dates

May 2004 to February 2006

Source of funding

"Supported by a grant from the British Urological Foundation"

"All botulinum toxin-A was provided free of charge by Allergan, Ltd"

Secondary publication
"All authors are investigators for Allergan Ltd"</td>
<td><u>Duration of OAB - Mean ± SD</u>
Not reported

*Data calculated by NCC-WCH

Inclusion criteria

1] Age 18 - 80 years
2] symptoms of OAB
3] proven detrusor overactivity on urodynamics
4] failed trial of anticholinergic therapy
5] able and willing to perform CISC

Exclusion criteria

1] OAB secondary to neurological disease
2] evidence of blader flow obstruction
3] anticoagulant therapy (eg heparin or warfarin)
4] pregnancy or planned pregnancy with a year
5] painful bladder syndrome or institial cystitis
6] indwelling catheter
7] increased post-void residual > 300 ml
8] previous urological use of botuliinum toxin
9] previous bladder surgery</td>
<td></td>
<td>Power calculation

The study was designed to have 90% power to detect a mean difference of 50 ml in MCC between BoNT-A and placebo assuming that the standard deviation is 42ml using a two-sided type I error of 5%. Thus, at least 32 patients (16 in each group) were required to comlete the trial.

Intention to treat analysis

An independent statistician performed the analysis on a per protocol basis. Missing values were imputed based on mean values at specific points.</td>
<td>Placebo: 0/18 (0%)

Psychological outcomes
Not reported

Clinical outcomes
Post-void residual volume (reported as baseline to week 12 change in ml)
BoNT-A 200U: -7.13 (16)
Placebo: -0 (18)

Incontinence episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>0.49</td><td>2.56</td><td>16</td></tr><tr><td>Control</td><td>1.07</td><td>1.91</td><td>18</td></tr></table>
Urgency episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>1.17</td><td>4.48</td><td>16</td></tr><tr><td>Control</td><td>2.13</td><td>1.74</td><td>18</td></tr></table>
Continence status</td>
<td>C2 - Were groups comparable for dropout - Yes
C3 - Were groups comparable for missing data - Yes
Level of bias: Low

D Detection bias
D1 - Was follow-up appropriate length - No - 12 weeks
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Unclear
D5 - Were investigators blinded to confounding factors - Unclear
Level of bias: Unclear

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes
2] Intervention - Yes
3] Outcome - Yes
Indirectness: None

Other information

Baseline incontinence episodes - SD data not</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td>(eg cystoplasty)
10] other bladder pathology (eg transitional cedll carcinoma. current UTI)
11] neuromuscular transmission disorder (eg myasthenia gravis, Eaton-Lambert syndrome)</td><td></td><td></td><td>
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>8</td><td>16</td></tr>
<tr><td>Control</td><td>0</td><td>18</td></tr>
</table>
Incontinence QOL
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>7.94</td><td>7.44</td><td>16</td></tr>
<tr><td>Control</td><td>15.39</td><td>8.06</td><td>18</td></tr>
</table>
Adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>6</td><td>18</td></tr>
<tr><td>Control</td><td>0</td><td>18</td></tr>
</table>
</td><td>provided but calculated from SEM provided

Standard deviations at endpoint not given so baseline standard deviations used.</td></tr>
<tr><td>Full citation

Brubaker,L., Richter,H.E., Visco,A., Mahajan,S., Nygaard,I., Braun,T.M., Barber,M.D., Menefee,S., Schaffer,J., Weber,A.M.,</td><td>Sample size

N = 43

BoNT-A 200 U = 28
Placebo = 15</td><td>Interventions

BoNT-A 200U was dissolved in 6 ml saline and divided into 2 syringes each containing 3ml</td><td>Details

Syringes were prepared by study pharmacists and they appeared identical to the injecting physician. All physicians administering</td><td>Results

Patient satisfaction with treatment
BoNT-A 200U: 6/28 (23.1%)
Placebo: 4/15 (26.7%)

Self reported rate of absolute</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials</td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Wei,J., Pelvic Floor,Disorders Network, Refractory idiopathic urge urinary incontinence and botulinum A injection, Journal of Urology, 180, 217-222, 2008

Ref Id

101247

Country/ies where the study was carried out

USA

Study type

Randomised controlled trial

Aim of the study

'To compare the effect of 200U intradetrusor BoNT-A vs placebo on improvement in urge incontinence symptoms in neurologically normal women with DOI refractory to at least 2 first line treatments.'

Study dates

Not reported</td>
<td>Characteristics

<u>Gender - Female/N (% female)</u>
BoNT-A 200U = 28/28 (100%)
Placebo = 15/15 (100%)

<u>Age - Mean ± SD</u>
BoNT-A 200U = 64.7 ± 14.5 years
Placebo = 69.2 ± 13.5 years

<u>Incontinence episodes / day - Mean ± SD</u>
BoNT-A 200U = 7.15 ± 7.59
Placebo = 6.33 ± 2.67

<u>Detrusor overactivity - n/N (%)</u>
BoNT-A 200U = 28/28 (100%)
Placebo = 15/15 (100%)

<u>Duration of OAB - Mean ± SD</u>
Not reported

Inclusion criteria

1] Females at least 21 years of age
2] Six or more urge incontinence episodes on a 3-day bladder diary.
3] Demonstrate DOI on urodynamic testing within the last year.
4] Refractory DOI symptom</td>
<td>Placebo - 6 ml saline in two 3ml syringes

Injections were administered into 15 to 20 detrusor muscle sites (in 3 rows) on posterior bladder wall avoiding the trigone and ureteral orifice. 0.1 ml indigo carmine was added to the total volumes as a marker for detrusor injection sites.</td>
<td>injections were experienced with cystoscopic injection techniques and they performed the procedure in standardized fashion, as instructed using an injection technique video.

All subjects received an antibiotic before the injection and for 3 days thereafter. Subjects unable to void after injection were taught intermittent self-catheterization.

Subjects with inadequate symptom improvement (PGI-I 4 or greater) who requested a second injection were eligible to receive an open label injection of 200 U BoNT-A at least 8 weeks but no more than 52 weeks after the first injection. All subjects were to be followed for 12 months after the first injection but not less than 1 month following the second injection or to study withdrawal up to a maximum of 13 months.

Power calculation</td>
<td>symptom reduction per day
Episodes of incontinence
Not reported

Episodes of frequency
Not reported

Continence status (zero episodes per day)
Not reported

Incontinence-specific quality of life (endpoint at 1 month)
Scale used = UDI
BoNT-A 200U: 67.7 ± 55.4 (28)
Placebo: 97.4 ± 58.3 (15)

Adverse effects of treatment - Increased PVR requiring intermittent catherisation
BoNT-A 200U: 12/28 (43%)
Placebo: 0/15 (0%)

Psychological outcomes
Not reported

Clinical measures
Post-void residual volume
Not reported

Incontinence QOL

<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>67.70</td><td>55.40</td><td>28</td></tr></table></td>
<td><u>A Selection bias</u>
A1 - Was there appropriate randomisation - Yes
A2 - Was there adequate concealment - Yes
A3 - Were groups comparable at baseline - No
Level of bias: Low

<u>B Performance bias</u>
B1 - Did groups get same level of care - Yes
B2 - Were participants blinded - Yes
B3 - Were clinical staff blinded - Yes
Level of bias: Low

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups - Yes
C2 - Were groups comparable for dropout - No - More dropped out in BoNT-A 200U group
C3 - Were groups comparablle for missing data - Yes
Level of bias: Low

<u>D Detection bais</u>
D1 - Was follow-up appropriate length - No Duration of study was 52 weeks but assessments were at 1 month not the planned 6 months</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Source of funding

'Botox was provided to the National Institutes of Health for this study by Allergan, Inc., Irvine, California under Investigational New Drug BB 12,780.

Supported by Grants 2U01 HD41249, 2U10 HD41250, 2U10 HD41261, 2U10 HD41267, 1U10 HD54136, 1U10 HD54214, 1U10 HD54215 and 1U10 HD54241 from the National Institute of Child Health and Human Development.'</td>
<td>control, defined as patients with inadequate symptom control after at least two first-line therapies for DOI. First-line therapies include: pharmacotherapy, supervised behavioral therapy, supervised physical therapy, supervised biofeedback, and electrical stimulation (transvaginal or implanted neuromodulation). First-line pharmacotherapy must include at least two trials of DOI medication for a minimum of 1 month each unless the drug is not tolerated.
5] Neurologically normal on exam, defined as normal knee reflexes, perineal sensation, and no gross neurologic abnormalities believed to affect urinary function

Exclusion criteria

1] Untreated urinary retention, defined as post-void residual greater than 150 ml after a measured void of greater than 150 mL within the last 3 months (including exclusion of patients using intermittent straight catheterization)
2] Surgically altered detrusor muscle, such as</td>
<td></td>
<td>Sample size was calculated to test efficacy rates of 30% for placebo and 50% for BoNT-A after approximately 6 months of follow-up. A dichotomous outcome (success/failure) was assumed with 2:1 randomization. A sample size of 210 subjects provided 80% power to test the hypothesis using a 2-tailed 5% level of significance. This sample size also permitted the testing of an effect size of 0.2 in the continuous measures of quality of life.

Intention to treat analysis

No allowance was made for subjects lost to follow-up.</td>
<td>
<table>
<tr><td>Control</td><td>97.40</td><td>58.30</td><td>15</td></tr>
</table>

Adverse effects

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>12</td><td>28</td></tr>
<tr><td>Control</td><td>0</td><td>15</td></tr>
</table>
</td>
<td>D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear - This was not reported
Level of bias: Unclear

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes
2] Intervention - No - participants could get a second injection after 8 weeks
3] Outcome - No - Need for self-catherisation was not reported clearly
Indirectness: Serious

Other information

Study terminated early due to higher than anticipated rate of increased post-void residual in subjects who received botulinum toxin A injection</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	augmentation cystoplasty 3] Known allergy to Botox 4] Prior treatment with intra-detrusor Botox in the last year 5] Symptomatic urinary tract infection 6] Currently pregnant or lactating patients or patients planning pregnancy within the next year 7] Sexually active premenopausal women with a uterus not on a medically approved form of contraception for at least 3 months prior to study participation; 8] Cystoscopic findings that preclude injection, in the opinion of the investigator 9] Current or prior bladder malignancy 10] Patients with known neurological diseases involving impaired neurotransmission 11] Patients who are on ambulatory anticoagulant therapy, including aspirin, who are unable to discontinue this treatment for 24 hours prior to the bladder injection 12] Suspected or previously diagnosed interstitial cystitis or chronic pelvic pain syndrome 13] Women with hematuria who have not undergone a				Further injections were not given. Required sample size not reached

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	clinically appropriate evaluation 14] Women taking aminoglycosides at the time of injection 15] Blood creatinine level greater than twice the upper limit of normal				
Full citation Tincello,D.G., Kenyon,S., Abrams,K.R., Mayne,C., Toozs-Hobson,P., Taylor,D., Slack,M., Botulinum toxin a versus placebo for refractory detrusor overactivity in women: a randomised blinded placebo-controlled trial of 240 women (the RELAX study), European Urology, 62, 507-514, 2012 **Ref Id** 216211 **Country/ies where the study was carried out** UK **Study type** Randomised controlled trial	**Sample size** N = 240 BoNT-A 200U = 122 Placebo = 118 **Characteristics** Gender - Female/N (% female) BoNT-A 200U = 122/122 (100%) Placebo = 118/118 (100%) Age - Mean (range) BoNT-A 200U = 60.7 (50.8 - 67.8) Placebo = 58.2 (51.5 - 69.2) Incontinence episodes / day - Median (Interquartile range) BoNT-A 200U = 6.2 (3.7 - 8.3) Placebo = 6.2 (3.0 - 8.7) Urgency episodes / day - Median (Interquartile range) BoNT-A 200U = 8.0 (5.7 -	**Interventions** Women received 200U of BoNT-A or placebo (vacuum dried 0.9% sodium chloride) diluted in 20ml of normal saline (10U/ml) injected into 20 sites, sparing the trigone	**Details** Antibiotic prophylaxis was not required but 2 centres administered intraoperative antibiotics **Power calculation** To detect a difference in outcome of 2.29 voids per 24 hours at the 5% statistical significance level, a minimum sample of 220 patients was required. To allow for 10% dropout rate 240 women were recruited. **Intention to treat analysis** Intention to treat analysis reported but no further information provided	**Results** Patient satisfaction with treatment - endpoint at 6 months Not reported Self reported rate of absolute symptom reduction per day - endpoint at 6 months* Episodes of incontinence - Mean ± sd (N) BoNT-A 200U: 3.1 ± 4.0 (116) Placebo: 5.7 ± 4.8 (111) Episodes of frequency BoNT-A 200U: 4.4 ± 3.7 (116) Placebo: 6.8 ± 4.5 (111) Continence status - no leaks at 6 months* BoNT-A 200U: 31/122 (17.2%) Placebo: 12/118 (10.2%) Incontinence-specific quality of life - endpoint at 6 months* Scale used - I-QOL	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - computer generated A2 - Was there adequate concealment - Yes - prepackaged drug packs A3 - Were groups comparable at baseline - Yes - no signififcant differences Level of bias: Low B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Unclear - study was double-blind but no other details reported

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Aim of the study

"To examine efficacy and safety of BoNT-A for refractory IDO in women"

Study dates

July 2006 to November 2009

Source of funding

"Wellbeing of Women & Moulton Charitable Trust. Drugs were provided by Allergan but the company had no further involvement"</td>
<td>10.3)
Placebo = 7.7 (6.0 - 9.7)

Detrusor overactivity - n/N (%)*
BoNT-A 150U = 122/122 (100%)
Placebo = 118/118 (100%)

Duration of OAB - Mean ± SD
Not reported

Inclusion criteria

1] refractory IDO after 8 weeks of treatment with any anticholinergic and any of of the followiing responses on Patient Global Impression fo Improvement 'a little better' or 'worse', verbal report of unacceptable improvement, treatment stopped for side effects, patients previous treatment with no benefit
2] > 8 voids & ≥ 2 urgency episodes per day

Exclusion criteria

1] urodynamic stress incontinence
2] neurologic disease
3] voiding dysfunction
4] contraindications to onabotulinumtoxinA</td>
<td></td>
<td></td>
<td>BoNT-A 200U: 53.0 ± 31.1 (116)
Placebo: 33.5 ± 22.6 (111)

Adverse effects of treatment*
Intermittent catherisation
BoNT-A 200U: 18/122 (14.7%)
Placebo: 4/118 (3.4%)

Psychological outcomes
Not reported

Clinical measures Post-void residual volume
Not reported

Incontinence episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>3.10</td><td>4.00</td><td>116</td></tr><tr><td>Control</td><td>5.70</td><td>4.80</td><td>111</td></tr></table>
Urgency episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>4.40</td><td>3.70</td><td>116</td></tr><tr><td>Control</td><td>6.80</td><td>4.50</td><td>111</td></tr></table></td>
<td>B3 - Were clinical staff blinded - Unclear - study was double-blind but no other details reported
Level of bias: Unclear

C Attrition bias
C1 - Was follow-up equal for both groups - Yes
C2 - Were groups comparable for dropout - Yes 6/122 and 5/118
C3 - Were groups comparable for missing data - Yes
Level of bias: Low

D Detection bias
D1 - Was follow-up appropriate length - Yes
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Unclear - Not reported
D5 - Were investigators blinded to confounding factors - Unclear - - not reported
Level of bias: Unclear

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>
Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>31</td><td>116</td></tr>
<tr><td>Control</td><td>12</td><td>112</td></tr>
</table>
Incontinence QOL
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>-53.00</td><td>31.10</td><td>116</td></tr>
<tr><td>Control</td><td>-33.50</td><td>22.60</td><td>111</td></tr>
</table>
Adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>18</td><td>122</td></tr>
<tr><td>Control</td><td>4</td><td>118</td></tr>
</table>
</td>
<td>2] Intervention - Yes
3] Outcome - Yes
Indirectness: None

Other information

* 6 month outcome data taken from conference abstract in excluded studies table</td>
</tr>
</table>

What is the effectiveness of Botulinum toxin A (200U) when compared to Botulinum toxin A (100U)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Dmochowski,R., Chapple,C., Nitti,V.W., Chancellor,M., Everaert,K., Thompson,C., Daniell,G., Zhou,J., Haag-Molkenteller,C., Efficacy and safety of onabotulinumtoxinA for idiopathic overactive bladder: a double-blind, placebo controlled, randomized, dose ranging trial, Journal of Urology, 184, 2416-2422, 2010 **Ref Id** 100191 **Country/ies where the study was carried out** USA, Canada, Europe **Study type** Randomised controlled trial **Aim of the study** "To assess the safety and efficacy of a range of doses of a single treatment of intradetrusor	**Sample size** N = 313 BoNT-A 50U = 57 BoNT-A 100U = 54 BoNT-A 150U = 49 BoNT-A 200U = 53 BoNT-A 300U = 56 Placebo = 44 **Characteristics** <u>Gender - Female/N (% female)</u> BoNT-A 50U = 53/57 (93.0%) BoNT-A 100U = 50/54 (92.6%) BoNT-A 150U = 47/49 (95.9%) BoNT-A 200U = 46/53 (86.8%) BoNT-A 300U = 52/56 (92.9%) Placebo = 40/44 (90.9%) <u>Age - Mean ± SD</u> BoNT-A 50U = 58.2 ± 15.1 years BoNT-A 100U = 60.8 ± 12.1 years BoNT-A 150U = 56.9 ± 13.3 years BoNT-A 200U = 59.6 ±	**Interventions** BoNT-A as 20 intradetrusor injections of 0.5 ml, avoiding the trigone and dome The BoNT-A concentration per ml in the10ml dosing syringe was 5U/ml for 50U, 10U/ml for 100U, 15U/ml for 150U, 20U/ml for 200U and 30U/ml for 300U Placebo as 20 intradetrusor injections of 0.5 ml, avoiding the trigone and dome	**Details** Anticholinergic medication was not permitted within 21 days of entry into the study or after treatment. Injections were administered via flexible or rigid cystocope under local anesthesia (with or without sedation as per local practice. Before injection the bladder was instilled with 1% to 2% lidocaine (or similar agent) to achieve sufficient anesthesia. The bladder was drained, rinsed and then instilled with enough saline to achieve adequate visualization for the injections. **Power calculation** A formal power calculation was not done but a power of 61% to 92% to detect a between group difference of 4 to 6 weekly UUI episodes was the basis for the sample size of 42 patients per group.	**Results** Patient satisfaction with treatment (Week 12) Not reported Self reported rate of absolute symptom reduction per day - Assessed at Week 24 Episodes of incontinence - weekly - Mean - no sd reported BoNT-A 300U: 7.8 BoNT-A 200U: 4.1 BoNT-A 150U: 5.6 BoNT-A 100U: 8.6 BoNT-A 50U: 11.4 Placebo: 15.3 Episodes of urgency BoNT-A 300U: 24.9 BoNT-A 200U: 29.8 BoNT-A 150U: 41.0 BoNT-A 100U: 38.7 BoNT-A 50U: 41.3 Placebo: 44.2 Continence status (zero episodes at week 24) BoNT-A 300U: 30/56 (53.6%) BoNT-A 200U: 29/53 (54.7%) BoNT-A 150U: 21/49 (42.9%) BoNT-A 100U: 15/54 (27.8%) BoNT-A 50U: 16/57 (28.1%) Placebo: 6/44 (13.6%) Incontinence-specific quality of life - Endpoint week 12	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Unclear - Method was not reported A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes Level of bias: Unclear <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>onabotulinumtoxinA versus placebo in patients with idiopathic OAB and UUI whose symptoms were not adequately managed with anticholinergics"

Study dates

July 2005 to June 2008

Source of funding

"Supported by Allergan, Inc"</td>
<td>14.9 years
BoNT-A 300U = 58.7 ± 13.0 years
Placebo = 58.7 ± 12.3 years

<u>Incontinence episodes / day - Mean ± SD</u>
BoNT-A 50U = 4.33 ± 2.7
BoNT-A 100U = 3.97 ± 3.2
BoNT-A 150U = 4.04 ± 3.8
BoNT-A 200U = 3.44 ± 2.5
BoNT-A 300U = 3.8 ± 3.0
Placebo = 4.64 ± 2.9

<u>Urgency episodes / day - Mean ± SD</u>
Not reported

<u>Detrusor overactivity - n/N (%)</u>
BoNT-A 50U = 44/57 (77.2%)
BoNT-A 100U = 44/54 (81.5%)
BoNT-A 150U = 34/49 (69.4%)
BoNT-A 200U = 42/53 (79.2%)
BoNT-A 300U = 40/56 (71.4%)
Placebo = 34/44 (77.3%)

<u>Duration of OAB -</u></td>
<td></td>
<td>Intention to treat analysis

Missing values up to week 12 weere replaced by the last observation adjusted by the ratio of means for the preceding and current visit for all non-missing values for all patients.</td>
<td>Scale used - I-QOL- No SD's reported
BoNT-A 300U: 39.7
BoNT-A 200U: 37.1
BoNT-A 150U: 35.2
BoNT-A 100U: 32.9
BoNT-A 50U: 29.8
Placebo: 17.9

Adverse effects of treatment
Post-void residual-related catherisation (CIC or indwelling)
BoNT-A 300U: 9/55 (16.4%)
BoNT-A 200U: 11/52 (21.2%)
BoNT-A 150U: 10/50 (20.0%)
BoNT-A 100U: 8/55 (14.5%)
BoNT-A 50U: 7/56 (12.5%)
Placebo: 0/43 (0%)

Psychological outcomes
Not reported

Clinical measures
Post-void residual volume
Not reported

Incontinence episodes

<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>-2.87</td><td>2.10</td><td>53</td></tr><tr><td>Control</td><td>-2.74</td><td>2.67</td><td>54</td></tr></table></td>
<td>data - Yes
Level of bias: Low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length - Yes
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear
Level of bias: Low

Indirectness

Does the study match the protocol in terms of:
1] Population - Yes
2] Intervention - Yes
3] Outcome - Yes
Indirectness: None

Other information

Some baseline data taken from a secondary publication Rovner 2011 - see excluded studies table.

Addition supplemetary data on 24 week</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>Mean ± SD
BoNT-A 50U = 106.2 ± 92.2 months
BoNT-A 100U = 99.1 ± 77.2 months
BoNT-A 150U = 127.6 ± 107.4 months
BoNT-A 200U = 107.3 ± 107.2 months
BoNT-A 300U = 114.3 ± 112.1 months
Placebo = 130.8 ± 112.9 months

Inclusion criteria

1] symptoms of OAB with UUI for at least 6 months immediately prior to screening
2] ≥ 8 UUI epiisodes/week with no more than 1 incontinence-free day/week
3] urinary frequency (defined as an average ≥ 8 micturitions/day)
4] to have not been adequately managed with ≥ 1 anticholinergic drug (defined as an inadequate response to or intolerable side effects after ≥ 1 month of therapy on an optimized dose) in the investigators opinion</td>
<td></td>
<td></td>
<td>Urgency episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>-4.34</td><td>3.49</td><td>53</td></tr><tr><td>Control</td><td>-4.46</td><td>3.81</td><td>54</td></tr></table>
Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>29</td><td>53</td></tr><tr><td>Control</td><td>15</td><td>54</td></tr></table>
Adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>11</td><td>53</td></tr><tr><td>Control</td><td>0</td><td>54</td></tr></table></td>
<td>continence status taken from www.clinicaltrials.gov (NCT00168454) and from supplementary information from the triallist (as suggested in text)

Means and standard deviations were divided by 7 from weekly totals for meta-analysis.</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria 1] stress-predominant urinary incontinence 2] used clean intermittent catheterization (CIC) 3] history or evidence of pelvic or urologic abnormalities 4] disease affecting bladder function 5] ≥ 2 UTI's within 6 months 6] 24-hr total urine volume voided > 3,000 ml or post-void residual (PVR) urine volume > 200 ml at screening				
Full citation Altaweel,W., Mokhtar,A., Rabah,D.M., Prospective randomized trial of 100u vs 200u botox in the treatment of idiopathic overactive bladder, Urology Annals, 3, 66-70, 2011 **Ref Id** 176921 **Country/ies where the study was carried out**	**Sample size** N = 22 **Characteristics** Gender - Female/N (% female) Not reported Age - Mean ± SD Not reported Incontinence episodes / day - Mean (No SD reported)	**Interventions** Each BTX-A 100u was diluted with 10 ml normal saline. Intradetrusor injection of BTX-A was performed in the posterior and lateral walls of the urinary bladder, with an equivalent dose (1cc/injection) given at each site, using a rigid cystoscopic injection instrument 22F and a 23-gauge injection needle. The injection needle was inserted and injected	**Details** After treatment, a 14F urethral Foley catheter was inserted, and oral antibiotics were prescribed for the next five days. Patients were discharged the same day after the procedure catheter free unless developed retention. The patient's voiding condition was followed up at the outpatient clinic two weeks later with residual volume measurement and then after one, three, six	**Results** Patient satisfaction with treatment Not reported Self-reported rate of absolute symptom reduction per day - Mean (No SD reported) Change from baseline for Incontinence episodes BoNT-A 200U = -1.2 BoNT-A 100U = -1.0 Change from baseline for Urgency episodes BoNT-A 200U = -6.7 BoNT-A 100U = -7.9	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - No - Alternation used A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline -

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Saudi Arabia

Study type

Randomized controlled trial

Aim of the study

"To evaluate the clinical outcome of two different doses of BTX-A in patients with idiopathic over active bladder"

Study dates

Jan 1 2008 to Mar 30 2009

Source of funding

No funding sources reported</td>
<td>BoNT-A 200U = 3.8
BoNT-A 100U = 4.2

<u>Urgency episodes / day - Mean (No SD reported)</u>
BoNT-A 200U = 9.6
BoNT-A 100U = 11.2

<u>Detrusor overactivity - n/N (%)</u>
Not reported

<u>Duration of OAB - Mean ± SD</u>
Not reported

Inclusion criteria

1] refractory idiopathic overactive
bladder defined
as failure of symptom control despite use of antimuscarinic treatment using toleterodine 4 mg/day or oxybutanine 15 mg/day during the previous three months.

Exclusion criteria

1] post void residual (PVR) urine volume of more than 150 ml
2] neurogenic bladder</td>
<td>directly into the detrusor muscle. After treatment, a 14F urethral Foley catheter was inserted, and oral antibiotics were prescribed for the next five days. Patients were discharged the same day after the procedure catheter free unless developed retention.</td>
<td>and nine months follow-up by voiding diary. If the PVR volume exceeded 200 ml at the follow-up visits, clean intermittent self-catheterization was recommended for evacuation of the bladder at least four times daily. An indwelling Foley catheter was placed for one week if transient urinary retention developed. The use of anticholinergic agents was discontinued one week before BTX-A injection. The use of urodynamic parameters assessed included maximum cystometric capacity (MCC), maximal voiding detrusor pressure, and maximal flow rate during voiding and PVR urine volume. Follow-up urodynamic studies were performed at three months after treatment. Antibiotics were given for urinary tract infection until the urinalysis results became negative. Data on adverse events including acute urinary retention, difficult urination, urinary tract infection and gross hematuria after BTX-A treatment were collected during follow-up examinations.</td>
<td>Continence status (Zero episodes per day) at 9 months
BoNT-A 200U = 3/11 (27.3%)
BoNT-A 100U = 1/11 (9.1%)

Incontinence specific quality of life
Not reported

Adverse effects of treatment - Need for catheterisation at 200cc indication
BoNT-A 200U = 2/11 (18.2%)
BoNT-A 100 U = 1/11 (9.1%)

Psyhcological outcomes
Not reported

Clinical measures - Mean ± SD
Post-void residual volume at 3 months
BoNT-A 200U = 78 ± 34
BoNT-A 100U = 62 ± 49

Continence status

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>3</td><td>11</td></tr><tr><td>Control</td><td>1</td><td>11</td></tr></table>
Adverse effects</td>
<td>Yes
Level of bias: High

B Performance bias
B1 - Did groups get same level of care - Yes
B2 - Were participants blinded - Unclear
B3 - Were clinical staff blinded - Unclear
Level of bias: Unclear

C Attrition bias
C1 - Was follow-up equal for both groups - Yes
C2 - Were groups comparable for dropout - Yes - No dropouts reported
C3 - Were groups comparablle for missing data - NA
Level of bias: Low

D Detection bias
D1 - Was follow-up appropriate length - Yes
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear - not reported
Level of bias: Unclear</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>3] bladder outlet obstruction
4] urinary tract infection</td>
<td></td>
<td>Power calculation

None reported

Intention to treat analysis

Not reported</td>
<td>
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>2</td><td>11</td></tr>
<tr><td>Control</td><td>1</td><td>11</td></tr>
</table>
Post void residual volume
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>78.00</td><td>34.00</td><td>11</td></tr>
<tr><td>Control</td><td>62.00</td><td>49.00</td><td>11</td></tr>
</table>
</td>
<td>Indirectness

Does the study match the protocol in terms of;
1] Population - Unlear if population included women
2] Intervention - Yes
3] Outcome - Yes
Indirectness: Serious

Other information

NA</td>
</tr>
</table>

Urinary incontinence (update)

What is the effectiveness of Botulinum toxin A (100U) when compared to placebo

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Dmochowski,R., Chapple,C., Nitti,V.W., Chancellor,M., Everaert,K., Thompson,C., Daniell,G., Zhou,J., Haag-Molkenteller,C., Efficacy and safety of onabotulinumtoxinA for idiopathic overactive bladder: a double-blind, placebo controlled, randomized, dose ranging trial, Journal of Urology, 184, 2416-2422, 2010 **Ref Id** 100191 **Country/ies where the study was carried out** USA, Canada, Europe **Study type** Randomised controlled trial **Aim of the study** "To assess the safety and	**Sample size** N = 313 BoNT-A 50U = 57 BoNT-A 100U = 54 BoNT-A 150U = 49 BoNT-A 200U = 53 BoNT-A 300U = 56 Placebo = 44 **Characteristics** <u>Gender - Female/N (% female)</u> BoNT-A 50U = 53/57 (93.0%) BoNT-A 100U = 50/54 (92.6%) BoNT-A 150U = 47/49 (95.9%) BoNT-A 200U = 46/53 (86.8%) BoNT-A 300U = 52/56 (92.9%) Placebo = 40/44 (90.9%) <u>Age - Mean ± SD</u> BoNT-A 50U = 58.2 ± 15.1 years	**Interventions** BoNT-A as 20 intradetrusor injections of 0.5 ml, avoiding the trigone and dome The BoNT-A concentration per ml in the10ml dosing syringe was 5U/ml for 50U, 10U/ml for 100U, 15U/ml for 150U, 20U/ml for 200U and 30U/ml for 300U Placebo as 20 intradetrusor injections of 0.5 ml, avoiding the trigone and dome	**Details** Anticholinergic medication was not permitted within 21 days of entry into the study or after treatment. Injections were administered via flexible or rigid cystocope under local anesthesia (with or without sedation as per local practice. Before injection the bladder was instilled with 1% to 2% lidocaine (or similar agent) to achieve sufficient anesthesia. The bladder was drained, rinsed and then instilled with enough saline to achieve adequate visualization for the injections.	**Results** Patient satisfaction with treatment (Week 12) Not reported Self reported rate of absolute symptom reduction per day - Assessed at Week 24 Episodes of incontinence - weekly - Mean - no sd reported BoNT-A 300U: 7.8 BoNT-A 200U: 4.1 BoNT-A 150U: 5.6 BoNT-A 100U: 8.6 BoNT-A 50U: 11.4 Placebo: 15.3 Episodes of urgency BoNT-A 300U: 24.9 BoNT-A 200U: 29.8 BoNT-A 150U: 41.0 BoNT-A 100U: 38.7 BoNT-A 50U: 41.3 Placebo: 44.2 Continence status (zero episodes at week 24) BoNT-A 300U: 30/56 (53.6%) BoNT-A 200U: 29/53 (54.7%) BoNT-A 150U: 21/49 (42.9%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation - Unclear - Method was not reported A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes Level of bias: Unclear <u>B Performance bias</u> B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low <u>C Attrition bias</u>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>efficacy of a range of doses of a single treatment of intradetrusor onabotulinumtoxinA versus placebo in patients with idiopathic OAB and UUI whose symptoms were not adequately managed with anticholinergics"

Study dates

July 2005 to June 2008

Source of funding

"Supported by Allergan, Inc"</td>
<td>BoNT-A 100U = 60.8 ± 12.1 years
BoNT-A 150U = 56.9 ± 13.3 years
BoNT-A 200U = 59.6 ± 14.9 years
BoNT-A 300U = 58.7 ± 13.0 years
Placebo = 58.7 ± 12.3 years

<u>Incontinence episodes / day - Mean ± SD</u>
BoNT-A 50U = 4.33 ± 2.7
BoNT-A 100U = 3.97 ± 3.2
BoNT-A 150U = 4.04 ± 3.8
BoNT-A 200U = 3.44 ± 2.5
BoNT-A 300U = 3.8 ± 3.0
Placebo = 4.64 ± 2.9

<u>Urgency episodes / day - Mean ± SD</u>
Not reported

<u>Detrusor overactivity - n/N (%)</u>
BoNT-A 50U = 44/57 (77.2%)
BoNT-A 100U = 44/54 (81.5%)
BoNT-A 150U = 34/49 (69.4%)
BoNT-A 200U = 42/53 (79.2%)
BoNT-A 300U = 40/56</td>
<td></td>
<td>Power calculation

A formal power calculation was not done but a power of 61% to 92% to detect a between group difference of 4 to 6 weekly UUI episodes was the basis for the sample size of 42 patients per group.

Intention to treat analysis

Missing values up to week 12 weere replaced by the last observation adjusted by the ratio of means for the preceding and current visit for all non-missing values for all patients.</td>
<td>BoNT-A 100U: 15/54 (27.8%)
BoNT-A 50U: 16/57 (28.1%)
Placebo: 6/44 (13.6%)

Incontinence-specific quality of life - Endpoint week 12
Scale used - I-QOL- No SD's reported
BoNT-A 300U: 39.7
BoNT-A 200U: 37.1
BoNT-A 150U: 35.2
BoNT-A 100U: 32.9
BoNT-A 50U: 29.8
Placebo: 17.9

Adverse effects of treatment
Post-void residual-related catherisation (CIC or indwelling)
BoNT-A 300U: 9/55 (16.4%)
BoNT-A 200U: 11/52 (21.2%)
BoNT-A 150U: 10/50 (20.0%)
BoNT-A 100U: 8/55 (14.5%)
BoNT-A 50U: 7/56 (12.5%)
Placebo: 0/43 (0%)

Psychological outcomes
Not reported

Clinical measures
Post-void residual volume
Not reported

Incontinence episodes

<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr></table></td>
<td>C1 - Was follow-up equal for both groups - Yes
C2 - Were groups comparable for dropout - Yes
C3 - Were groups comparable for missing data - Yes
Level of bias: Low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length - Yes
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear
Level of bias: Low

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes
2] Intervention - Yes
3] Outcome - Yes
Indirectness: None

Other information

Some baseline data</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>(71.4%)
Placebo = 34/44
(77.3%)

<u>Duration of OAB - Mean ± SD</u>
BoNT-A 50U = 106.2 ± 92.2 months
BoNT-A 100U = 99.1 ± 77.2 months
BoNT-A 150U = 127.6 ± 107.4 months
BoNT-A 200U = 107.3 ± 107.2 months
BoNT-A 300U = 114.3 ± 112.1 months
Placebo = 130.8 ± 112.9 months

Inclusion criteria

1] symptoms of OAB with UUI for at least 6 months immediately prior to screening
2] ≥ 8 UUI epiisodes/week with no more than 1 incontinence-free day/week
3] urinary frequency (defined as an average ≥ 8 micturitions/day)
4] to have not been adequately managed with ≥ 1 anticholinergic drug (defined as an inadequate response to or intolerable side</td>
<td></td>
<td></td>
<td>
<table>
<tr><td>Experimental</td><td>-2.74</td><td>2.67</td><td>54</td></tr>
<tr><td>Control</td><td>-2.46</td><td>2.47</td><td>44</td></tr>
</table>
Urgency episodes
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>-4.46</td><td>3.81</td><td>53</td></tr>
<tr><td>Control</td><td>-2.54</td><td>4.10</td><td>44</td></tr>
</table>
Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>15</td><td>54</td></tr>
<tr><td>Control</td><td>6</td><td>44</td></tr>
</table>
Adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>6</td><td>54</td></tr>
</table>
</td>
<td>taken from a secondary publication Rovner 2011 - see excluded studies table.

Addition supplemetary data on 24 week continence status taken from www.clinicaltrials.gov (NCT00168454) and from supplementary information from the triallist (as suggested in text)

Means and standard deviations were divided by 7 from weekly totals for meta-analysis.</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	effects after ≥ 1 month of therapy on an optimized dose) in the investigator's opinion **Exclusion criteria** 1] stress-predominant urinary incontinence 2] used clean intermittent catheterization (CIC) 3] history or evidence of pelvic or urologic abnormalities 4] disease affecting bladder function 5] ≥ 2 UTI's within 6 months 6] 24-hr total urine volume voided > 3,000 ml or post-void residual (PVR) urine volume > 200 ml at screening			**Control** 0 44	
Full citation Jabs,C., Carleton,E., Efficacy of botulinum toxin a intradetrusor injections for nonneurogenic urinary urge incontinence - A randomized double-blind control trial, Neurourology and Urodynamics, 29, 1228-1229, 2010	**Sample size** N = 20 Botulinum toxin A (BoNT-A) = 11 Placebo (PLA) = 9 **Characteristics** Gender - Female/N (%	**Interventions** Botulinum toxin A (100U) or saline placebo intradetrusor injection via cystoscopy Number of injections not specified	**Details** Women were recruited from clinical practice of traillist. An operating room nurse mixed the solutions (details not provided). Both patient and surgeon were blinded for 6 months.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day - Assessed at Week 24 Incontinence episodes - weekly - Mean ± SD BoNT-A 100U: 2.0 ± 3.0 N = 11	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes -

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Ref Id

128924

Country/ies where the study was carried out

Canada

Study type

Randomised controlled trial

Aim of the study

To determine the efficacy of intradetrusor injection of botullinum toxin A on non-neurogenic urinary urge incontinence

Study dates

Not reported

Source of funding

None reported</td>
<td>female)
BoNT-A 100U = 11/11 (100%)
PLA = 9/9 (100%)

Age
Not reported by group but overall mean age was 64.5 (range 48 to 84)

Incontinence episodes / day - Mean ± SD
BoNT-A 100U = 6.1 ± 5.9
Placebo = 5.2 ± 2.3

Urgency episodes / day - Mean ± SD
Not reported

Detrusor overactivity - n/N (%)
Not reported

Duration of OAB - Mean ± SD
Not reported

Inclusion criteria

1] > 28 years of age
2] confirmed diagnosis of idiopathic urge incontinence refractory to anticholinergic treatment</td>
<td></td>
<td>Power calculation

Not reported

Intention to treat analysis

Not reported</td>
<td>Placebo: 5.3 ± 5.0 N = 9

Urgency episodes
Not reported

Continence status (zero episodes at week 24)
BoNT-A 100U: 6/11 (54.5%)
Placebo: Not reported

Incontinence-specific quality of life - Endpoint week 12
Not reported

Adverse effects of treatment
Post-void residual-related catherisation (CIC or indwelling)
Not reported

Psychological outcomes
Not reported

Clinical measures
Post-void residual volume
Not reported

Incontinence episodes

<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>2.00</td><td>3.00</td><td>11</td></tr><tr><td>Control</td><td>5.30</td><td>5.00</td><td>9</td></tr></table></td>
<td>Random number table used
A2 - Was there adequate concealment - Yes - envelopes usd
A3 - Were groups comparable at baseline - No- Placebo group reported fewer incontinence episodes at baseline
Level of bias: Medium

B Performance bias
B1 - Did groups get same level of care - Yes
B2 - Were participants blinded - Yes
B3 - Were clinical staff blinded - Yes
Level of bias: Low

C Attrition bias
C1 - Was follow-up equal for both groups - Yes
C2 - Were groups comparable for dropout - Yes
C3 - Were groups comparable for missing data - Yes
Level of bias: Low

D Detection bias
D1 - Was follow-up appropriate length - Yes
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria Not reported				assess outcome - Yes D4 - Were investigators blinded to intervention - Yes D5 - Were investigators blinded to confounding factors - Unclear Level of bias: Low **Indirectness** Does the study match the protocol in terms of; 1] Population - Yes 2] Intervention - Yes 3] Outcome - Yes Indirectness: None **Other information** None
Full citation Dowson,C., Sahai,A., Watkins,J., Dasgupta,P., Khan,M.S., The safety and efficacy of botulinum toxin-A in the management of bladder oversensitivity: a randomised double-blind placebo-controlled trial, International Journal of Clinical Practice, 65, 698-704, 2011	**Sample size** N = 23 Botulinum toxin A (BoNT-A 100U) = 10 Placebo (PLA) = 13 **Characteristics** Gender - Female/N (% female)* BoNT-A 100U = 8/10 (80.0%)	**Interventions** Prior to the injection, a urine sample was taken to exclude infection (and pregnancy if appropriate) and all received an oral dose of ciprofloxacin 500mg Lignocaine gel was applied to the urethra prior to cystoscopy. Intradetrusor, trignone spearing injections of either BoNT-A 100U or saline were performed with a flexible cystocopic technique using a 4mm Olympus needle. Ten sites	**Details** Study procedures were performed by a single surgeon. Urodynamics were performed in accordance with the ICS guidelines. **Power calculation** Not reported	**Results** Patient satisfaction with treatment (Week 12) BoNT-A: 2/10 (20.0%) PLA: 0/13 (0%) Self reported rate of absolute symptom reduction per day Incontinence episodes - change score - Mean ± SD BoNT-A 100U: -0.1 (No SD) PLA: 0.9 (No SD) Urgency episodes - change	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Yes - independent statistician used A2 - Was there adequate

<table>
<tr>
<th>Study details</th>
<th>Participants</th>
<th>Interventions</th>
<th>Methods</th>
<th>Outcomes and Results</th>
<th>Comments</th>
</tr>
<tr>
<td>Ref Id

129097

Country/ies where the study was carried out

UK

Study type

Randomised controlled trial

Aim of the study

Not reported

Study dates

November 2007 to November 2009

Source of funding

"All authors are investigators for Allergan"</td>
<td>PLA = 7/11 (63.6%)

Age - Mean ± SD
BoNT-A 100U = 49.6 ± 19 years
PLA = 46.7 ± 17 years

Incontinence episodes / day - Mean ± SD
BoNT-A 100U = 1.2 (No SD)
PLA = 2 (No SD)

Urgency episodes / day - Mean ± SD
BoNT-A 100U = 12.4 (No SD)
PLA = 10.8 (No SD)

Detrusor overactivity - n/N (%)
Not reported

Duration of OAB - Mean ± SD
Not reported

* completers only

Inclusion criteria

1] Aged between 18 and 79 years
2] diagnosis of bladder oversensitivity
3] failed conservative and pharmacological treatment including at least 1 anticholinergic</td>
<td>along the base, posterior and lateral walls of the bladder were injected with 1ml of solution of BoNT-A 100U in saline solution or normal saline.

All were given a three day course of ciprofloxacin 500mg twice daily.</td>
<td>Intention to treat analysis

Not reported</td>
<td>score
BoNT-A 100U: 0.1 (No SD)
PLA: 1.0 (No SD)

Continence status (zero episodes at week 24)
Not reported

Incontinence-specific quality of life - Endpoint week 12
Scale used - UDI-6
BoNT-A 100U: 8.2 (No SD)
Placebo: 8.6 (No SD)

Adverse effects of treatment
Post-void residual-related catherisation (CIC or indwelling)
BoNT-A 100U: 3/10 (30.0%)
PLA: 0/13 (0%)

Psychological outcomes
Not reported

Clinical measures
Post-void residual volume
Not reported

Patient satisfaction with treatment

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>2</td><td>10</td></tr><tr><td>Control</td><td>0</td><td>13</td></tr></table></td>
<td>concealment - YEs
A3 - Were groups comparable at baseline - Yes
Level of bias: Low

B Performance bias
B1 - Did groups get same level of care - Yes
B2 - Were participants blinded - Yes
B3 - Were clinical staff blinded - Yes
Level of bias: Low

C Attrition bias
C1 - Was follow-up equal for both groups - Yes
C2 - Were groups comparable for dropout - Yes
C3 - Were groups comparable for missing data - Yes
Level of bias: Low

D Detection bias
D1 - Was follow-up appropriate length - Yes
D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>medication

Exclusion criteria

1] current or planned pregnancy
2] breast feeding
3] painful bladder syndrome
4] pre-existing neurological condition
5] evidence of bladder outflow obstruction
6] indwelling catheter
7] previous bladder surgery
8] previous urological use of botulinum toxin A
9] continued anticoagulation with heparin or warfarin</td>
<td></td>
<td></td>
<td>Incontinence episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>1.10</td><td>2.20</td><td>10</td></tr><tr><td>Control</td><td>2.90</td><td>2.20</td><td>11</td></tr></table>Urgency episodes
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>12.50</td><td>5.90</td><td>10</td></tr><tr><td>Control</td><td>11.80</td><td>5.90</td><td>11</td></tr></table>Adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>3</td><td>10</td></tr><tr><td>Control</td><td>0</td><td>13</td></tr></table></td>
<td>Level of bias: Low

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes
2] Intervention - Yes
3] Outcome - No - outcomes reported at 12 weeks
Indirectness: None

Other information

None</td>
</tr>
<tr>
<td>Full citation

Denys,P., Le,Normand L., Ghout,I., Costa,P., Chartier-</td>
<td>Sample size

N = 107</td>
<td>Interventions

OnabotulinumtoxinA was used in the following doses; 50U, 100U</td>
<td>Details

All women were trained and were</td>
<td>Results

Patient satisfaction with treatment</td>
<td>Limitations

NICE guidelines manual. Appendix D:</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Kastler,E., Grise,P., Hermieu,J.F., Amarenco,G., Karsenty,G., Saussine,C., Barbot,F., VESITOX study group, Efficacy and safety of low doses of onabotulinumtoxinA for the treatment of refractory idiopathic overactive bladder: a multicentre, double-blind, randomised, placebo-controlled dose-ranging study, European Urology, 61, 520-529, 2012 **Ref Id** 194803 **Country/ies where the study was carried out** France **Study type** Randomised controlled trial **Aim of the study** To evaluate the efficacy and tolerability of a single intradetrusor injection procedure of low-doses of onabotulinumtoxinA in patients with idiopathic OAB refractory to anticholinergics and in patients who discontinued anticholinergics	Botulinum toxin A (BoNT-A 50u) = 23 Botulinum toxin A (BoNT-A 100u) = 23 Botulinum toxin A (BoNT-A 150u) = 30 Placebo (PLA) = 31 **Characteristics** Gender - Female/N (% female) BoNT-A 50U = 20/21 (95.2%) BoNT-A 100U = 18/22 (81.8%) BoNT-A 150U = 22/27 (81.5%) Placebo = 27/29 (93.1%) Age - Mean ± SE BoNT-A 50U = 62.3 ± 12.8 years BoNT-A 100U = 62.5 ± 17.5 years BoNT-A 150U = 60.3 ± 12.8 years Placebo = 61.7 ± 14.0 years Incontinence episodes / day - Mean ± SE BoNT-A 50U = 3.9 ± 2.4 BoNT-A 100U = 5.9 ± 6.3 BoNT-A 150U = 3.9 ± 2.7	and 150U Saline was used as placebo A single injection procedure (15 injections) was used targetting the blader sparing the trigone, given under cystoscopic guidance after the bladder was distended using approximately 100ml of normal saline solution. Either local or general anaesthetic wes used. OnabotulinimtoxinA was reconstituted using 15 ml of normal saline solution.	willing to perform clean intermittent catheterisation for prophylactic use and were able to complete a bladder diary. In case of anticholinergic use, a stable regimen was maintained during the study period. **Power calculation** A sample calculation of 38 patients per group was based on a 50% reduction in primary outcome criteria after BoNT-A injection, a 20% reduction in the placebo group, an α-risk of 5%, with a power of 80% resulting in a total of 160 patients. An interim analysis was planned at mid-inclusion. **Intention to treat analysis** Last observation carried forward (LOCF) was used	Not reported Self reported rate of absolute symptom reduction per day - Assessed at Week 24 Incontinence episodes Not reported Episodes of urgency Not reported Continence status (zero episodes at week 20) BoNT-A 150U: 12/30 (40.0%) BoNT-A 100U: 10/23 (43.4%) BoNT-A 50U: 3/31 (9.7%) Placebo: 2/31 (6.5%) Incontinence-specific quality of life - Endpoint week 12 Not reported Adverse effects of treatment Post-void residual-related catherisation (CIC or indwelling) BoNT-A 150U: 4/30 (13.3%) BoNT-A 100U: 1/23 (4.1%) BoNT-A 50U: 3/31 (9.7%) Placebo: 1/31 (3.2%) Psychological outcomes Not reported Clinical measures Post-void residual volume Not reported **Continence status**	Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation - Unclear - Method was not reported A2 - Was there adequate concealment - Unclear - Not reported A3 - Were groups comparable at baseline - Yes Level of bias: Unclear B Performance bias B1 - Did groups get same level of care - Yes B2 - Were participants blinded - Yes B3 - Were clinical staff blinded - Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups - Yes C2 - Were groups comparable for dropout - Yes C3 - Were groups comparable for missing data - Yes Level of bias: Low D Detection bias D1 - Was follow-up appropriate length - Yes

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study dates

October 2005 to March 2009

Source of funding

Sponsored by the "Assistance Publique - Hopitaux de Paris" and funded by the French Ministry of Health</td>
<td>Placebo = 5.9 ± 4.6

Urgency episodes / day - Mean ± SE
BoNT-A 50U = 6.8 ± 5.3
BoNT-A 100U = 8.7 ± 6.1
BoNT-A 150U = 9.3 ± 4.6
Placebo = 7.9 ± 3.5

Detrusor overactivity - n/N (%)
BoNT-A 50U = 21/21 (100%)
BoNT-A 100U = 22/22 (100%)
BoNT-A 150U = 27/27 (100%)
Placebo = 29/29 (100%)

Duration of OAB - Mean ± SD
Not reported

some centres withdrawn from study after protocol violations

Inclusion criteria

1] three or mor urgency epsides per day with or wthough urinary urge incontinence</td>
<td></td>
<td></td>
<td>
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>9</td><td>23</td></tr>
<tr><td>Control</td><td>2</td><td>31</td></tr>
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Adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>1</td><td>23</td></tr>
<tr><td>Control</td><td>1</td><td>31</td></tr>
</table>
</td>
<td>D2 - Were outcomes defined precisely - Yes
D3 - Was a valid and reliable methods used to assess outcome - Yes
D4 - Were investigators blinded to intervention - Yes
D5 - Were investigators blinded to confounding factors - Unclear
Level of bias: Low

Indirectness

Does the study match the protocol in terms of;
1] Population - Yes
2] Intervention - Yes
3] Outcome - No -some outcomes not repotred at timepoints of interest
Indirectness: Some

Other information

Sample size required by calculation not met</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	2] eight or more voidings per day 3] proved detrusor overactivity 4] were refractory to, had contraindication to, or discontinued anticholinergics because of adverse events **Exclusion criteria** 1] symptomatic UTI 2] urinary flow rate < 15 ml/s 3] post-void residual > 150ml 4] predominant stress urinary incontinence 5] a 24 hour urinary production > 3 l 6] an allergy or contraindication to study medication 7] an ongoing anticoagulant or antineoplastic treatment 8] has used BoNT-A in previous 3 months				

Sacral nerve stimulation versus no active treatment

No studies identified

SNS vs PTNS for OAB

No studies identified

What is the comparative effectiveness of surgical approaches for mid-urethral procedures in women undergoing their primary surgical tape procedure?

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Andonian,S., Chen,T., St-Denis,B., Corcos,J., Randomized clinical trial comparing suprapubic arch sling (SPARC) and tension-free vaginal tape (TVT): one-year results, European Urology, 47, 537-541, 2005 **Ref Id** 100532 **Country/ies where the study was carried out** Canada **Study type** Randomized controlled trial **Aim of the study** To test the safety and efficacy of the suprapubic arch sling in a randomised clinical trial with a minimum follow-up of 1 year	**Sample size** N = 84 Top-down procedure = 41 Bottom-up procedure = 43 **Characteristics** <u>Gender – Female/N (% female)</u> 84/84 (100%) <u>Age (years)- Mean (95% CI)</u> Top-down procedure = 62.6 (59.4 to 65.9) Bottom-up procedure = 60.4 (56.5 to 64.2) <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u> Not reported	**Interventions** SPARC procedures were performed as described by Niknejad et al 2002 using SPARC sets manufactured by American Medical Systems Inc (Minnetonka, MN, USA) TVT procedures were performed as described by Ulmsten et al 1996 using TVT sets manufactured by Gynecare (Ethicon, Inc., Sommerville, NJ, USA)	**Details** Anterior and posterior colporrhaphy and vaginal hysterectomy were performed simultaneously in symptomatic women with pelvic organ prolapse. A 16F Foley catheter was left in situ until complete patient recovery from anaesthesia. Patients were invited to urinate before leaving the hospital, and a bladder scan ensured that post-void residual was < 150 ml. In cases of higher residual volumes, an indwelling catheter was re-inserted and the patient was followed at the clinic within 48 hours for a voiding trial and measurement of post-void residual. Anaesthesia was performed as follows: <u>SPARC</u> Local = 1/41 (2.4%) Spinal = 34/41 (83%) General = 6/41 (15%) <u>TVT</u> Local = 2/43 (4.7%) Spinal = 31/43 (72%)	**Results** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 12 months</u> "1-hour pad test of ≤ 2 g was considered as an objective cure" - n/N (%) SPARC = 34/41 (83%) TVT = 40/42 (95%) <u>Incontinence-specific quality of life at 12 months</u> Scale used - Incontinence Impact Questionnaire (IIQ) - Mean, 95% CI (N) SPARC = 49.9, 38.0 to 69.8 (41) TVT = 45.3, 36.1 to 54.5 (42) <u>Adverse effects of treatment</u> **Peri-operative** Bladder perforation* SPARC = 10/41 (24%) TVT = 10/43 (23%) Patients with > 250ml blood loss SPARC = 4/41 (10%) TVT = 3/43 (7%) Complete retention SPARC = 2/41 (4.9%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation: yes A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes Level of bias: low <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: yes B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study dates

April 2001 to December 2002

Source of funding

Not reported</td>
<td>Inclusion criteria

1] Urodynamic stress incontinence with or without pelvic organ prolapse

Women with previous failed anti-incontinence surgeries or bulking agent treatments were eligible for the study.

Women with mixed urinary incontinence were not excluded as far as their cystometrogram showed normal capacity, compliance and no uninhibited contractions

Exclusion criteria

1] Obstructive, unstable bladder function
2] Neurogenic bladder
3] Urinary tract infection was a temporary exclusion criteria</td>
<td></td>
<td>General = 10/43 (23%)

Power calculation

Since the primary endpoint of the trial was objective cure rate, defined by 1-hour pad test of ≤ 2 g, success rate of 90% for TVT was used. It was decided that 30% difference in success rate between the two procedures would be clinically significant. To detect a 30% difference, with an alpha value of 0.05 and power of 80%, at least 38 subjects in each groupwas required. This number was increased to 42 per group to account for 10% dropout during follow-up.

Intention to treat analysis

Not reported</td>
<td>TVT = 4/43 (9.3%)

Infected pelvic haematoma
SPARC =1/41 (2.4%)
TVT = 0/43 (0%)

Fever requiring broad-spectrum antibiotics
SPARC = 1/41 (2.4%)
TVT = 0/43 (0%)

Post-operative
Tape erosion*
SPARC = 1/41 (2.4%)
TVT = 0/43 (0%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative and post-operative categories used for meta-analyses

Continence status

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>40</td><td>43</td></tr>
<tr><td>Control</td><td>34</td><td>41</td></tr>
</table>
</td>
<td>length: yes
D2 - Were outcomes defined precisely: yes
D3 - Was a valid and reliable method used to assess outcome: yes
D4 - Were investigators blinded to interventions: yes - pad test performed by nurse blinded to treatment allocation
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: low

Indirectness

Population: Percentage of study population with MUI not reported. Percentage of women who had previous failed anti-incontinence surgeries (and the details of those procedures) not reported.

Intervention: Percentage of study population undergoing concomitant surgery not reported.

Outcome: continence status measured by 1-h pad test.

Other information

Study included in 2006 guideline.

At 12 month follow-up one</td>
</tr>
</table>

<table>
<tr>
<th>Study details</th>
<th>Participants</th>
<th>Interventions</th>
<th>Methods</th>
<th>Outcomes and Results</th>
<th>Comments</th>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Peri-operative adverse effects

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>10</td><td>43</td></tr>
<tr><td>Control</td><td>10</td><td>41</td></tr>
</table>

Post-operative adverse effects

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>0</td><td>43</td></tr>
<tr><td>Control</td><td>1</td><td>41</td></tr>
</table>
</td>
<td>woman in the TVT group died of myocardial infarction, unrelated to surgery.

The one tape erosion, in SPARC group, required partial tape removal.

Complete retention: SPARC = 2/41, TVT = 4/43. Two women with complete retention in each group required re-operation to loosen the tape after 3 days. The remaining two cases of complete retention (both in the TVT group) resumed spontaneous complete voiding within 48 hours of the operation.

Standard deviation for quality of life data calculated by NCC-WCH using 95% CI.</td>
</tr>
<tr>
<td>Full citation

Andonian,S., St-Denis,B., Lemieux,M.C., Corcos,J., Prospective clinical trial comparing Obtape and DUPS to TVT: one-year safety and efficacy results, European Urology, 52, 245-251, 2007

Ref Id

100533</td>
<td>Sample size

N = 158

TOT (transobturator outside in) = 78
TVT (bottom-up tension-free vaginal tape) = 80

Characteristics

<u>Gender – Female/N (% female)</u>
158/158 (100%)</td>
<td>Interventions

TVT (Gynecare, Sommerville, NJ, USA) procedure was carried out as described by Ulmsten (1996), with the exception of type of anaesthesia.

TOT (Obtape, Mentor Corp,</td>
<td>Details

Anterior and posterior colporrhaphy and vaginal hysterectomy were performed simultaneously when indicated in symptomatic women with pelvic organ prolapse.

A 16F Foley catheter was left in situ until complete patient recovery from anaesthesia.</td>
<td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status at 12 months</u>
Scale used – Cured = 1-h pad test ≤ 2g, failed = 1-h pad test > 2g

Cured</td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: unclear
A2 - Was there adequate concealment: yes
A3 - Were groups comparable at baseline: TVT patients were</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out Canada **Study type** Randomised controlled trial **Aim of the study** "The aim of the present prospective, randomised, controlled, clinical trial was to compare Obtape and DUPS to the original TVT procedure." **Study dates** February 2003 – May 2005 **Source of funding** Not reported	<u>Age (years)- Mean (range)</u> TOT = 56.2 (21.7 – 85.7) TVT = 61.1 (35.4 – 94.6) <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u> Not reported <u>Mixed urinary incontinence - n/N (%)</u> Not reported <u>Incontinence-specific quality of life</u> Scale used - International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) - Score (95% CI) TOT = 14.7 (13.4 to 16.0) TVT = 14.4 (13.0 to 15.8) **Inclusion criteria** 1] SUI with or without pelvic organ prolapse 2] Previous failed anti-	Santa Barbara, CA, USA) was performed according to the technique described by Delorme (2001)	Patients were invited to urinate before leaving the hospital, and a bladder scan ensured that postvoid residual (PVR) was <150 ml. In cases of higher residual volumes or inability to void, an indwelling urethral catheter was reinserted and the patients followed at the clinic within 48h for a voiding trial and PVR measurement. If they were unable to void 48h later, they were taught clean intermittent catheterisation (CIC) if they were physically capable, or an indwelling Foley catheter was reinserted and a repeat voiding trial conducted at a later time. If these measures failed, urethrolysis was performed. **Power calculation** "Since the primary end point of the trial was an objective cure rate, as defined by the 1-h pad test of ≤ 2 g, the success rate of 90% for TVT was used. It was decided that a 20% difference in the success rate between TVT versus Obtape and between TVT versus DUPS would be clinically significant. Therefore, to detect a 20%	TOT = 64/77 (83%) TVT = 69/80 (86%) **Failed** TOT = 10/77 (13%) TVT = 8/80 (10%) <u>Incontinence-specific quality of life at 12 months</u> Scale used - International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) - Mean (95% CI) TOT = 5.2 (3.3 to 7.1) TVT = 3.7 (2.7 to 4.7) <u>Adverse effects of treatment</u> **Peri-operative** Bladder perforation TOT = 0/77 (0%) TVT = 11/80 (13.8%) > 250 ml blood loss TOT = 2/77 (2.6%) TVT = 3/80 (3.8%) Complete retention* TOT = 6/77 (7.8%) TVT = 6/80 (7.5%) Haematoma TOT = 2/77 (2.6%) TVT = 9/80 (0%) **Post-operative** Urinary tract infection TOT = 1/77 (1.3%) TVT = 0/80 (0%) Mesh erosion	older than TOT patients (*P* < 0.01). Level of bias: high - statistically significant different between the ages of TVT and TOT patients <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: yes B3 - Were clinical staff blinded: not applicable Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: not applicable C3 - Were groups comparable for missing data: unclear Level of bias: unclear <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes D5 - Were investigators blinded to confounding factors: unclear Level of bias: low

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>incontinence surgeries or bulking agent treatments

Exclusion criteria

1] Obstruction
2] Unstable bladder function
3] Neurogenic bladder
4] Urinary tract infection was a temporary exclusion criteria</td>
<td></td>
<td>difference, with an alpha value of 0.05 and power of 80%, at least 72 subjects were required in each group. This number was increased to 79 per group to account for 10% dropout during the follow-up period."

Intention to treat analysis

Not reported</td>
<td>TOT = 2/77 (2.6%)
TVT = 0/80 (0%)

De novo urgency
TOT = 6/77 (8%)
TVT = 5/80 (6%)

Persistent urgency*
TOT = 18/77 (23%)
TVT = 16/80 (20%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative and post-operative categories used for meta-analyses

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>69</td><td>80</td></tr><tr><td>Control</td><td>64</td><td>78</td></tr></table>
Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr></table></td>
<td>Indirectness

Population: Women with MUI were not excluded from the study but the number of included women with MUI was not reported

Intervention: 17% of participants underwent concomitant surgery

Outcome: Pad test results reported for continence status

Other information

This was a three-arm trial comparing TVT, Obtape (transobturator outside in; TOT) and DUPS (undertaken according to the description of Rodriquez and Raz, 2001). Randomisation stopped accruing after 32 patients in each arm due to the high number of vaginal erosions in the DUPS group, DUPS was discontinued and patients were randomised to either TVT or TOT. Only results from TVT and TOT arms have been extracted here.

Women with mixed urinary incontinence were not excluded as long as their cystometrogram showed normal capacity, compliance</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>
<table>
<tr><td>Experimental</td><td>6</td><td>80</td></tr>
<tr><td>Control</td><td>6</td><td>77</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>16</td><td>80</td></tr>
<tr><td>Control</td><td>18</td><td>77</td></tr>
</table>
</td>
<td>and no uninhibited contractions. [Number of women with MUI in each group not reported]

Concomitant prolapse surgery was performed in 8/77 (10%) in the TOT group and 18/80 (22%) in the TVT group.

One patient in the TOT group was found to have a urethral diverticulum, which was repaired, but the TOT procedure was cancelled, leaving 77 patients in the TOT group for the final analysis.

One patient in the TOT group required urethrolysis. The two patients in the TOT group with vaginal mesh erosion required resection of the mesh and closure of the vaginal wound. Two patients in the TOT group required repeat anti-incontinence surgery with TVT.</td>
</tr>
<tr>
<td>Full citation

Aniuliene,R., Tension-free vaginal tape versus tension-free vaginal tape obturator (inside-outside) in the surgical treatment of female stress urinary incontinence, Medicina (Kaunas, Lithuania), 45,</td>
<td>Sample size

N = 264

TVT-O (transobturator inside out) = 150
TVT (bottom up tension-free vaginal tape) = 114

Characteristics</td>
<td>Interventions

Surgical procedures (TVT and TVT-O) were performed by the same surgeon using the standardised Gynecare protocol.</td>
<td>Details

Cystoscopy and cough test were routinely performed only in the TVT group.

Antibiotic prophylaxis was applied for all patients during surgery.

Foley catheter was left for</td>
<td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status at 12 months</u>
Scale used – "Results were</td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: unclear - no mention of randomisation in</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
639-643, 2009 **Ref Id** 100543 **Country/ies where the study was carried out** Lithuania **Study type** Randomized controlled trial **Aim of the study** "To compare prospectively the TVT procedure with the TVT-O procedure regarding the effectiveness, safety and simplicity." **Study dates** Not reported **Source of funding** Not reported	<u>Gender – Female/N (% female)</u> 264/264 (100%) <u>Age (years)- Mean ± SD</u> TVT-O = 49 ± 9.5 TVT = 51 ± 10.1 <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI (years) – Mean ± SD</u> TVT-O = 7.5 ± 2.4 TVT = 6.5 ± 3.1 <u>Detrusor overactivity – n/N (%)</u> Not reported **Inclusion criteria** 1] Women with stress urinary incontinence 2] Patient's agreement to buy a TVT or TVT-O set (there is no compensation from territorial patients funds in Lithuania) **Exclusion criteria** 1] Urogenital prolapse greater than stage II 2] Urinary retention 3] Overactive bladder		12 hours in the TVT group and for 6 hours in the TVT-O group after operation. **Power calculation** Not reported **Intention to treat analysis** Not reported	estimated according to the following criteria: **excellent** - no signs of SUI, imperative urination or dysuria; **good -** no signs of SUI, very mild imperative urination, no dysuria; **moderate** - no signs of SUI, imperative urination with minimal leakage, very mild dysuria; **bad** - SUI, imperative urination, a woman uses inlays." **Excellent** TVT-O = 117/150 (78%) TVT = 97/114 (85.1%) **Good** TVT-O = 25/150 (16.7%) TVT = 11/114 (9.7%) **Moderate** TVT-O = 5/150 (3.3%) TVT = 3/114 (2.6%) **Bad** TVT-O = 3/150 (2%) TVT = 3/114 (2.6%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Suprapubic haematoma TVT-O = 0/150 (0%) TVT = 1/114 (0.9%) Wound bleeding in vagina TVT-O = 3/150 (2%) TVT = 2/114 (1.8%)	methods, although author does stated 'prospective randomised study' in abstract A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes Level of bias: unclear <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: unclear C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: no - how 'signs of SUI' 'imperative urination' and 'dysuria' (variables that form composite measure of continence status) were measured is not described D3 - Was a valid and reliable method used to assess outcome: unclear

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>4] Mental disease</td>
<td></td>
<td></td>
<td>Bladder perforation
TVT-O = 0/150 (0%)
TVT = 1/114 (0.9%)

Urinary retention*
TVT-O = 5/150 (3/3%)
TVT = 18/114 (15.8%)

Symptoms of irritated bladder
TVT-O = 5/150 (3/3%)
TVT = 6/114 (5.3%)

Post-operative
Urinary tract infection*
TVT-O = 1/150 (0.7%)
TVT = 5/114 (4.4%)

Fever >38°C
TVT-O = 1/150 (0.7%)
TVT =0/114 (0%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative and post-operative categories used for meta-analyses

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>97</td><td>114</td></tr></table></td>
<td>D4 - Were investigators blinded to interventions: unclear
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: high

Indirectness

Population: 18/150 (12%) in TVT-O group and 16/114 (14%) had undergone previous incontinence surgery (procedures not described)

Intervention: No

Outcome: How 'signs of SUI' 'imperative urination' and 'dysuria' (variables that form composite measure of continence status) were measured is not described.

Other information

All procedures performed by a single surgeon.</td>
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<td></td>
<td></td>
<td>
<table>
<tr><td>Control</td><td>117</td><td>150</td></tr>
</table>
Peri-operative adverse effects
<table>
<tr><td></td><td>Events</td><td>Total</td></tr>
<tr><td>Experimental</td><td>18</td><td>114</td></tr>
<tr><td>Control</td><td>5</td><td>150</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><td></td><td>Events</td><td>Total</td></tr>
<tr><td>Experimental</td><td>5</td><td>114</td></tr>
<tr><td>Control</td><td>1</td><td>150</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>Full citation

Barry,C., Lim,Y.N., Muller,R., Hitchins,S., Corstiaans,A., Foote,A., Greenland,H., Frazer,M., Rane,A., A multi-centre, randomised clinical control trial comparing the retropubic (RP) approach versus the transobturator approach (TO) for tension-free, suburethral sling</td>
<td>Sample size

N = 187

TVT = 107
TOT = 80

Characteristics

<u>Gender - Female/N (% female)</u>
187/187 (100%)</td>
<td>Interventions

TVT (Gynecare, Johnson & Johnson) was performed as performed as described by Ulmsten 1996 except the choice of anaesthesia was left to the surgeon.</td>
<td>Details

Patients were seen pre-operatively and at 3 months post-operatively. Data collected included patient demograhics, operative details, intra- and post-operative complications and pre- and post-operative symptomatology using BFLUTS, incontinence impact using IIQ-7, 3-day</td>
<td>Results

<u>Patient satisfaction with treatment</u>
Not reported at 12 months

<u>Self reported rate of symptom reduction per day</u>
Not reported at 12 months

<u>Continence status</u>
Not reported at 12 months

<u>Incontinence-specific quality of life</u></td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: Yes - Stratified randomization in blocks of 20
A2 - Was there adequate concealment: unclear - Not</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
treatment of urodynamic stress incontinence: the TORP study, International Urogynecology Journal, 19, 171-178, 2008 **Ref Id** 100557 **Country/ies where the study was carried out** Australia **Study type** Randomized controlled trial **Aim of the study** To compare the safety and efficacy of of the Monarc transobturator sling to those of TVT in the treatment of SUI **Study dates** July 2004 to October 2005 **Source of funding** Not reported	<u>Age (years) - Mean ± SD</u> TVT = 53.6 ± 12.1 TOT = 54.2 ± 11.4 <u>Incontinence episodes/day</u> Not reported <u>Duration of SUI</u> Not reported <u>Detrusor overactivity</u> Not reported <u>Mixed urinary incontinence -n/N (%)</u> Not reported **Inclusion criteria** 1] failed conservative management for symptomatic stress incontinence 2] required prophylactic incontinence surgery for prolapse repair for occult stress incontinence (no pre-operative subjective complaint of urinary stress incontinence leakage but found to have SUI) **Exclusion criteria** 1] significant voiding dysfunction (maximum	TOT (Monarc, American Medical Systems) was performed as described by Naidu 2005 by to standardize sling tension, surgeons were requested to perform either a cough test or simulated cough (Crede manoeuvre) with 300mL of water in bladder intra-operatively in patients undergoing sling surgery alone, unless intra-operative bladder injury occurred, whereby catheter would then be left in overnight.	bladder diary and pad usage, clinical examination (POP-Q, ICS), and urodynamic tests. **Power calculation** Using a one-sided α level of 5% and a power of 80%, it was estimated that at least 100 women in each arm would be required to detect a reduction in bladder injury from 6.4 to 0% as significant. Allowing for a loss to follow-up of 15%, it was proposed that 230 patients be recruited to the study **Intention to treat analysis** Not reported	Not reported at 12 months <u>Adverse effects of treatment</u> **Peri-operative** Bladder injury TVT = 7/105 (6.7%) TOT = 0/79 (0%) Urethral perforation TVT = 0/105 (0%) TVT = 1/79 (1.3%) Bowel injury TVT = 0/105 (0%) TOT = 0/79 (0%) Major haemorrhage TVT = 0/105 (0%) TOT = 0/79 (0%) Nerve entrapment TVT = 0/105 (0%) TOT = 1/79 (1.3%) Retropubic haematoma TVT = 1/105 (1.0%) TOT = 0/79 (0%) **Post-operative** Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported **Peri-operative adverse effects**	reported A3 - Were groups comparable at baseline: No - very unequal numbers in groups Level of bias: High <u>B Performance bias</u> B1 - Did groups get same level of care: Yes B2 - Were participants blinded: Unclear B3 - Were clinical staff blinded: Unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: Yes C2 - Were groups comparable for dropout: Yes C3 - Were groups comparable for missing data: Yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: Unclear - not reported D5 - Were investigators blinded to confounding factors: Unclear - Not reported Level of bias: low

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>urine flow rate < 10th percentile according to Liverpool nomogram
2] post-void residual volume >50 mL
3] known allergy to polypropylene
4] immunosuppressant therapy
5] past history of neurological disease, urogenital malignancy, fistula or pelvic radiotherapy</td>
<td></td>
<td></td>
<td>
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>7</td><td>105</td></tr>
<tr><td>Control</td><td>0</td><td>79</td></tr>
</table>
</td>
<td>Indirectness

Does the study reflect the review protocol in terms of:
Population: Yes
Intervention: Yes
Outcome: Yes
Indirectness: None

Other information

Sample size does not meet power calculation - logistical reasons given as duration of recruitment period

Loss to follow-up rates were high at 20% to 25%</td>
</tr>
<tr>
<td>Full citation

Basu,M., Duckett,J., A randomised trial of a retropubic tension-free vaginal tape versus a mini-sling for stress incontinence, BJOG: An International Journal of Obstetrics and Gynaecology, 117, 730-735, 2010

Ref Id

100560

Country/ies where the</td>
<td>Sample size

N = 71

TVT = 33
Miniarc = 38

Characteristics

<u>Gender – Female/N (% female)</u>
71/71 (100%)

<u>Age (years)- Mean ± SD</u>
TVT = 48.2 ± 9.4
Miniarc = 49.7 ± 10.7

<u>Incontinence</u></td>
<td>Interventions

TVT was performed as described by Ulmsten 1995

Miniarc was passed through the obturator muscle via a 1cm incision 1cm below the external urethral meatus. The tape was anchored in place via self-fixating tips at either end. Saline cystoscopy was</td>
<td>Details

Participants were given the choice of general or spinal anaesthesia. An indwelling catheter was left in overnight if spinal anaesthesia was used. Patients were discharged home on the day after surgery if they were voiding adequately with a post-void residual of < 100ml.

Power calculation

Sample size was based on presumed subjective cure</td>
<td>Results

<u>Patient satisfaction with treatment</u>
Not reported at 12 months

<u>Self reported rate of symptom reduction per day</u>
Not reported at 12 months

<u>Continence status</u>
Not reported at 12 months

<u>Incontinence-specific quality of life</u>
Not reported at 12 months

<u>Adverse effects of treatment</u>
Peri-operative
Bladder injury
TVT = 0/38 (0%)</td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials
<u>A Selection bias</u>
A1 - Was there appropriate randomisation: Yes - Computer generated
A2 - Was there adequate concealment: unclear - opaque envelopes used
A3 - Were groups comparable at baseline: Yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level</td>
</tr>
</table>

<table>
<tr>
<th>Study details</th>
<th>Participants</th>
<th>Interventions</th>
<th>Methods</th>
<th>Outcomes and Results</th>
<th>Comments</th>
</tr>
<tr>
<td>study was carried out

United Kingdom

Study type

Randomized controlled trial

Aim of the study

"To evaluate the efficacy of the mini-sling against a conventional retropubic TVT, in terms of resolution of SUI and urodynamic stress incontinence"

Study dates

January 2008 to February 2009

Source of funding

Funded by a grant from American Medical Systems</td>
<td><u>episodes/day</u>
Not reported

<u>Duration of SUI</u>
Not reported

<u>Detrusor overactivity n/N (%)</u>
TVT: 19/33(57.6%)
Miniarc: 19/38 (50.0%)

Inclusion criteria

1] SUI symptoms
2] objective evidence of urodynamic stress incontinence
3] failed conservative management

Exclusion criteria

1] history of previous continence surgery
2] evidence of voiding dysfunction
3] known bladder pathology
4] prolapse of pelvic organ prolapse quantification scheme stage 2 or above
5] recurrent urinary tract infections
6] those planning to conceive</td>
<td>carried out in all cases.</td>
<td>rate of 75% for the miniarc and 95% for TVT. It was calculated that 64 patients would be needed to detect a difference of 20% in cure rates with a 90% power and a α of 0.05. Assuming a drop-out rate of 10%, the study aimed to recruit 70 patients.

Intention to treat analysis

Not reported</td>
<td>Miniarc = 0/33 (0%)

Urethral perforation
TVT = 0/38 (0%)
Miniarc = 1/33 (3.0%)

Post-operative
Not reported

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Peri-operative adverse effects

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>0</td><td>38</td></tr><tr><td>Control</td><td>1</td><td>33</td></tr></table></td>
<td>of care: Yes
B2 - Were participants blinded: Yes
B3 - Were clinical staff blinded: No
Level of bias: low

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: Yes
C2 - Were groups comparable for dropout: Yes
C3 - Were groups comparable for missing data: Yes
Level of bias: low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: Yes
D3 - Was a valid and reliable method used to assess outcome: Yes
D4 - Were investigators blinded to interventions: No
D5 - Were investigators blinded to confounding factors: No
Level of bias: Some

Indirectness

Does the study reflect the review protocol in terms of:
Population: Yes
Intervention: Yes
Outcome: Yes
Indirectness: None</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Other information *Most common adverse effects in peri-operative and category used for meta-analysis
Full citation Abdel-Fattah,M., Ramsay,I., Pringle,S., Hardwick,C., Ali,H., Young,D., Mostafa,A., Randomised prospective single-blinded study comparing 'inside-out' versus 'outside-in' transobturator tapes in the management of urodynamic stress incontinence: 1-year outcomes from the E-TOT study, BJOG: An International Journal of Obstetrics and Gynaecology, 117, 870-878, 2010 **Ref Id** 100562 **Country/ies where the study was carried out** UK	**Sample size** N = 341 TVT-O = 170 TOT = 171 **Characteristics** <u>Gender – Female/N (% female)</u> 341/341 (100%) <u>Age (years)- Mean ± SD</u> TVT-O = 51.5 (SD not reported) TOT = 52.1 (SD not reported) <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u>	**Interventions** TVT-O™ (Ethicon Inc, Somerville, NJ, USA) was performed as originally described by de Leval (2003). TOT-ARIS® (Coloplast Corp, Minneapolis, MN, USA) was performed as originally described by Delorme (2001).	**Details** Intra-operative cough stress test and cystoscopy were not performed in either study arm (in line with a number of studies reporting low rates of lower urinary tract injuries with transobturator tapes and the recommendation for the omission of intra-operative cystoscopy). **Power calculation** "A sample-size calculation showed that with 80% power and assuming a 90% success rate (both objective and patient-reported) for TVT-O, 140 women were needed in each arm to detect a 10% difference in the success rate between the two procedures. With an anticipated drop-out rate of 20% over 3 years we aimed to recruit 168 women to each arm."	**Results** <u>Patient satisfaction with treatment at 12 months</u> Scale used – Patient Global Impression of Improvement (PGI-I). "Patient-reported success rate defined as 'Very much improved' or 'Much improved'" TVT-O = 121/149 (81.2%) TOT = 111/143 (77.6%) <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 12 months</u> Definition Cure = "negative standard 1-h pad test" TVT-O = 114/121 (94.2%) TOT = 96/109 (88.1%) <u>Incontinence-specific quality of life</u> Scale used - King's Health Questionnaire (KHQ) - Median difference (range not reported) in incontinence impact domain score TVT-O = 66.67 TOT =66.67 [Authors report individual KHQ domains separately, only	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation: yes A2 - Was there adequate concealment: yes A3 - Were groups comparable at baseline: yes Level of bias: low <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: yes - although for ethical considerations women were informed of the intervention if they wished, but were instructed not to disclose this information to clinician at follow up B3 - Were clinical staff blinded: not applicable Level of bias: unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Randomised controlled trial **Aim of the study** "To compare the two surgical approaches of transobturator tape insertion in the management of female USI: the 'inside-out' route (using the TVT-O™ tape) and the 'outside-in' route (using the ARIS® tape)." **Study dates** April 2005 to April 2007 **Source of funding** The study was funded by a grant from Henry Smith Charity. Refs: 20050062 & 20050933.	Not reported <u>Mixed urinary incontinence - n/N (%)</u> TVT-O = 40/170 (23.5%) TVT = 43/171 (25.1%) **Inclusion criteria** 1] Diagnosed with urodynamic stress incontinence (USI) from preoperative urodynamics or with mixed incontinence 2] Previous incontinence surgery 3] Failed or declined pelvic floor muscle training **Exclusion criteria** 1] Unwilling to participate in randomisation process 2] Predominant overactive bladder symptoms 3] Specific co-morbidities such as known neurological conditions (e.g. multiple sclerosis), diabetes, pelvic organ prolapse (≥ stage 2 POP-Q) 4] Concomitant surgery at time of transobturator tape insertion		**Intention to treat analysis** Not reported	incontinence impact was extracted in to evidence table] <u>Adverse effects of treatment</u> **Peri-operative** Vaginal angle perforations TVT-O = 3/170 (1.76%) TOT = 17/171 (10%) Bladder injury TVT-O = 1/170 (0.6%) TOT = 1/171 (0.6%) Urethral injury TVT-O = 0/170 (0%) TOT = 1/171 (0.6%) EBL > 200 ml* TVT-O = 15/170 (8.8%) TOT = 11/171 (6.4%) [EBL not defined] **Post-operative** Vaginal erosion TVT-O = 3/170 (1.76%) TOT = 5/171 (2.9%) Tape release TVT-O = 1/170 (0.6%) TOT = 0/171 (0%) Hip pain ≥ 7 TVT-O = 34/170 (22.7%) TOT = 26/171 (17.7%) Groin pain ≥ 7 TVT-O = 27/170 (18%) TOT = 19/171 (11%) <u>Psychological outcomes</u>	<u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes - postoperative assessment at 1 year performed by clinician blinded to intervention D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Does the study reflect the review protocol in terms of: Population: Yes Included women with MUI (83/341, 24.3%; TVT-O = 40/170, 23.6%; TOT = 43/171, 24.6%) and women with previous incontinence surgery - details not reported (46/341, 13.5%; TVT-O = 28/170, 16.5%; TOT = 18/171, 10.5%).

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not reported

<u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative and post-operative categories used for meta-analyses

Patient satisfaction with treatment
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>111</td><td>171</td></tr>
<tr><td>Control</td><td>121</td><td>170</td></tr>
</table>
Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>96</td><td>171</td></tr>
<tr><td>Control</td><td>114</td><td>170</td></tr>
</table>
Peri-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
</table>
</td>
<td>Intervention: No

Outcome: Yes - continence status measured by pad test

Indirectness: Some

Other information

299/341 women (88%) completed 12-month follow-up (TVT-O = 152/170, 89%; TOT = 147/171, 86%).

230/299 women followed up at 12 months underwent a standard 1-h pad test. 69 women requested to avoid further hospital trips but participated in the completion of postoperative questionnaire. 292/299 women completed the postoperative PGI-I questionnaire.

The authors report two other measures of patient satisfaction (success on a patient satisfaction scale where success = ≥ 8/10 and success on International Consultation of Incontinence Questionnaire-Short Form (ICIQ-SF) where success = 'never leaked' or 'leak a few drops once or less/week'. All three reported measures of patient satisfaction showed lower cure rates than</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Experimental</td><td>11</td><td>171</td></tr>
<tr><td>Control</td><td>15</td><td>170</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>26</td><td>171</td></tr>
<tr><td>Control</td><td>34</td><td>170</td></tr>
</table>
</td><td>the objective cure rate assessed by 1-h pad test.</td></tr>
<tr><td>Full citation

But,I., Faganelj,M., Complications and short-term results of two different transobturator techniques for surgical treatment of women with urinary incontinence: a randomized study, International Urogynecology Journal, 19, 857-861, 2008

Ref Id

100571

Country/ies where the study was carried out

Slovenia</td><td>Sample size

N = 120
TOT = 60
TVT-O = 60

Characteristics

<u>Gender – Female/N (% female)</u>
120/120 (100%)

<u>Age (years)- Mean (No SD reported)</u>
TOT = 51.6
TVT-0 = 53.6

<u>Incontinence episodes/day</u>
Not reported</td><td>Interventions

TOT was performed as described by Delorme 2001

TVT-O was performed as described by de Leval 2003</td><td>Details

Both procedures were carried out by a single surgeon. Before the end of the procedure the bladder was filled with 250ml of saline and the cough stress test was performed to allow for minimum tape adjustments if needed. After surgery, water was left in the bladder and patient were encouraged to empty their bladder spontaneously 1 hour after the procedure. On the evening (usually after the third voiding) the post-void residual was measured using a catheter.</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported at 12 months

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported at 12 months

<u>Continence status</u>
Not reported at 12 months

<u>Incontinence-specific quality of life at 12 months</u>
Not reported at 12 months

<u>Adverse effects of treatment</u>
Peri-operative
Vaginal wall perforation
TOT = 3/60 (5.0%)
TVT-O = 0/60 (0%)</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes - computer generated
A2 - Was there adequate concealment: Unclear - not reported
A3 - Were groups comparable at baseline: Yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: yes
B2 - Were participants blinded:</td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study type

Randomized controlled trial

Aim of the study

To analyse differences in peri-operative complications and pain in a group of patients who were being treated for stress and mixed urinary incontinence

Study dates

January 2005 to June 2007

Source of funding

None reported</td>
<td><u>Duration of SUI - Mean (No SD reported)</u>
TOT: 7.9
TVT-O: 6.4

<u>Detrusor overactivity – n/N (%)</u>
Not reported

<u>Mixed incontinence - n/N (%)</u>
Not reported by group but a total of 89/120 (74.2%) had mixed UI

Inclusion criteria

1] stress UI or mixed UI with stress as predominant symptom

Exclusion criteria

1] Urge incontinence or mixed UI with predominant urge incontinence</td>
<td></td>
<td>Power calculation

Not reported

Intention to treat analysis

Not reported</td>
<td>Vaginal mucosa tears
TOT: 6/60 (10.0%)
TVT-O: 1/60 (1.7%)

Post-operative
Not reported

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>6</td><td>60</td></tr><tr><td>Control</td><td>1</td><td>60</td></tr></table></td>
<td>unclear - not reported
B3 - Were clinical staff blinded: unclear - not reported
Level of bias: Some

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: Yes
C2 - Were groups comparable for dropout: Yes
C3 - Were groups comparable for missing data: Yes
Level of bias: Some

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: Yes
D3 - Was a valid and reliable method used to assess outcome: Yes
D4 - Were investigators blinded to interventions: Unclear
D5 - Were investigators blinded to confounding factors: Unclear
Level of bias: low

Indirectness

Does the study match the review protocol in terms of:
Population: Yes
Intervention: Yes
Outcome: Yes
Indirectness: None</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Other information
Full citation Karateke,A., Haliloglu,B., Cam,C., Sakalli,M., Comparison of TVT and TVT-O in patients with stress urinary incontinence: short-term cure rates and factors influencing the outcome. A prospective randomised study, Australian and New Zealand Journal of Obstetrics and Gynaecology, 49, 99-105, 2009 **Ref Id** 100648 **Country/ies where the study was carried out** Turkey **Study type** Randomized controlled trial **Aim of the study** "This prospective randomised trial was designed to compare the	**Sample size** N = 164 TVT (bottom-up tension-free vaginal tape) = 81 TVT-O (transobturator inside out) = 83 **Characteristics** <u>Gender – Female/N (% female)</u> 164/164 (100%) <u>Age (years)- Mean ± SD</u> TVT = 49.31 ± 5.00 TVT-O = 49.08 ± 4.93 <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u> Not reported <u>Incontinence-specific</u>	**Interventions** TVT-O was performed according to the original technique by de Leval (2003) except for mid-urethral transverse incision instead of vertical one. TVT was performed according to the original technique by Ulmsten (1995).	**Details** Metzenbaum scissors were placed between tape and urethra prior to removal of plastic covers. Cough test was not used in both groups. Cystoscopy was routinely performed only in the TVT group. Although diagnostic cystoscopy was not used, the signs suggesting bladder perforation (such as leakage through surgical abdominal or vaginal cuts) were recorded in TVT-O group. When bladder injury occurred, an indwelling catheter was placed on 72h. If postoperative post-void residual volume was > 100 ml, the patient carried out intermittent self-catheterisation at home until a post-void residual volume of < 80 ml on two consecutive measurements was obtained. Spinal and general anaesthesia was used	**Results** <u>Patient satisfaction with treatment at 12 months</u> Scale used – "Patients were asked to rate their overall satisfaction with the surgical outcome, with the three possible choices being very satisfied, satisfied or not satisfied." **Very satisfied** TVT = 68/81 (84.0%) TVT-O = 69/83 (83.1%) **Satisfied** TVT = 8/81 (9.9%) TVT-O = 7/83 (8.4%) **Not satisfied** TVT = 5/81 (6.2%) TVT-O = 7/83 (8.4%) <u>Self reported rate of absolute symptom reduction per day</u> Episodes of incontinence: Not reported <u>Continence status at 12 months</u> Scale used – "Cure of SUI was defined as no leakage of urine during cough stress test (performed at maximum cystometric capacity after the filling line was removed) at	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation: yes - pre-determined computer-generated randomisation code. A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes Level of bias: low <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes - all patients received intervention to which they were randomised C3 - Were groups comparable

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
use of TVT and TVT-O for surgical treatment of SUI in terms of cure rates, complications and factors influencing cure rate." **Study dates** December 2004 to March 2006 **Source of funding** Not reported	<u>quality of life</u> Scale used - Incontinence Impact Questionnaire (IIQ-7) TVT = 13.83 ± 3.88 TVT-O = 13.83 ± 3.88 **Inclusion criteria** Patients suffering from urinary incontinence with urodynamically proven SUI **Exclusion criteria** 1] Urogenital prolapse greater than stage 1 2] Detrusor overactivity 3] Symptoms of overactive bladder 4] Urinary retention (peak flow rate < 15 ml/s) 5] Previous anti-incontinence surgery including anterior colporrhaphy 6] Neurological bladder		according to the patient and anaesthesiologist's preference. **Power calculation** Preliminary power analysis indicated that a sample size of 152 patients (76 for TVT group and 76 for TVT-O group) provided a statistical power (1−β) of at least 80% at α = 0.05 for the detection of 16% differences of cure rates between the two groups. To compensate for dropouts (estimated 10%), study aimed to recruit 84 patients per group. **Intention to treat analysis** Not reported	urodynamic testing." **Cured** TVT = 72/81 (88.9%) TVT-O = 72/83 (86.7%) **Failed** TVT = 9/81 (11.1%)* TVT-O = 11/83 (13.3%)* *failed data calculated from reported cure rates <u>Incontinence-specific quality of life at 12 months</u> Scale used - Incontinence Impact Questionnaire (IIQ-7) TVT = 6.94 ± 3.40 (81) TVT-O = 6.88 ± 3.38 (83) Scale used - Urogenital Distress Inventory (UDI-6) [reported as UDI 1–2 scores, UDI 3–4 scores, UDI 5–6 scores] UDI 1–2 TVT = 1.60 ± 0.93 (81) TVT-O = 1.54 ± 0.91 (83) UDI 3–4 TVT = 0.89 ± 0.87 (81) TVT-O = 1.00 ± 1.06 (83) UDI 5–6 TVT = 0.93 ± 1.19 (81) TVT-O =0.76 ± 1.11 (83) <u>Adverse effects of treatment</u> **Peri-operative** Bladder perforation	for missing data: yes - 83/84 in TVT-O and 81/83 in TVT group were assessed at 12 months. Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Does the study reflect the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** IIQ-7 scores used in meta-analysis of incontinence-specific quality of life

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				TVT = 3/81 (3.7%) TVT-O = 0/83 (0%) Haematoma TVT = 4/81 (4.9%) TVT-O = 2/83 (2.4%) **Post-operative** Fever TVT = 4/81 (4.9%) TVT-O = 1/83 (1.2%) Tape erosion TVT = 4/81 (4.9%) TVT-O = 2/83 (2.4%) Voiding difficulty TVT = 8/81 (9.9%) TVT-O = 6/83 (7.2%) De novo detrusor overactivity - 12 months TVT =12/81 (14.8%) TVT-O = 10/83 (12.0%) De novo urge incontinence - 12 months TVT = 6/81 (7.4%) TVT-O =5/83 (6.0%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported **Patient satisfaction with treatment**	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments

	Events	Total
Experimental	68	81
Control	69	83

Continence status

	Events	Total
Experimental	72	81
Control	7	83

Incontinence QOL

	Mean	SD	Total
Experimental	6.94	3.40	81
Control	6.88	3.38	83

Peri-operative adverse effects

	Events	Total

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Experimental</td><td>4</td><td>81</td></tr>
<tr><td>Control</td><td>2</td><td>83</td></tr>
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Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>12</td><td>81</td></tr>
<tr><td>Control</td><td>10</td><td>83</td></tr>
</table>
</td><td></td></tr>
<tr><td>Full citation

Krofta,L., Feyereisl,J., Otcenasek,M., Velebil,P., Kasikova,E., Krcmar,M., TVT and TVT-O for surgical treatment of primary stress urinary incontinence: prospective randomized trial, International Urogynecology Journal, 21, 141-148, 2010

Ref Id

100662

Country/ies where the study was carried out

Czech Republic</td><td>Sample size

N = 300

TVT-O (transobturator inside out) = 151
TVT (bottom-up tension-free vaginal tape) = 149

Characteristics

<u>Gender – Female/N (% female)</u>
300/300 (100%)

<u>Age (years)- Mean ± SD</u>
TVT-O = 57.82 ± 10.35
TVT = 57.19 ± 10.65

<u>Incontinence episodes/day – Mean</u></td><td>Interventions

TVT-O procedure (Gynecare® TVT Obturator System, Ethicon, USA) was performed according to the original technique described by de Leval (2003).

TVT procedure (Gynecare® TVT Ethicon, USA) was performed according to the technique described by Ulmsten (1996)</td><td>Details

The TVT-O procedure was performed under spinal or local anaesthesia supplemented by intravenous analgosedation. Hydrodissection was performed routinely only in case of local anaesthesia. The Gynecare Winged Guide was regularly used but the cough test and cystoscopy were not. To avoid excess tension during the plastic sheath removal, Babcock forceps were used to grasp the tape in the middle and create a small, 5mm-long tape loop.

The TVT procedure was</td><td>Results

<u>Patient satisfaction with treatment at 12 months</u>
Scale used – "Patients were also asked to rate their overall satisfaction after the operation with three possible choices: very satisfied, satisfied, or not satisfied."
Very satisfied
TVT-O = 120/151 (79.5%)
TVT = 120/149 (80.5%)

Satisfied
TVT-O = 25/151 (16.6%)
TVT = 21/149 (14.1%)

Not satisfied
TVT-O = 2/151 (1.3%)
TVT = 0/149 (0%)</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: unclear
A3 - Were groups comparable at baseline: yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: yes
B2 - Were participants blinded: no
B3 - Were clinical staff blinded:</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Randomized controlled trial **Aim of the study** "The current randomised, non-blinded study was undertaken to prospectively compare the TVT procedure with TVT-O, concerning the effectiveness and safety." **Study dates** January 2005 to December 2006 **Source of funding** None reported	± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported Incontinence-specific quality of life Scale used - VAS TVT - O = 7.91 ± 1.82 (151) TVT = 7.86 ± 1.61 (149) Scale used - Incontinence Questionnaire-Short Form (ICIQ-UI SF) TVT-O = 13.76 ± 4.78 (151) TVT = 13.28 ± 15.83 (149) Scale used - CONTILIFE Daily activities TVT-O = 22.38 ± 5.96 TVT = 19.82 ± 5.29 Effort activities TVT-O = 16.22 ± 2.62 TVT = 17.62 ± 3.48 Self-image TVT-O = 18.39 ± 5.51 TVT = 17.56 ± 4.82 Emotional impact TVT-O = 24.95 ± 6.52		performed under local anaesthesia supplemented by intravenous analgosedation. Cystoscopy was routinely performed and a cough test was performed with the patient coughing repeatedly with a bladder volume of 300 ml. In both groups, for all patients, a bladder catheter (16-French Foley) was kept in place for 24h. After catheter removal, patients were instructed to urinate 3 times before a bladder scan was performed to measure postvoid residual volume (PVR). When the PVR was > 100 ml or there was complete retention, a Foley catheter was inserted for 24h. Patients were discharged when PVR < 100 ml. All subjects received intravenous prophylactic antibiotic treatment with 2g cefazoline, administered at the beginning of surgery. **Power calculation** A preliminary power calculation indicated that a sample size of 172 women (86 in each group) would	Self reported rate of absolute symptom reduction per day Episodes of incontinence: Not reported Episodes of urgency: Not reported Continence status at 12 months Scale used – "**Objective cure:** a negative cough stress test with 300 ml of saline solution in the bladder during multichannel urodynamic examination and 1-h pad test weight < 1g. **Objective improvement** defined as negative cough stress test and 1-h pad test weight < 5g. **Objective failure** defined as positive cough stress test and urine leakage of > 5g on 1-h pad test." **Cured** TVT-O = 130/151 (86.1%) TVT = 127/149 (85.2%) **Improved** TVT-O = 14/151 (9.3%) TVT = 12/149 (8.1%) **Failed** TVT-O = 3/151 (2%) TVT = 2/149 (1.3%) Scale used - "**Subjective cure** was defined by no leakage of urine after surgery. **Subjective improvement:** if assessment of frequency of urine leakage after surgery was lower than before. **Subjective failure** occurred if the	no Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes - 147/151 (97.4%) in TVT-O and 141/149 (94.6%) were assessed at 12 months Level of bias: low D Detection bias D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: No Intervention: No Outcome: Cough test plus pad test to measure continence status

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	TVT = 22.74 ± 6.56 Sexuality TVT-O = 8.62 ± 4.62 TVT = 8.90 ± 4.06 Well-being TVT-O = 3.46 ± 0.93 TVT = 3.47 ± 0.93 **Inclusion criteria** 1] Urodynamically proven primary SUI including a positive stress test 2] Conservative therapy unsuccessful **Exclusion criteria** 1] Predominant urge incontinence 2] Urodynamic detrusor instability 3] Preoperative use of anti-cholinergic medication 4] Previously failed anti-incontinence surgery 5] Previous prolapse or radical pelvic surgery or radiotherapy 6] Postvoid residual volume > 100 ml 7] Diagnosis of stage II, III or IV pelvic organ prolapse according to the International Continence		lend a statistical power (1-β) of at least 80% at α = 0.05 for the detection of 15% differences of cure rates between the TVT and TVT-O group. Anticipating the drop out at the level of 10% of patients in each arm, we planned to include at least 190 patients. **Intention to treat analysis** Not reported	urine leakage frequency before and after the surgery was identical or worse." **Cured** TVT-O = 112/151 (74.2%) TVT = 111/149 (74.5%) **Improved** TVT-O = 31/151 (20.5%) TVT = 27/149 (18.1%) **Failed** TVT-O = 4/151 (2.6%) TVT = 3/149 (2%) <u>Incontinence-specific quality of life at 12 months</u> Scale used - Visual Analog Scale (VAS) - 0 = no symptoms, 10 = maximum symptoms TVT-O = 2.16 ± 1.88 (147) TVT = 2.14 ± 1.45 (141) Scale used - Incontinence Questionnaire-Short Form (ICIQ-UI SF) TVT-O = 3.5 ± 3.47 (147) TVT = 3.00 ± 4.92 (141) Scale used - CONTILIFE Daily activities TVT-O = 10.62 ± 4.21 TVT = 10.32 ± 5.14 Effort activities TVT-O = 10.52 ± 2.19 TVT = 9.64 ±3.25 Self-image TVT-O = 10.31 ± 4.21 TVT = 9.07 ± 3.52	**Other information** Percentages calculated by NCC-WCH. For meta-analysis of patient satisfaction, "very satisfied" and "satisfied" were pooled. ICIQ scores were used in meta-analysis of incontinence-specific quality of life. There is a statistically significant correlation between VAS scores and subjective evaluation (r = 0.666; $p < 0.001$). All four cases of tape erosion were diagonsed during first 4 months after the procedure. Two patients in the TVT-O group were not satisfied with the procedure due to de novo urgency symptoms.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Society pelvic organ prolapse quantification system 8] Concomitant operations			Emotional impact TVT-O = 11.91 ± 6.29 TVT = 10.39 ± 4.97 Sexuality TVT-O = 5.07 ± 1.97 TVT = 5.57 ± 1.37 Well-being TVT-O = 1.91 ± 1.12 TVT = 1.48 ± 0.83 <u>Adverse effects of treatment</u> **Peri-operative** Bladder perforation TVT-O = 0/151 (0%) TVT = 1/149 (0.7%) Severe urinary retention TVT-O = 1/151 (0.6%) TVT = 1/149 (0.7%) Retropubic haematoma TVT-O = 0/151 (0%) TVT = 1/149 (0.7%) Suprapubic discomfort TVT-O = 0/151 (0%)* TVT = 6/149 (4.5%) Inner thigh discomfort TVT-O = 8/151 (5.4%) TVT = 0/149 (0%) **Post-operative** Tape erosion TVT-O = 2/151 (%) TVT = 2/149 (%)	

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>De novo urgency*
TVT-O = 20/151 (%)
TVT = 9/149 (%)

Anticholinergic use postoperatively
TVT-O = 15/151 (%)
TVT = 7/149 (%)

Urinary tract infection
TVT-O = 8/151 (5.4%)
TVT = 5/149 (3.4%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Postoperative retention of urine (24h) - PVR > 100 ml
TVT-O = 10/151 (6.6%)
TVT = 4/149 (2.7%)

*Most common adverse effects in peri-operative and post-operative ctageories used in meta-analyses

Patient satisfaction with treatment
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>120</td><td>149</td></tr><tr><td>Control</td><td>120</td><td>151</td></tr></table></td><td></td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>127</td><td>149</td></tr>
<tr><td>Control</td><td>130</td><td>151</td></tr>
</table>
Incontinence QOL
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>3.00</td><td>4.92</td><td>141</td></tr>
<tr><td>Control</td><td>3.50</td><td>3.47</td><td>147</td></tr>
</table>
Peri-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>6</td><td>149</td></tr>
<tr><td>Control</td><td>0</td><td>151</td></tr>
</table>
Post-operative adverse effects
</td><td></td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>9</td><td>149</td></tr><tr><td>Control</td><td>20</td><td>151</td></tr></table>	
Full citation Laurikainen,E., Valpas,A., Kivela,A., Kalliola,T., Rinne,K., Takala,T., Nilsson,C.G., Retropubic compared with transobturator tape placement in treatment of urinary incontinence: a randomized controlled trial, Obstetrics and Gynecology, 109, 4-11, 2007 **Ref Id** 100672 **Country/ies where the study was carried out** Finland **Study type** Randomized controlled trial **Aim of the study** To compare the TVT	**Sample size** N = 267 TVT = 136 TVT-O = 131 **Characteristics** Gender – Female/N (% female) 267/267 (100%) Age (years)- Mean ± SD TVT = 53 ± 10 TVT-O = 54 ± 10 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD TVT = 7 ± 6 TVT-O = 10 ± 7 Detrusor overactivity – n/N (%) Not reported	**Interventions** TVT was performed as decribed by Ulmsten and TVT-O as described by de Leval and in both case Gynecare (Ethicon, Johnso & Johson) wass used.	**Details** Women were positioned on the operating table according to the procedure. For TVT the angle of the thighs in the stirrups was to be 70^{o} while for TVT-O it was to be betwenn 90^{o} and 110^{o}. Both procedures were performed under local anaesthesia, using 75-135ml prilocaine plus adrenalin diluted to 0.25%. Light intravenous sedation was used to enable the patient to perform the intraoperative cough stress test. The cough stress test was performed with a bladder volume of 300ml, with the goal of adjusting the tape to allow a drop of urine to escape from the outer meatus of the urethra on strong coughing. Cystoscopy was performed twice during the TVT	**Results** Patient satisfaction with treatment Not reported at 12 months Self reported rate of absolute symptom reduction per day Not reported Continence status at 12 months* Scale used - objective cure rate = negative stress test TVT = 128/136 (94.1%) TVT-O = 122/131 (93.1%) Incontinence-specific quality of life Scale used = UDI-6 (score at 12 months) TVT: 7 ± 2 TVT-O: 7 ± 2 Scale used = IIQ-7 (score at 12 months) TVT: 7 ± 1 TVT-O: 7 ± 1 Adverse effects of treatment **Peri-operative** Bladder injury TVT: 1/136 (0.7%) TVT-O: 0/131 (0%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: yes - computer generated A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes Level of bias: low B Performance bias B1 - Did groups get same level of care: Yes B2 - Were participants blinded: Unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
procedure with the TVT-O, using the same tape for both, in terms of cure rate, peri-operative complications. **Study dates** March 2004 to November 2005 **Source of funding** Not reported	**Inclusion criteria** 1] history of stress urinary incontinence 2] indication for surgical treatment of stress incontinence 3] positive cough stress test 4] Detrusor Instability Score (DIS) 7 or less **Exclusion criteria** 1] previous incontinence surgery 2] postvoid residual urine volume > 100mL 3] lower urinary tract anomaly 4] current urinary tract infection or more than 3 UTI eppisodes in past year 5] urogenital prolapse of more then 2nd degree (Baden-Walker) 6] BMI > 35 7] previous radiation treatment of the pelvis 8] active malignancy 9] anticoagulant therapy 10] hemophilia 11] neurogenic disease whihc can be associated with bladder disorders 12] anticholinergic		procedure (one each passing of the needle) and once during the TVT-O procedure. **Power calculation** Sample size calculation was based on a 95% success rate with TVT and that a 10% difference in either success rate or complication rate would be clinically relevant. With 70% power to show a 10% difference, the sample size should be 160 patients, 130 in each arm. **Intention to treat analysis** Not reported	Vaginal perforation TVT: 2/136 (1.5%) TVT-O:/3/131 (2.3%) Groin pain TVT: 2/136 (1.5%) TVT-O: 21/131 (16%) Urinary tract infection TVT: 11/136 (8%) TVT-O: 17/131 (13%) Hematoma TVT: 1/136 (0.7%) TVT-O: 0/131 (0%) Wound infection TVT: 1/136 (0.7%) TVT-O: 0/131 (0%) **Post-operative** Urinary tract infection* TVT: 19/134 (14.2%) TVT-O: 22/131 (16.8%) De novo urgency TVT: 2/134 (1,5%) TVT-O: 3/131 (2.3%) Retention symptoms TVT: 1/134 (0.7%) TVT-O: 2/131 (1.5%) Tape erosion TVT: 0/134 (0%) TVT-O: 1/131 (0.8%) Pain TVT: 0/134 (0)	C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes - pad test performed by nurse blinded to treatment allocation D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None **Other information** Data on 12 months outcomes taken from a secondary publication 'Rinne et al., 2008' in excluded studies table

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td>medication
13] duloxetine medication
14] inability to understand the purpose of the trial
15] patient immobile</td><td></td><td></td><td>TVT-O: 1/131 (0.8%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures at 12 months</u>
Post-void residual volume (ml) - Median (interquartile range)
TVT-O = 00.00 (00.00 – 10.25)
TVT = 10.00 (00.00 – 50.00)

*Data on most common adverse effects for both peri-operative and post-operative categories used in meta-analyses

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>128</td><td>136</td></tr><tr><td>Control</td><td>122</td><td>131</td></tr></table>
Incontinence QOL
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>7.00</td><td>1.00</td><td></td></tr><tr><td>Control</td><td>7.00</td><td>1.00</td><td></td></tr></table></td><td></td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>2</td><td>136</td></tr><tr><td>Control</td><td>21</td><td>131</td></tr></table>Post-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>19</td><td>136</td></tr><tr><td>Control</td><td>22</td><td>131</td></tr></table></td><td></td></tr>
<tr><td>Full citation

Liapis,A., Bakas,P., Giner,M., Creatsas,G., Tension-free vaginal tape versus tension-free vaginal tape obturator in women with stress urinary incontinence, Gynecologic and Obstetric Investigation, 62, 160-164, 2006

Ref Id

100677</td><td>Sample size

N = 89

TVT-O (transobturator inside out) = 43
TVT (bottom-up tension-free vaginal tape) = 46

Characteristics

<u>Gender – Female/N (% female)</u>
89/89 (100%)</td><td>Interventions

TVT-O was performed using the Gynecare TVT Winged Guide and the correct TVT Helical Presser.

TVT was performed according to the technique described by Ulmsten (1996)</td><td>Details

<u>TVT-O</u>
"The patient is placed in gynecological position with thighs in hyperflexion. A 16-Fr Foley catheter is inserted into the bladder. The points were the needles will exit at the skin level are identified by tracing a horizontal line at the level of the urethral meatus. The exit points are located 2 cm above this line and 2 cm outside the thigh folds. A skin incision is</td><td>Results

<u>Patient satisfaction with treatment at 12 months</u>
Scale used – "Subjective cure, improvement and failure were assessed with the use of a simple questionnaire"
Cured
TVT-O = 33/43 (76.7%)
TVT = 34/46 (73.9%)

Improved
TVT-O = 7/43 (16.2%)
TVT = 10/46 (21.7%)</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: unclear - "All patients were randomly assigned to an operation from the outpatient department of the hospital"
A2 - Was there adequate concealment: unclear</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out Greece **Study type** Randomized controlled trial **Aim of the study** "To compare prospectively the TVT-O procedure concerning the effectiveness, safety and simplicity with the TVT procedure." **Study dates** November 2003 to October 2004 **Source of funding** Not reported	<u>Age (years)- Mean ± SD</u> TVT-O = 52 ± 10.2 TVT = 53 ± 9.1 <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI (years) – Mean ± SD</u> TVT-O = 4.4 ± 3.1 TVT = 4.7 ± 3.4 <u>Detrusor overactivity – n/N (%)</u> Not reported **Inclusion criteria** "All patients included in the study had SUI without evidence of bladder over-activity" **Exclusion criteria** 1] Evidence of detrusor instability 2] Other gynaecologic disease requiring hysterectomy or other gynaecologic operation 3] Previously failed surgcal treatment		made at each exit point. A median sagittal incision of the vaginal wall is started 1 cm distal to the urethral meatus and about 2 cm long. A fine dissection path is created with dissection on a horizontal plane with a 45° angle relatively to the urethral sagittal plane, towards the upper part of ischio-pubic ramus. The Gynecare TVT Winged Guide is inserted into the dissected tract until it passes the inferior pubic ramous. The correct TVT Helical Presser is inserted into the dissected tract following the channel of the TVT Winged Guide. The device is pushed inward slightly and passes the obturator membrane and then comes out through the incision of skin. The technique is repeated on the patient's other side ensuring that the tape lies flat under the urethra without tension." <u>TVT</u> Additional detail not reported. **Power calculation** Not reported	**Failed** TVT-O = 3/43 (6.9%) TVT = 2/46 (4.3%) <u>Self reported rate of absolute symptom reduction per day</u> Episodes of incontinence: Not reported Episodes of urgency: Not reported <u>Continence status at 12 months</u> Scale used – "**Objective cure** was defined as a negative cough stress test during multi-channel urodynamic examination and a 1-hour pad test giving a weight of less than 1 g. **Objective improvement** was defined as a negative cough stress test and a 1-hour pad test weight of less than 5 g. **Failure** was defined as a positive cough stress test and urine leakage more than 5 g in the 1-hour pad test." **Cured** TVT-O = 39/43 (90%)* TVT = 41/46 (89%)* **Improved** TVT-O = 3/43 (7.6%)* TVT = 3/46 (6.5%)* **Failed** TVT-O = 1/43 (2.5%)* TVT = 2/46 (4.3%)* *Only % reported, n calculated by	A3 - Were groups comparable at baseline: yes Level of bias: unclear <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: unclear Level of bias: unclear <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes - for continence status; unvalidated questionnaire used to assessing satisfaction (subjective cure) D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
			Intention to treat analysis Not reported	NCC-WCH <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Bladder perforation TVT-O = 0/43 (0%) TVT = 3/46 (6.5%) Urinary retention (> 100 ml)* TVT-O = 1/43 (2.3%) TVT = 4/46 (8.7%) **Post-operative** Urinary infection TVT-O = 1/43 (2.3%) TVT = 3/46 (6.5%) Vaginal erosion TVT-O = 0/43 (0%) TVT = 1/46 (2.2%) De novo instability at 12 months TVT-O = 4/43(9.3 %)** TVT = 4/46 (8.6%)** De novo urgency at 12 months*** TVT-O = 6/43 (13.9%)** TVT = 5/46 (10.8%)** **Only % reported, n calculated by NCC-WCH *** Most common adverse effects in peri-operative and post-operative categories used in meta-analysis <u>Psychological outcomes</u>	**Indirectness** Does the study reflect the review protocol in terms of: Population: no Intervention: no Outcome: Continence status assessed with cough stress test and pad test. Indirectness: None **Other information** Authors report that 91 patients were operated on and that 89 were available for follow-up at 12 months. It is not clear which group the 2 patients lost to follow-up were randomised. The majority of patients were discharged from hospital the next day of the operation. Only one patient required prolonged catheterisation for 10 days and this patient belonged to the TVT group. One patient suffered considerable haemorrhage during the TVT procedure and required vaginal packing for 24 h. In cases of bladder perforation, the needle was repositioned successfully, followed by

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Not reported

<u>Clinical measures</u>
Not reported

Patient satisfaction with treatment
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>34</td><td>46</td></tr><tr><td>Control</td><td>33</td><td>43</td></tr></table>
Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>41</td><td>46</td></tr><tr><td>Control</td><td>39</td><td>43</td></tr></table>
Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>4</td><td>46</td></tr></table></td><td>catheterisation for 7 days postoperatively.

One patient in the TVT group presented vaginal erosion because of rejection of the tape and this patient was treated with excision of the presenting part of the tape and spontaneous healing.

3-item questionnaire used to assess subjective cure
[reported in Results column as Patient Satisfaction]
1] Do you feel cured from your SUI after the operation you had? Yes/No
2] Do you think that your incontinence has been improved after the operation you had? Yes/No
3] Do you think that you are about the same or worse after your operation for the management of your SUI?
About the same Yes/No
Worse Yes/No</td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Control</td><td>1</td><td>43</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>5</td><td>46</td></tr>
<tr><td>Control</td><td>6</td><td>43</td></tr>
</table>
</td><td></td></tr>
<tr><td>Full citation

Porena,M., Costantini,E., Frea,B., Giannantoni,A., Ranzoni,S., Mearini,L., Bini,V., Kocjancic,E., Tension-free vaginal tape versus transobturator tape as surgery for stress urinary incontinence: results of a multicentre randomised trial, European Urology, 52, 1481-1490, 2007

Ref Id

100727

Country/ies where the study was carried out

Italy</td><td>Sample size

N = 148

TOT (transobturator outside in) = 75
TVT (bottom-up retropubic tension-free vaginal tape) = 73

Characteristics

<u>Gender – Female/N (% female)</u>
148/148 (100%)

<u>Age, years - Mean ± SD</u>
TOT = 60.6 ± 10
TVT = 61.8 ± 10.7

<u>Incontinence episodes/day – Mean ± SD</u>
Not reported</td><td>Interventions

TOT procedure followed standard operative technique by Delorme (2001). The tape was a fusion-welded, nonwoven, nonknitted polypropylene tape (Obtape®, Mentor-Porges, Le Plessis-Robinson, France).

TVT procedure followed standard operative technique by Ulmsten (1996) (Gynecare, Ethicon, Somerville, NJ, USA).</td><td>Details

The procedures were performed under general or spinal anaesthesia according to preference of each centre.

In both procedures, a Foley catheter was left for 24 h. After the catheter was removed, if postvoid residual volume was greater than 50% of the bladder volume, intermittent catheterisation was proposed.

Pre-, peri- and post-operative evaluations were done by using the same protocol in all centres.

Power calculation</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Episodes of incontinence
Not reported

Episodes of urgency
Not reported

<u>Continence status</u>
Scale used - "patients were considered dry (no leakage during clinical and/or stress test and/or reported by patients) or wet as deduced from clinical examination, stress test and interview. Patients who referred being wet were separated into 'improved' and 'failure' on the subjective analysis."
Results for whole study population:</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: unclear
A3 - Were groups comparable at baseline: no - significantly more patients presented with detrusor overactivity in the TOT group
Level of bias: high - significantly more patients presented with detrusor overactivity in the TOT group

<u>B Performance bias</u>
B1 - Did groups get same level of care: unclear</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Randomized controlled trial **Aim of the study** "This prospective, randomised, multicentre study assessed complications and functional outcome of TVT and TOT (primary end points) and the success rate (secondary end point) in women with SUI after a median follow-up of 31 months." **Study dates** May 2002 to November 2005 **Source of funding** Not reported	<u>Duration of SUI, years – Mean ± SD (N)</u> TOT = 4.0 ± 3.1 (75) TVT = 3.7 ± 2 (73) <u>Detrusor overactivity – n/N (%)</u> TOT = 14/75 (19%) TVT = 7/73 (10%) <u>Mixed urinary incontinence - n/N (%)</u> TOT = 34/75 (45%) TVT = 31/73 (42%) <u>Incontinence-specific quality of life</u> Scale used - Urogenital Distress Inventory short form (UDI-6) - Median (range) TOT = 10 (2–21) TVT = 8 (0–19) Scale used - Impact Incontinence Quality of life short form (IIQ-7) - Median (range) TOT = 8 (0–18) TVT = 8 (0–16) **Inclusion criteria** "Stress or mixed urinary incontinence (stress component clinically predominant) associated with urethral hypermobility		A preliminary power analysis indicated that a sample size of 140 patients (70 for TOT group and 70 for TVT group) provided a statistical power (1 − β) of at least 80% at α = 0.05 for the detection of 19%, 22%, and 24% in differences of proportion of any postoperative condition between the two groups, when the incidence of postoperative conditions equalled 10%, 20%, and 30%, respectively. Power calculation was performed with the PS Power and Sample Size software. **Intention to treat analysis** Not reported	**Dry** TOT = 58/75 (77.3%) TVT = 50/73 (68.5%) **Improved** TOT = 10/75 (13.3%) TVT = 13/73 (17.8%) **Unchanged** TOT = 7/75 (9.3%) TVT = 7/73 (9.6%) Results for SUI only population†: **Dry** TOT = 34/41 (82.9%) TVT = 36/43 (83.7%) **Improved** TOT = 2/41 (4.9%) TVT = 5/43 (11.6%) **Unchanged** TOT = 5/41 (12.2%) TVT = 2/43 (4.7%) All percentages above calculated by NCC-WCH †Reported denominator excludes 3 patients in TVT group lost to follow-up. Unclear how many of those lost to follow up had SUI only. <u>Incontinence-specific quality of life at endpoint</u> Scale used - Urogenital Distress Inventory short form (UDI-6) - Median (range) (N) TOT = 0 (0 − 21) (75)	B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: unclear - mean follow up reported C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: unclear - mean follow up reported Level of bias: unclear <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes - mean follow up TOT = 31 ± 15 months, TVT = 32 ± 12 months D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes - continence status was measured by a blinded assessor D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: 44% of study

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	(International Continence Society definitions)." **Exclusion criteria** 1] Previous anti-incontinence surgery 2] Pelvic organ prolapse (POP) greater than stage 1 according to the Half-Way system and POP-Q system classification in any vaginal compartment			TVT = 0 (0 – 21) (70) Scale used - Impact Incontinence Quality of life short form (IIQ-7) - Median (range) (N) TOT = 0 (0 – 16) (75) TVT = 0 (0 – 12) (70) <u>Adverse effects of treatment</u> **Peri-operative** Bladder injury TOT = 1/75 (1.3%) TVT = 2/73 (2.7%) Vaginal injury TOT = 4/75 (5.3%) TVT =0/73 (0%) Retropubic haematoma TOT = 0/75 (0%) TVT = 1/73 (1.4%) Transient voiding dysfunction (self-catheterisation)* TOT = 2/75 (2.7%) TVT = 3/73 (4.1%) **Post-operative** Vaginal erosion* TOT = 3/75 (4%) TVT =0/73 (0%) Urethrolysis TOT = 0/75 (0%) TVT = 1/73 (1.4%) Wound discomfort and suprapubic foreign body granuloma (removal of sovrapubic mesh edges) TOT = 0/75 (0%)	population had MUI. 14% of the study population had detrusor overactivity and received surgery only if anti-cholinergic therapy failed. Intervention: No Outcome: Continence status was defined as "no leakage during clinical and/or stress test and/or reported by patients." **Other information** When detrusor overactivity was diagnosed, patients received anti-cholinergic therapy and were referred to surgery only if pharmacotherapy failed. Patients were followed-up at 3, 6 and 12 months post-operatively and then annually. Mean ± SD (N) follow-up: TOT = 31 ± 15 (75), TVT = 32 ± 12 (70). Three participants in the TVT group were lost to follow-up. The authors state that outcomes were better when stress rather than mixed incontinence was present preoperatively (P = 0.025) Discrepancy between baseline and results in number of women with SUI/MUI in TVT

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>TVT = 1/73 (1.4%)

Paraincisional hernia
TOT = 0/75 (0%)
TVT = 1/73 (1.4%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

<u>Duration of procedure (min) - Median (range)</u>
TOT = 20 (20 – 55)
TVT = 30 (20 – 60)

*Most common adverse effects in peri-operative and post-operative categories used in meta-analyses

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>50</td><td>73</td></tr><tr><td>Control</td><td>58</td><td>75</td></tr></table>
Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr></table></td><td>group not accounted for by loss to follow-up of three participants: baseline SUI = 42, baseline MUI = 31, results SUI = 43, results MUI = 27.

Two different types of tape were compared which is a potential bias.</td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Experimental</td><td>3</td><td>73</td></tr>
<tr><td>Control</td><td>2</td><td>75</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>0</td><td>73</td></tr>
<tr><td>Control</td><td>3</td><td>75</td></tr>
</table>
</td><td></td></tr>
<tr><td>Full citation

Ross,S., Robert,M., Swaby,C., Dederer,L., Lier,D., Tang,S., Brasher,P., Birch,C., Cenaiko,D., Mainprize,T., Murphy,M., Carlson,K., Baverstock,R., Jacobs,P., Williamson,T., Transobturator tape compared with tension-free vaginal tape for stress incontinence: a randomized controlled trial, Obstetrics and Gynecology, 114, 1287-1294, 2009

Ref Id

100738</td><td>Sample size

N = 199

TOT (transobturator outside in) = 94
TVT (retropubic tension-free vaginal tape) = 105

Characteristics

<u>Gender – Female/N (% female)</u>
199/199 (100%)

<u>Age (years)- Mean ± SD</u>
TOT = 50.1 ± 8.3
TVT = 51.8 ± 10.4

<u>Incontinence episodes/day – Mean</u></td><td>Interventions

TOT procedure performed using the outside-in Obtryx Halo midurethral sling (Boston Scientific, Natick, MA).

TVT procedure performed using the Advantage retropubic midurethral sling (Boston Scientific, Natick, MA).

All procedures were carried out according to the usual practice of</td><td>Details

All surgeons received training in both techniques and had carried out at least five of each procedure using Boston Scientific (Natick, MA) devices before recruiting patients to the trial.

Anaesthesia was either general or local, depending on the clinical state and choice of the patient, and according to the usual clinical practice of the anaesthesiologist. Local anaesthesia alone was used in 66% of TOT procedures and 71% of TVT procedures; general</td><td>Results

<u>Patient satisfaction with treatment at 12 months</u>
Scale used – "Subjective symptom assessment by questionnaire. Subjective cure defined as 'no experience of lost or leaked urine when you coughed. laughed, sneezed, lifted, exercised etc.' or if urine loss had been 'no problem at all' or a 'small problem' over the previous 7 days."

Cured
TOT = 85/94 (90.4%)*
TVT = 88/105 (83.8%)*

<u>Self reported rate of absolute symptom reduction per day</u>
Episodes of incontinence:
Not reported</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: yes
A3 - Were groups comparable at baseline: unclear - report baseline characteristics but do not report results of any statistical comparison for differences
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out Canada **Study type** Randomized controlled trial **Aim of the study** "Our study was designed to answer the following primary question: how effective is transobturator tape compared with TVT in terms of objective cure at 12 months postoperatively? Secondary questions examined surgical complications, and subjective effectiveness of transobturator tape compared with TVT at 12 months." **Study dates** October 2005 to June 2007 **Source of funding** Peer-reviewed funding was received from Alberta Heritage Fund for Medical Research. Grant-in-aid	± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported Incontinence-specific quality of life Scale used - Urogenital Distress Inventory (UDI-6) - Median (range) TOT = 39 (28 - 56) TVT = 44 (33 - 61) Scale used - Incontinence Impact Questionnaire (IIQ-7) - Mean (range) TOT = 33 (19 - 52) TVT = 33 (19 - 57) **Inclusion criteria** 1] Elected surgical management of SUI 2] Visualised leaking urine from the urethra with cough 3] Suitable for either TOT or TVT sling procedure **Exclusion criteria** 1] Had previous	participating surgeons, consistent with the recommendations of Boston Scientific	anaesthesia was used in 34% of TOT procedures and 27% of TVT procedures. Intraoperative cystoscopy was carried out for all patients. Where possible, operations were planned as outpatient procedures with postoperative home care (usual care in Calgary). If necessary for clinical or logistic reasons, women were admitted to the hospital. **Power calculation** At the start of our study, the baseline TVT cure rate was estimated to be 73%. The study clinicians decided that a 15% difference between groups (eg, 90% compared with 75%) would be necessary to change clinical practice. To detect a difference of that order, assuming 80% power and a two-sided significance level of 0.05, a sample of 100 patients per group with complete follow-up would be required (total 200).	Continence status at 12 months Scale used – "Objective cure measured using pad test < 1g" **Cured** TOT = 68/94 (72.3%)* TVT = 67/105 (63.8%)* Incontinence-specific quality of life at 12 months Scale used - Urogenital Distress Inventory (UDI-6) - Median (range) TOT = 3 (0-11) TVT = 11 (0-22) Change in UDI-6 score - Mean ± SD (N) TOT = − 34 ± 20 (86) TVT = − 30 ± 23 (95) Scale used - Incontinence Impact Questionnaire (IIQ-7) - Median (range) TOT = 0 (0-5) TVT = 9 (0-10) Change in IIQ-7 score - Mean ± SD (N) TOT = − 30 ± 24 (86) TVT = − 30 ± 27 (95) Adverse effects of treatment **Peri-operative** Bladder perforation** TOT = 0/94 (0%) TVT = 3/105 (3%) Blood loss > 200ml TOT = 0/94 (0%) TVT = 3/105 (3%)	of care: yes B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: unclear Level of bias: unclear D Detection bias D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: no Intervention: no Outcome: yes - continence status measured by pad test

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>industry funding was received from Boston Scientific (Natick, MA). Devices were purchased by Calgary Health Region as part of usual care.</td>
<td>incontinence surgery
2] Required any concurrent surgery
3] Had an overactive bladder (urinary frequency and urgency with or without urge incontinence)
4] Had more than 100 ml postvoid residual volume
5] Intended to have more children
6] Alzheimer's or Parkinson's disease
7] Progressive neurological disease such as multiple sclerosis
8] Immunocompromised
9] Unable to understand English
10] Would be unavailable for follow up</td>
<td></td>
<td>Intention to treat analysis

Analyses were undertaken following the intention-to-treat principle: women were analysed in the surgical group to which they were randomized. A single analysis was planned when all women had completed the 12 month follow-up.</td>
<td>Post-operative
Procedures for release of tape or mesh extrusion**
TOT = 4/94 (4.3%)*
TVT = 2/105 (1.9%)*

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

<u>Duration of operation (min) - Median (range)</u>
TOT = 19 (16 - 23)
TVT = 18 (16 - 23)

*percentage calculated by NCC-WCH
** Most common adverse effect in peri-operative and post-operative categoris used in meta-analysis

Patient satisfaction with treatment

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>88</td><td>105</td></tr><tr><td>Control</td><td>85</td><td>94</td></tr></table>
Continence status</td>
<td>Other information

Participants reporting urge urinary incontinence symptoms in the last 7 days as "a big problem" at baseline: TOT = 22/94 (23.4%); TVT = 35/105 (33.3%)

A total of 182/199 (91%) women were followed up at 12 months. 84/94 in TOT and 87/105 in TVT completed pad test; 86/94 in TOT and 95/105 in TVT responded to questionnaire (including UDI-6 and IIQ-7).

All women had allocated surgery except one woman in the TOT group whose surgeon initiated a TOT procedure but converted to the TVT procedure at the same surgery after urethral muschels were torn.

On vaginal examination the tape was palpable for 80% of the TOT group and 26.7% of the TVT group (P < 0.001); more women in the TOT group experience groin pain during vaginal palpation (15.3%) compared with 5.6% in the TVT group (P < 0.044)</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments

	Events	Total
Experimental	67	105
Control	68	94

Incontinence QOL

	Mean	SD	Total
Experimental	-30.00	24.00	95
Control	-30.00	27.00	86

Peri-operative adverse effects

	Events	Total
Experimental	3	105
Control	0	94

Post-operative adverse effects

	Events	Total

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				<table><tr><td>**Experimental**</td><td>2</td><td>105</td></tr><tr><td>**Control**</td><td>4</td><td>94</td></tr></table>	
Full citation *Two publications resulted from the single randomised controlled trial of retropubic 'bottom-up' versus transobturator 'outside-in'. Results are presented in the David-Montifiore et al., 2006, publication unless otherwise indicated.* David-Montefiore,E., Frobert,J.L., Grisard-Anaf,M., Lienhart,J., Bonnet,K., Poncelet,C., Darai,E., Peri-operative complications and pain after the suburethral sling procedure for urinary stress incontinence: a French prospective randomised multicentre study comparing the retropubic and transobturator routes, European Urology, 49, 133-138, 2006 and Darai,E., Frobert,J.L., Grisard-Anaf,M., Lienhart,J., Fernandez, H.,	**Sample size** N = 88 TVT (bottom-up tension-free vaginal tape) = 42 TOT (transobturator outside in) = 46 **Characteristics** Gender – Female/N (% female) 88/88 (100%) Age (years)- Mean ± SD TVT = 56.8 ± 12 TOT = 53.4 ± 10.5 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported	**Interventions** TVT was performed as described by Ulmsten 1996 TOT was performed as described by Delorme 2001	**Details** The I-STOP device (CL Medical, Lyon, France) was used for both procedures and both procedures were performed in the dorsal-lithotomy position. The choice between general or regional anaesthetic was made in each study centre. Tape adjustment for both procedures was performed under the midurethra. Cystoscopy was always performed before vaginal and skin closure with resorbable sutures. **Power calculation** The power calculation assumed that the incidence of de novo urge incontinence and immediate and late voiding dysfunction after the retropubic procedure is 60% and the figure would be halved by using the transobturator approach, with a tape 1 error of 0.05 and a type 2 error of 0.2. On this basis it	**Results** Patient satisfaction with treatment Not reported at 12 months Self reported rate of absolute symptom reduction per day Episodes of incontinence: Not reported at 12 months Continence status Not reported at 12 months Incontinence-specific quality of life Reported as UDI at > 6 months TVT: 4.7 ± 10 TOT: 1.2 ± 5 Adverse effects of treatment **Peri-operative** Bladder perforation TVT: 4/42 (9.5%) TOT: 0/46 (0%) Vaginal injury* TVT: 0/42 ()%) TOT: 5/46 (10.9%) Haemorrhage (>200ml) TVT: 2/42 (4.8%) TOT: 0/46 (0%) Retropubic haematoma TVT: 2/42 (4.8%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: Yes - computer generated A2 - Was there adequate concealment: unclear - not reported A3 - Were groups comparable at baseline: Yes Level of bias: low B Performance bias B1 - Did groups get same level of care: Yes B2 - Were participants blinded: unclear - not reported B3 - Were clinical staff blinded: unclear - not reported Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: Yes C2 - Were groups comparable for dropout: Yes C3 - Were groups comparable for missing data: unclear

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Duberand, G,.David-Montefiore,E. Functional results after the suburethral sling procedure for urinary stress incontinence: a prospective randomised multicentre study comparing the retropubic and transobturator routes, European Urology, 51, 795-802, 2007.

Ref Id

100780

Country/ies where the study was carried out

France

Study type

Randomized controlled trial

Aim of the study

"To evaluate post-operative pain, peri-operative complications, and the immediate functional outcome of the TVT procedure for SUI, using the same non-elastic polypropylene tape and comparing the retropubic and transobturator routes"</td>
<td><u>Mixed urinary incontinence - n/N (%)</u>
TVT = 5/42 (11.9%)
TOT = 6/46 (13%)

Inclusion criteria

Women with SUI

Exclusion criteria

None reported</td>
<td></td>
<td>was necessary to recruit at least 40 women to each arm.

Intention to treat analysis

Not reported</td>
<td>TOT: 0/46 (0%)

Pelvic abscess
TVT: 1/42 (2.4%)
TOT: 0/46 (0%)

<u>Psychological outcomes</u>
Reported as Emotional and social discomfort at > 6 months
TVT: 1.0 ± 1.7
TOT: 0.5 ± 0.8

<u>Clinical measures (mL) Mean ± SD</u>
Post-void residual volume
TVT: 23 ± 45
TOT: 28 ± 49

* Most common adverse effect in peri-operative category used in meta-analysis

Incontinence QOL
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>4.70</td><td>10.00</td><td>42</td></tr>
<tr><td>Control</td><td>1.20</td><td>5.00</td><td>46</td></tr>
</table>
Peri-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
</table>
</td>
<td>Level of bias: low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: yes
D3 - Was a valid and reliable method used to assess outcome: yes
D4 - Were investigators blinded to interventions: unclear
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: low

Indirectness

Does the study reflect the review protocol in terms of:
Population: Yes
Intervention: Yes
Outcome: Yes
Indirectness: None

Other information

Data on Incontinence quality of life, psychological outcomes and post-void residual outcomes from secondary publication "Darai et al., 2007"</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates March 2004 to March 2005 **Source of funding** Not reported					

Experimental	0	42
Control	5	46

Psychogical outcomes – depression (Darai et al., 2007)

	Mean	SD	Total
Experimental	1.00	1.70	42
Control	0.50	0.80	46

Post void residual volume (Darai et al., 2007)

	Mean	SD	Total
Experimental	43.00	45.00	42
Control	28.00	49.00	46

Post-operative de novo urinary frequency

	No	%	Total

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Experimental</td><td>5</td><td>11.9</td><td>42</td></tr>
<tr><td>Control</td><td>4</td><td>8.7</td><td>46</td></tr>
</table>

There were no cases of tape erosion. (Darai et al., 2007) nor of retention.</td><td></td></tr>
<tr><td>Full citation

Wang,A.C., Lin,Y.H., Tseng,L.H., Chih,S.Y., Lee,C.J., Prospective randomized comparison of transobturator suburethral sling (Monarc) vs suprapubic arc (Sparc) sling procedures for female urodynamic stress incontinence, International Urogynecology Journal, 17, 439-443, 2006

Ref Id

100785

Country/ies where the study was carried out

Taiwan

Study type

Randomized controlled trial</td><td>Sample size

N = 62

TOT = 31
SPARC = 31

Characteristics

<u>Gender - Female/N (% female)</u>
62/62 (100%)

<u>Age (years) - Mean ± SD</u>
TVT = 50.5 ± 11.9
TOT = 51.4 ± 10.1

<u>Incontinence episodes/day</u>
Not reported

<u>Duration of SUI</u>
Not reported

<u>Detrusor overactivity</u>
Not reported</td><td>Interventions

TOT procedure was performed as describve by Dargent 2002 using the MONARC tape (American Medical Systems)

SPARC (American Medical Systems) procedure was performedas described by Plzak 2002</td><td>Details

All women underwent preoperative assessment. A 1-hour pad test was performed as well as a urodynamic study including filling and vboiding cystometry with electromyography with multichannel urodynamc assessment using a 8-French doubel-lumen perfusion catheter. Intraoperative urethrocystoscopy was performed for both procedures. A routine suprapubic ultrasonaography was used to detect unrecognised subcutaneous, retropubic or obturator haematoma the day after each procedure. Because spinal anaesthesia was used, a retention</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported at 12 months

<u>Self reported rate of symptom reduction per day</u>
Not reported at 12 months

<u>Continence status</u>
Not reported at 12 months

<u>Incontinence-specific quality of life</u>
Not reported at 12 months

<u>Adverse effects of treatment</u>
Peri-operative
Bladder injury
TOT = 0/31 (0%)
SPARC = 1/29 (3.4%)

Vaginal injury*
TOT: 4/31 (12.9%)
SPARC: 0/29 (0%)

Haematoma</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: Yes - Computer generated
A2 - Was there adequate concealment: unclear - not reported
A3 - Were groups comparable at baseline: Yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: Yes
B2 - Were participants blinded: Yes
B3 - Were clinical staff blinded: No
Level of bias: low</td></tr>
</table>

<table>
<tr>
<th>Study details</th>
<th>Participants</th>
<th>Interventions</th>
<th>Methods</th>
<th>Outcomes and Results</th>
<th>Comments</th>
</tr>
<tr>
<td>Aim of the study

To compare the procedure-related complications of the transbturator tape and suprapubic tape and if the orientation of tape positioning affects postoperative voiding function

Study dates

Not reported

Source of funding

Not reported</td>
<td><u>Mixed urinary incontinence -n/N (%)</u>
Not reported

Inclusion criteria

1] urodynamically proven stress urinary incontinence

Exclusion criteria

1] preoperative BOO (defined as 1 or the following - freeQmax of ≤ 12 ml/s in repeated free uroflow studies combined with PdetQman of ≥ 20 cm H_2O, postvoid residual volume ≥100 ml, and Pabd increase of at least 10 cm H_2O

2] previous anti-incontinence surgery and/or pelvic prolapse greater than stage II of the Incontinence Continenece Society grading system</td>
<td></td>
<td>catheterization was instituted for each patient and the catheter was removed the day after the procedure. Sterile, intermittent catheterization was offered every 4 hours after urethral catheter was removed. Women were discharged once the amount of postvoid residuals was less that 20% of that from self-voiding consecutively four times.

Power calculation

To detect a 36.3% difference in perforation rate and 30% difference in voiding dysfunction rate we conducted a test with a significance of 0.05 and 80% power and calculated 30 women would be needed in each arm to detect a difference in voiding dysfunction rate and 18m in each arm to detect a difference in bladder perforation rate.

Intention to treat analysis

Not reported</td>
<td>TOT = 0/31 (0%)
SPARC = 1/29 (3.4%)

Post-operative
Not reported

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

* Most common adverse effect in peri-operative category used in meta-analysis

Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>4</td><td>31</td></tr><tr><td>Control</td><td>0</td><td>29</td></tr></table></td>
<td><u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: Yes
C2 - Were groups comparable for dropout: Yes
C3 - Were groups comparable for missing data: Yes
Level of bias: low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: Yes
D3 - Was a valid and reliable method used to assess outcome: Yes
D4 - Were investigators blinded to interventions: No
D5 - Were investigators blinded to confounding factors: No
Level of bias: Some

Indirectness

Does the study reflect the review protocol in terms of:
Population: Yes

Intervention: Yes

Outcome: Yes

Indirectness: None

Other information</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Wang,F., Song,Y., Huang,H., Prospective randomized trial of TVT and TOT as primary treatment for female stress urinary incontinence with or without pelvic organ prolapse in Southeast China, Archives of Gynecology and Obstetrics, 281, 279-286, 2010 **Ref Id** 100786 **Country/ies where the study was carried out** China **Study type** Randomized controlled trial **Aim of the study** "To compare the TOT procedure with the TVT procedure in a randomised clinical trial setting and compare their efficacy in the treatment of SUI associated with or without	**Sample size** N = 140 TOT (transobturator outside in) = 70 TVT (bottom-up tension-free vaginal tape) = 70 **Characteristics** **Whole study population** Gender - Female/N (% female) 140/140 (100%) Age (years)- Mean ± SD TOT = 58 ± 11.6 TVT = 60 ± 10.8 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI (years) – Mean ± SD TOT = 4.3 ± 3.9 TVT = 4.7 ± 4.6 Detrusor overactivity - n/N (%) Not reported Incontinence-specific quality of life Scale used - Urogenital	**Interventions** TOT procedures were performed in accordance with the technique by Delorme et al. (2001) TVT procedures were performed in accordance with the technique by Ulmsten et al. (1998) Prolene tape (Ethicon, Sommerville, NJ, USA) was used in the TVT procedures [unclear whether this tape was also used in the TOT procedures].	**Details** The two procedures were performed under local anaesthesia supplemented by intravenous sedative, unless the patient was also undergoing vaginal hysterectomy or pelvic floor repair. In these cases, patients were given spinal anaesthesia. The urinary catheter was removed 12-24h after surgery. In patients who also underwent various other vaginal reconstructive procedures, the urinary catheter was removed 24-72h after surgery. **Power calculation** Not reported **Intention to treat analysis** Not reported	**Results** Patient satisfaction with treatment at 12 months "Subjective assessment of the outcome of incontinence was classified as cured (UDI-6 and IIQ-7 postoperative < 10), improved (UDI-6 and IIQ-7 if postoperative > preoperative) and worsened (UDI-6 and IIQ-7 if postoperative < preoperative)." **Cured** TOT = 64/70 (91.4%) TVT = 63/70 (90%) *percentage reported, n calculated Self reported rate of absolute symptom reduction per day Not reported Continence status at 12 months "Objective cure was defined as no stress incontinence during cough stress test (300 cm fluid in the bladder, cough forcefully, visible leakage means a positive test), a 1-h pad test of < 2g." Cough test - n/N (%) **Whole study population** **No visible leakage** TOT = 64/70 (91%) TVT = 65/70 (93%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: unclear A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes Level of bias: unclear B Performance bias B1 - Did groups get same level of care: unclear B2 - Were participants blinded: no B3 - Were clinical staff blinded: unclear Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: unclear Level of bias: low D Detection bias D1 - Was follow-up appropriate length: yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
pelvic organ prolapse (POP)." **Study dates** September 2003 to December 2007 **Source of funding** Not reported	Distress Inventory Short Form (UDI-6) Mean ± SD (N) TOT = 46 ± 20 (70) TVT = 49 ± 21 (70) Scale used - Incontinence Impact Questionnaire Short Form (IIQ-7) Mean ± SD (N) TOT = 42 ± 20 (70) TVT = 40 ± 21 (70) **SUI only population** Gender - Female/N (%) 88/88 (100%) Age (years) - Mean ± SD TOT = 59 ±13.5 TVT = 58 ± 11.2 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI (years) – Mean ± SD TOT = 4.7 ± 4.1 TVT = 5.1 ± 4.2 Detrusor overactivity - n/N (%) Not reported Incontinence-specific quality of life Scale used - Urogenital Distress Inventory Short Form (UDI-6) Mean ± SD			**Visible leakage** TOT = 6/70 (9%) TVT = 5/70 (7%) **SUI only** **No visible leakage** TOT = 45/48 (94%) TVT = 38/40 (95%) **Visible leakage** TOT = 3/48 (6%) TVT = 2/40 (5%) 1-h pad test **Whole study population** **< 2g** TOT = 65/70 (93%) TVT = 66/70 (94%) **> 2g** TOT = 5/70 (7%) TVT = 4/70 (6%) **SUI only** **< 2g** TOT = 46/48 TVT =38/40 **> 2g** TOT =2/48 TVT = 2/40 Incontinence-specific quality of life at 12 months Scale used - Urogenital Distress Inventory Short Form (UDI-6) Mean ± SD (N) **Whole study population** TOT =14 ± 17 (70) TVT = 15 ± 15 (70)	D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: Results for SUI only and concomitant prolapse populations are presented separately Intervention: No Outcome: Continence status measured by cough stress test and 1-hr pad test **Other information** The study reports data for the whole study population and then data for SUI only and SUI with concomitant pelvic organ prolapse separately. Data are reported here for the whole-study and the SUI-only populations. Adverse events data are reported for the whole study population. TOT:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	(N) TOT = 50 ± 17 (40) TVT= 52 ± 18 (48) Scale used - Incontinence Impact Questionnaire Short Form (IIQ-7) Mean ± SD (N) TOT = 41 ± 31 (40) TVT = 45 ± 23 (48) **Inclusion criteria** 1] Urodynamically proven SUI **Exclusion criteria** 1] Urge incontinence 2] Overactive bladder			**SUI only** TOT = 19 ± 12 (40) TVT = 18 ± 12 (48) Scale used - Incontinence Impact Questionnaire Short Form (IIQ-7) - Mean ± SD (N) **Whole study population** TOT =10 ± 12 (70) TVT = 13 ± 12 (70) **SUI only** TOT = 9 ± 11 (40) TVT = 8 ± 12 (48) <u>Adverse effects</u> **Peri-operative** Bladder perforation* TOT = 1/70 (1.4%) TVT = 3/70 (4.3%) **Post operative** Tape division TOT = 1/70 (1.4%) TVT = 0/70 (0%) Pain TOT = 8/70 (11.4%) TVT = 3/70 (4.3%) Short-term voiding difficulty* TOT = 6/70 (8.57%) TVT = 8/70 (11.4%) Frequency TOT = 3/70 TVT = 4/70 Urgency	Isolated SUI = 40/70 Concomitant uterine or vaginal vault prolapse = 30/70 TVT: Isolated SUI = 48/70 Concomitant uterine or vaginal vault prolapse = 22/70 All procedures were performed by one surgeon. Patients with uterine prolapse underwent transvaginal hysterectomy, anterior-posterior colporrhaphy (APC) and intravaginal slingplasty reconstructive surgeries plus either TOT or TVT. Patients with vaginal vault prolapse underwent APC plus either TOT or TVT. The authors report that concomitant pelvic reconstructive procedure had no effect on surgical results. "Positive cough stress test was a necessary condition of performing an incontinence stress surgery." Data for whole study population used in meta-analysis (and for incontinence-specific quality of life outcome have used UDI-6 scores)

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>TOT = 1/70
TVT = 3/70

Leakage of urine when straining
TOT = 2/70
TVT = 1/70

Vaginal tape erosion
TOT = 2/70 (at 3-month follow up visit)
TVT = 1/70 (at 1-month follow up visit)

Overactive bladder
TOT = 4/70
TVT = 1/70

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative and post-operative categories used in meta-analysis

Patient satisfaction with treatment
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>63</td><td>70</td></tr><tr><td>Control</td><td>64</td><td>70</td></tr></table></td><td></td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Continence status **Events** **Total** **Experimental** 65 70 **Control** 64 70 **Incontinence QOL** **Mean** **SD** **Total** **Experimental** 15.00 15.00 70 **Control** 14.00 17.00 80 **Peri-operative adverse effects** **Events** **Total** **Experimental** 3 70 **Control** 1 70 **Post-operative adverse effects**	

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td><table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>8</td><td>70</td></tr><tr><td>Control</td><td>6</td><td>70</td></tr></table></td><td></td></tr>
<tr><td>Full citation

Wang,W., Zhu,L., Lang,J., Transobturator tape procedure versus tension-free vaginal tape for treatment of stress urinary incontinence, International Journal of Gynaecology and Obstetrics, 104, 113-116, 2009

Ref Id

100787

Country/ies where the study was carried out

China

Study type

Randomized controlled trial

Aim of the study

"To compare the two surgical approaches to treat Chinese women with SUI to assess</td><td>Sample size

N = 315

TVT-O (transobturator inside out) = 155
TVT (bottom up tension-free vaginal tape) = 160

Characteristics

<u>Gender – Female/N (% female)</u>
315/315 (100%)

<u>Age (years) - Mean ± SD</u>
TVT-O = 54.8 ± 12.5
TVT = 55.0 ± 11.9

<u>Incontinence episodes/day – Mean ± SD</u>
Not reported

<u>Duration of SUI (years) – Mean ± SD</u>
TVT-O = 8.5 ± 8.8
TVT = 10.3 ± 9.3

<u>Detrusor overactivity –</u></td><td>Interventions

TVT-O procedures were performed in accordance with the technique described by de Leval (2005) with Gynecare needles and woven polypropylene tapes (Ethicon Inc, Somerville, NJ, USA)

TVT procedures were performed in accordance with the technique described by Ulmsten (1996) with Gynecare needles and woven polypropylene tapes (Ethicon Inc, Somerville, NJ, USA)</td><td>Details

All patients received prophylactic antibiotics with one preoperative dose of 500 mg of intravenous levofloxavin.

All operations were performed by the same surgeon.

The two procedures were performed under local anaesthesia supplemented by an intravenous sedative, unless patients were also undergoing vaginal hysterectomy or pelvic floor repair. In these cases, they were given general or spinal anaesthesia

Cystoscopy was performed in the TVT group, before the tape was pulled upward, because of the risk of bladder perforation. Cystoscopy was not performed in the TVT-O group owing to the minimal</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Episodes of incontinence:
Not reported

Episodes of urgency:
Not reported

<u>Continence status at 12 months</u>
Scale used – Cured = "when the cough test was negative". Improved = "when the frequency of involuntary passage of urine and urine weight by the 1-h pad test were decreased by more than 50%". Failed = "frequency of involuntary passage of urine and urine weight by the 1-h pad test were decreased by less than 50% or worse than that before surgery"
Cured
TVT-O = 106/118 (89.8%)
TVT = 103/115 (89.6%)

Improved</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: unclear
A3 - Were groups comparable at baseline: yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: yes
B2 - Were participants blinded: unclear
B3 - Were clinical staff blinded: unclear
Level of bias: unclear

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: yes
C2 - Were groups comparable for dropout: yes
C3 - Were groups comparable</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
complications (primary end point) and cure rates at intermediate term follow-up (secondary end point)." **Study dates** January 2004 to December 2007 **Source of funding** Not reported	n/N (%) Not reported **Inclusion criteria** Women with demonstrable severe SUI, or mild or moderate SUI and failure of conservative therapy. **Exclusion criteria** 1] Pregnancy 2] Urinary tract infection 3] Urge incontinence 4] Postvoid residual volume > 100 ml 5] Past history of neurological disease, urogenital malignancy, fistula or pelvic radiotherapy		risk of bladder perforation with this procedure. **Power calculation** Not reported **Intention to treat analysis** Not reported	TVT-O = 9/118 (7.6%) TVT = 10/115 (8.7%) **Failed** TVT-O = 3/118 (2.5%) TVT = 2/115 (1.7%) Incontinence-specific quality of life Not reported Adverse effects of treatment **Peri-operative** Haematoma TVT-O = 2/146 (1.4%) TVT = 2/154 (1.3%) Wound infection TVT-O = 0/146 (0%) TVT = 0/154 (0%) Urinary retention* TVT-O = 4/146 (2.7%) TVT = 6/154 (3.9%) **Post-operative** De novo urinary urgency TVT-O = 6/146 (4.1%) TVT = 9/154 (5.8%) Tape erosion TVT-O = 3/146 (2.1%) TVT = 3/154 (1.9%) Groin/thigh pain* TVT-O = 12/146 (8.2%) TVT = 4/154 (2.6%) Psychological outcomes Not reported	for missing data: unclear Level of bias: low D Detection bias D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes - although definition of 'cured' is based purely on negative cough test result, definition of improved or failed is based on change from baseline in pad test result and "frequency of involuntary passage of urine" episodes. D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: no Intervention: Concomitant procedures were performed in 78/154 in TVT-O group and 86/160 in TVT group Outcome: Continence status "cured" measured by negative cough test

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>
<u>Clinical measures</u>
Post-void residual volume < 100 ml 12 h after surgery
TVT-O = 119/146 (81.5%)
TVT = 130/154 (84.4%)

*Most common adverse effects in peri-operative and post-operative categories used in meta-analysis

Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>103</td><td>160</td></tr>
<tr><td>Control</td><td>106</td><td>155</td></tr>
</table>
Peri-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>6</td><td>154</td></tr>
<tr><td>Control</td><td>4</td><td>146</td></tr>
</table>
Post-operative adverse effects
</td>
<td>
Other information

One patient assigned to the TVT-O group withdrew from the study before the procedure due to a heart attack, therefore 154 women received the TVT-O procedure.

None of the participants had intrinsic sphincter deficiency or mixed incontinence.

Concomitant surgical procedures were performed in both groups: TVT-O = 78/154 (50.34%), TVT = 86/160 (53.8%). Procedures were anterior and/or posterior vaginal repair, transvaginal or laparoscopic hysterectomy/hysterosalpingo-oophorectomy, posterior intravaginal slingplasty or scarospinous ligament fixation surgery for concurrent pelvic organ prolapse.

Vaginal tape erosions were reported by 3 in the TVT group at 4 and 6 months following surgery; and 3 in the TVT-O group at 3, 4 and 12 months. There were no cases of urethral or bladder erosion.

Data at 24 and 36 months follow up is extracted in the evidence table for the question: "What is the long-term
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</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td><table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>4</td><td>154</td></tr><tr><td>Control</td><td>12</td><td>146</td></tr></table></td><td>effectiveness of surgical approaches for mid-urethral procedures in women undergoing their primary surgical tape procedure?"</td></tr>
<tr><td>Full citation

Zullo,M.A., Plotti,F., Calcagno,M., Marullo,E., Palaia,I., Bellati,F., Basile,S., Muzii,L., Angioli,R., Panici,P.B., One-year follow-up of tension-free vaginal tape (TVT) and trans-obturator suburethral tape from inside to outside (TVT-O) for surgical treatment of female stress urinary incontinence: a prospective randomised trial, European Urology, 51, 1376-1382, 2007

Ref Id

100797

Country/ies where the study was carried out

Italy

Study type

Randomized controlled trial</td><td>Sample size

N = 72

TVT-O (transobturator inside out) = 37
TVT (bottom-up tension-free vaginal tape) = 35

Characteristics

<u>Gender - Female/N (% female)</u>
72/72 (100%)

<u>Age - Mean ± SD</u>
TVT-O = 53.4 ± 10.7
TVT = 52.8 ± 11.8

<u>Incontinence episodes/day - Mean ± SD</u>
Not reported

<u>Duration of SUI -Mean ± SD</u>
Not reported

<u>Detrusor overactivity</u>
Not reported (see</td><td>Interventions

Surgical procedures were performed by the same two experienced surgeons, according to the techniques of Ulmsten (1995) and De Leval (2003).</td><td>Details

Cystoscopy was routinely performed only in the TVT group.

A short-term antibiotic prophylaxis was performed 2 hours prior to surgery (cefazolin 2 g). All surgical procedures were performed under lumbar epidural anaesthesia.

When bladder injury occurred, an indwelling catheter was placed for 48 hours.

If postoperative postvoid residual volume > 100 ml, the patient carried out intermittent self-catheterisation at home until postvoid residual < 80 ml on two consecutive measurements was obtained.</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self-reported rate of absolute symptom reduction per day</u>
Episodes of incontinence
Not reported

Episodes of urgency
Not reported

<u>Continence status at 12 months</u>
Scale used - Cure = no leakage of urine during the stress test at urodynamic testing
TVT-O = 33/37 (89%)
TVT = 32/35 (91%)

<u>Incontinence-specific quality of life at 12 months</u>
Scale used - Visual Analog Scale (VAS) to quantify perception of symptom severity by standardised question "Can you quantify the influence of urinary incontinence on your daily life?"
TVT-O = 0.9 ± 0.7 (37)
TVT = 1.1 ± 0.9 (35)</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: unclear
A3 - Were groups comparable at baseline: yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: yes
B2 - Were participants blinded: no
B3 - Were clinical staff blinded: no
Level of bias: unclear

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: yes
C2 - Were groups comparable for dropout: yes
C3 - Were groups comparable</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study "This prospective randomised trial compared use of TVT and transobturator suburethral tape from inside to outside (TVT-O) for surgical treatment of SUI in terms of complications (primary end point) and short-term success rate (secondary end point)." **Study dates** July 2004 to May 2005 **Source of funding** Not reported.	exclusion criteria) <u>Incontinence-specific quality of life</u> Scale used - Visual Analog Scale (VAS) to quantify perception of symptom severity by standardised question "Can you quantify the influence of urinary incontinence on your daily life?" TVT-O = 8.2 ± 2.8 (37) TVT = 8.6 ± 3.4 (35) **Inclusion criteria** 1] SUI with no contraindications to vaginal surgery and signed informed consent. **Exclusion criteria** 1] Urogenital prolapse greater than stage 1 2] Detrusor overactivity 3] Symptoms of overactive bladder 4] Intrinsic urethral sphincter deficiency 5] Urinary retention 6] Previous anti-incontinence surgery 7] Neurogenic bladder 8] Psychiatric disease		**Power calculation** "We believed that that incidence of intraoperative and postoperative complications would be 39% (higher value reported in the literature) in the TVT group and 7% in the TVT-O group. Based on 0.9 power to detect a significant different (p = 0.05, 2-sided), 35 patients were required for each study group. To compensate for non-evaluable patients (estimated 10%) we planned to enroll 38 patients per group." **Intention to treat analysis** "All 72 patients were treated in an intention-to-treat basis."	<u>Adverse effects of treatment</u> **Peri-operative** Bladder injury* TVT-O = 0/37 TVT = 2/35 Vaginal perforation TVT-O = 0/37 TVT = 1/35 Retropubic haematoma TVT-O = 0/37 TVT = 1/35 **Postoperative** Fever TVT-O = 0/37 TVT = 2/35 Urinary tract infection TVT-O = 1/37 TVT = 2/35 Severe pain (pain requiring analgesic 1 wk after surgery) TVT-O = 1/37 TVT = 0/35 Urinary retention TVT-O = 0/37 TVT = 1/35 Tape erosion TVT-O = 0/37 TVT = 0/35 Frequency at 12 months TVT-O = 0/37 (0%) TVT = 2/35 (6%)	for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes - all follow-up examinations were performed by physicians not involved in study protocol (masked) D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: no Intervention: no Outcome: continence status measured by stress test. Quality of life was assessed with a question about quantifying influence of symptoms on daily life, measured on a VAS. **Other information** At 1, 6 and 12 months after

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Urgency at 12 months*
TVT-O = 0/37 (0%)
TVT = 3/35 (9%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative and post-operative categories used in meta-analyses

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>32</td><td>35</td></tr><tr><td>Control</td><td>33</td><td>37</td></tr></table>
Incontinence QOL
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>1.10</td><td>0.90</td><td>35</td></tr><tr><td>Control</td><td>0.90</td><td>0.70</td><td>37</td></tr></table></td><td>surgery, patients were asked to answer urogynaecologic standardised questions addressing urinary symptoms and physical examination was performed.

Median follow-up was 16 months (range 13 to 21 months).</td></tr>
</table>

<table>
<tr>
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<td>Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>2</td><td>35</td></tr><tr><td>Control</td><td>0</td><td>37</td></tr></table>
Post-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>3</td><td>35</td></tr><tr><td>Control</td><td>0</td><td>37</td></tr></table></td>
<td></td>
</tr>
<tr>
<td>Full citation

Deffieux,X., Daher,N., Mansoor,A., Debodinance,P., Muhlstein,J., Fernandez,H., Transobturator TVT-O versus retropubic TVT: results of a multicenter randomized controlled trial at 24 months follow-up, International Urogynecology Journal, 21, 1337-1345, 2010

Ref Id</td>
<td>Sample size

N = 149

TVT-O (transobturator inside out) = 74
TVT (botton-up retropubic tension-free vaginal tape) = 75

Characteristics

<u>Gender – Female/N (% female)</u>
149/149 (100%)

<u>Age (years)- Mean ± SD</u></td>
<td>Interventions

TVT-O (Johnson and Johnson, Ethicon, Gynecare) procedures were all performed using the vaginal approach from inside to outside, as described by de Leval.

TVT procedures were all performed using the vaginal approach in</td>
<td>Details

The method of anaesthesia was left to the discretion of each surgeon.

Vaginal incision was made in the same fashion in both groups.

The polypropylene sling was identical in both procedures.

For both procedures, the surgeons were instructed to place the slings "tension-free". Beyond this no other</td>
<td>Results

<u>Patient satisfaction with treatment at 12 months</u>
Scale used - subjective cure rate = "no referred leakage at interview"
TVT-O = 61/69 (88%)
TVT = 63/69 (91%)

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status at 12 months</u>
Scale used - objective cure rate = negative stress test
TVT-O = 67/69 (97%)</td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: yes
A3 - Were groups comparable at baseline: yes
Level of bias: low

<u>B Performance bias</u></td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
124241 **Country/ies where the study was carried out** France **Study type** Randomised controlled trial **Aim of the study** "To compare the retropubic TVT and transobturator TVT-O procedures (both using the same macroporous monofilament polypropylene sling), with emphasis being placed on cure rates and intraoperative and post-operative complications, with a minimum follow-up of 24 months." **Study dates** January 2005 to December 2007 **Source of funding** Not reported	TVT-O = 52.8 ± 9.8 TVT = 54.6 ± 10.9 <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u> Not reported <u>Mixed urinary incontinence - n/N (%)</u> TVT-O = 20/74 (27%) TVT = 26/75 (35%) **Inclusion criteria** 1] Isolated or mixed urodynamic stress incontinence (USI; according to the International Continence Society classification) 2] Indication for surgical treatment of USI 3] Positive cough stress test (cough stress test was performed during cystometry in sitting position, volume 200 – 300 ml) 4] At least 18 years of age	accordance with the technique described by Ulmsten and the manufacturer (Johnson and Johnson, Ethicon, Gynecare).	standardisation of the sling tension was imposed. No per-operative cough stress test was required. All patients, including those in the TVT-O group, underwent an intraoperative cystoscopy to check for the presence of lower urinary tract injury. **Power calculation** The sample size calculation (SPSS analysis) was performed assuming a bladder injury rate of 8% for TVT and 0.5% for TVT-O. With α equal to 5% and 80% power (1-β) the sample size should be 180 patients, with 90 patients in each group, to reveal a 7.5% difference. The number of subjects included in the trial did not reach this figure because of insufficient enrolment in some centres. **Intention to treat analysis** Not reported	TVT = 65/69 (94%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Bladder injury* TVT-O = 2/74 (2%) TVT = 4/75 (5%) Urethral injury TVT-O = 0/74 (0%) TVT = 1/75 (1%) Vaginal extrusion (erosion) TVT-O = 1/74 (1%) TVT = 0/75 (0%) Pain over 30/100 on Visual Analog Scale at 24 months TVT-O = 4/67 (6%) TVT = 2/64 (3%) **Post-operative** Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures at 12 months</u> Post-void residual volume (ml) - Median (interquartile range) TVT-O = 00.00 (00.00 – 10.25) TVT = 10.00 (00.00 – 50.00) *Most common adverse effects in peri-operative category used in meta-analysis	B1 - Did groups get same level of care: unclear B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes - 69/74 in TVT-O and 69/75 in TVT completed assessment at 12 months Level of bias: unclear <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: 31% of the study population had mixed urinary stress incontinence.

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>Exclusion criteria

1] Concomitant pelvic organ prolapse surgery
2] Concomitant hysterectomy
3] Previous incontinence surgery
4] Pregnancy
5] Anticoagulation therapy
6] Higher than first stage urogenital prolapse
7] Patient unable to understand the purpose of the trial</td>
<td></td>
<td></td>
<td>Patient satisfaction with treatment

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>63</td><td>75</td></tr>
<tr><td>Control</td><td>61</td><td>74</td></tr>
</table>

Continence status

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>65</td><td>75</td></tr>
<tr><td>Control</td><td>67</td><td>74</td></tr>
</table>

Peri-operative adverse effects

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>4</td><td>75</td></tr>
<tr><td>Control</td><td>2</td><td>74</td></tr>
</table>
</td>
<td>Intervention: No

Outcome: Continence status measured by cough stress test

Other information

The authors state that "Gynecare (Johnson and Johnson, Ethicon) had no role in the design, implementation or analysis of this study or in the writing of the present publication."

Three patients required repeat surgery: one patient in TVT-O group as a result of vaginal sling extrusion, two patients in the TVT group as a result of persistent bladder outlet obstruction symptoms and a major postvoid residual volume.

The authors report that improvements in most items of the CONTILIFE questionnaire, including global quality of life were observed in both groups with no difference between the groups.

Data at 24 months follow up is extracted in the evidence table for the question: "What is the long-term effectiveness of surgical approaches for mid-urethral procedures in women</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					undergoing primary surgical tape procedure?"
Full citation Lord,H.E., Taylor,J.D., Finn,J.C., Tsokos,N., Jeffery,J.T., Atherton,M.J., Evans,S.F., Bremner,A.P., Elder,G.O., Holman,C.D.J., A randomized controlled equivalence trial of short-term complications and efficacy of tension-free vaginal tape and suprapubic urethral support sling for treating stress incontinence, BJU International, 98, 367-376, 2006 **Ref Id** 134944 **Country/ies where the study was carried out** Australia **Study type** Randomized controlled trial **Aim of the study** Not reported	**Sample size** N = 313 TVT = 154 SPARC = 159 **Characteristics** Gender – Female/N (% female) 313/313 (100%) Age (years)- Mean ± SD TVT = 53.2 ± 12.1 SPARC = 51.9 ± 11.2 Incontinence episodes/16 hours – Median (range) TVT: 6.4 (4.0 - 9.0) SPARC: 6.4 (4.0 - 8.0) Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported Mixed urinary incontinence - n/N (%) TVT: 89/154 (60.5%) SPARC: 91/159 (59.2%)	**Interventions** TVT and SPARC procedures were performed by experienced surgeon but no further information provided.	**Details** Cystoscopy was performed to check on bladder or urethra perforation. Standardized suprapubic adjustment was performed with no urethral elevation and Metzenbaum scissors between urethra and tape. A vaginal pack and catheter were inserted overnight both removed at 6am the next morning. Two voids >150 mL and two urinary residuals < 150 ml prior to discharge **Power calculation** Sample size was based on a retrospective estimated 2% bladder perforation rate of the study surgeons. A one-sided equivalence model with power of 80% and an α of 0.05 was selected and these yielded a minimum sample size of 145 per arm. **Intention to treat analysis** ITT analysis was reported but no information given on	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported at 12 months Continence status Not reported at 12 months Incontinence-specific quality of life Not reported at 12 months Adverse effects of treatment **Peri-operative** Bladder perforation TVT: 1/147 (0.7%) SPARC: 3/154 (1.9%) >100 ml blood loss* TVT: 32/147 (21.8%) SPARC: = 28/154 (18.2%) Haematoma TVT: 6/147 (4.1%) SPARC: 4/154/80 (2.6%) **Post-operative** Not reported Psychological outcomes Not reported	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: Yes - computer generated A2 - Was there adequate concealment: Yes - sealed opaque envelopes used A3 - Were groups comparable at baseline: Yes Level of bias: Low B Performance bias B1 - Did groups get same level of care: Yes B2 - Were participants blinded: Yes B3 - Were clinical staff blinded: Yes Level of bias: Low C Attrition bias C1 - Was follow-up equal for both groups: Yes C2 - Were groups comparable for dropout: Yes C3 - Were groups comparable for missing data: Yes Level of bias: Low

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study dates

January 2003 to October 2004

Source of funding

None reported</td>
<td>Inclusion criteria

1] Clinical diagnosis of SUI and a recommendation for minimally invasive surgery

Exclusion criteria

1] age < 18 years
2] pregnancy
3] major voiding dysfunction specified as an abnormal flow (i..e. maximal flow rate <10mL/s or a residual urinary volume of > 150ml)</td>
<td></td>
<td>how it was perfomed.</td>
<td><u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative category used in meta-analysis

Peri-operative adverse effects

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>32</td><td>147</td></tr><tr><td>Control</td><td>28</td><td>154</td></tr></table></td>
<td><u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: Yes
D3 - Was a valid and reliable method used to assess outcome: Yes
D4 - Were investigators blinded to interventions: Yes
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: Low

Indirectness

Does the study reflect the review protocol in terms of:
Population: Yes
Intervention: Yes
Outcome: Yes
Indirectness: None

Other information</td>
</tr>
<tr>
<td>Full citation

Hinoul,P., Vervest,H.A.M., Den,BoonJ, Venema,P.L., Lakeman,M.M., Milani,A.L., Roovers,J.P.W.R., A randomized, controlled trial comparing an innovative single incision sling with an established transobturator</td>
<td>Sample size

N = 195

TVT-Secur (single incision) = 97
TVT-O (transobturator inside out) = 98</td>
<td>Interventions

TVT-Secur was performed according to manufacturer instructions for use and placed in the direction of the obturator muscles</td>
<td>Details

Before the RCT all surgeons had performed 5–10 TVT Secur procedures and were comfortable with the technique.

Cystoscopy was not routinely performed during</td>
<td>Results

<u>Patient satisfaction with treatment at 12 months</u>
Scale used – Subjective SUI "response to whether any SUI episodes had occurred during the last month" [only percentage reported]
TVT-Secur = 24%</td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
sling to treat female stress urinary incontinence, Journal of Urology, 185, 1356-1362, 2011 **Ref Id** 134949 **Country/ies where the study was carried out** Belgium, The Netherlands **Study type** Randomized controlled trial **Aim of the study** "Since TVT Secur was the first single incision sling to be marketed, a prospective RCT to compare its efficiency and morbidity to those of the well established TVT-O sling was deemed appropriate." **Study dates** April 2007 to January 2009 **Source of funding** Supported by a grant from Ethicon, Somerville, NJ,	**Characteristics** Gender – Female/N (% female) 195/195 (100%) Age (years)- Mean ± SD TVT-Secur = 52.3 ± 11 TVT-O = 53.2 ± 12 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported Incontinence-specific quality of life - Mean ± SD TVT-Secur = 62 ± 21 (97) TVT-O = 58 ± 23 (98) **Inclusion criteria** 1] All patients in whom SUI could be objectified during clinical and/or urodynamic examination were considered eligible to participate in the trial.	(the hammock position) [manufacturer not reported]. TVT-O was performed according to manufacturer instructions.	the trial **Power calculation** "Power analysis was based on a similar RCT available at the inception of our trial that showed a 90% objective and an 80% subjective cure rate after TVT-O placement. A difference between the techniques of more than 15% was considered clinically relevant. With 80% power to show a 15% difference at α = 0.05 sample size had to be 158 patients, including 79 per arm. By anticipating a dropout rate of 15% of patients per arm the study aimed to include at least 184 patients." **Intention to treat analysis** "Analysis was by intent to treat."	TVT-O = 8.3% **Patient satisfaction calculated by NCC-WCH** TVT-Secur = 73/96 (76%) TVT-O = 90/98 (91.7%) Self reported rate of absolute symptom reduction per day Episodes of incontinence: Not reported Continence status at 12 months Scale used – **Objective SUI "**measured by a standing cough stress test with a bladder volume of 300 cc or greater than 70% of maximal bladder capacity according to the patient voiding diary. Volume was confirmed by bladder scan" i.e. percentage with SUI diagnosed by cough test. Only percentage reported. TVT-Secur = 16.4% TVT-O = 2.4% **Continence status calculated by NCC-WCH** TVT-Secur = 80/96 (83.6%) TVT-O = 96/98 (97.6%) Incontinence-specific quality of life Scale used - Urinary incontinence subscale of Dutch version of Urinary Distress Inventory (UDI) TVT-Secur = 21 ± 24 (96) TVT-O = 13 ± 21 (98) Adverse effects of treatment **Peri-operative**	A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: unclear - results of statistical tests of baseline data comparability not reported Level of bias: low B Performance bias B1 - Did groups get same level of care: unclear B2 - Were participants blinded: no - not possible as one procedure resulted in skin wounds while the other was exit free B3 - Were clinical staff blinded: no - not possible as one procedure resulted in skin wounds while the other was exit free Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: unclear - 77% of TVT-Secur compared with 87% of TVT-O group were clinically assessed at 12 months; 65% of TVT-Secur compared with 92% of TVT-O group returned completed QOL questionnaires Level of bias: unclear D Detection bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
USA	**Exclusion criteria** 1] Recurrent SUI 2] Any concomitant surgery 3] Stage 2 or greater genital prolapse according to the International Continence Society classification			Bleeding greater than 100 cc* TVT-Secur = 28/96 (29%) TVT-O = 17/98 (19%) Bleeding greater than 500 cc TVT-Secur = 0/96 (0%) TVT-O = 1/98 (1%) Vaginal perforation TVT-Secur = 1/96 (1%) TVT-O = 0/98 (0%) Haematuria TVT-Secur = 1/96 (1.1%) TVT-O = 1/98 (1%) Urinary retention TVT-Secur = 3/96 (3%) TVT-O = 4/98 (4%) Wound infection TVT-Secur = 1/96 (1%) TVT-O = 0/98 (0%) **Post-operative** Urinary tract infection TVT-Secur = 6/96 (7%) TVT-O = 2/98 (2%) Pyelonephritis TVT-Secur = 1/96 (1%) TVT-O = 0/98 (0%) Mesh tape exposure TVT-Secur = 7/96 (7%) TVT-O = 1/98 (1%) Tape takedown TVT-Secur = 0/96 (0%) TVT-O =2/98 (2%)	D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: unclear **Indirectness** Does the study reflect the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes - continence status measured by cough stress test Indirectness: None **Other information** One patient originally assigned to TVT Secur mistakenly received the TVT-O and was excluded from further analysis. At 12 months 75/96 (78%) in the TVT Secur and 85/98 (87%) in the TVT-O groups were clinically assessed. 63/96 (66%) in the TVT Secur and 90/98 (92%) in the TVT-O groups returned completed

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
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<td></td>
<td></td>
<td>Anticholinergics*
TVT-Secur = 12/96 (14%)
TVT-O = 14/98 (15%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

*Most common adverse effects in peri-operative and post-operative adverse effects used in meta-analysis

Patient satisfaction with treatment
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>73</td><td>97</td></tr>
<tr><td>Control</td><td>90</td><td>98</td></tr>
</table>
Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>80</td><td>96</td></tr>
<tr><td>Control</td><td>96</td><td>98</td></tr>
</table>
</td>
<td>QOL questionnaires for analysis.

Three tape exposures in the TVT-Secur group were noted at 6 weeks, 3 at 6 months and 1 at 12 months. All 7 tape exposures in the TVT-Secur group warranted surgical closure using local anaesthesia. All resolved completely. The only patient with exposure in the TVT-O group was successfully treated with local oestrogen therapy.

Eight patients in the TVT-Secur group required re-intervention to address unresolved SUI 6 months postoperatively. Re-intervention in another 6 patients was planned to treat SUI at 12 months. OR to undergo re-intervention for SUI 1 year after TVT Secur vs TVT-O placement was 2.3 (95% CI 1.9 to 2.7).

Reported denominator for peri-operative adverse effects was 92 for TVT-O group (Table 2), rather than the 98 randomised. Assumed this was a typing error; not accounted for by loss to follow up (which would not be relevant for peri-operative adverse effects, as all participants received surgery).</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Incontinence QOL
<table><tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr><tr><td>Experimental</td><td>21.00</td><td>24.00</td><td>96</td></tr><tr><td>Control</td><td>13.00</td><td>21.00</td><td>98</td></tr></table>Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>28</td><td>96</td></tr><tr><td>Control</td><td>17</td><td>98</td></tr></table>Post-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>12</td><td>96</td></tr><tr><td>Control</td><td>14</td><td>98</td></tr></table></td><td></td></tr>
<tr><td>Full citation

Zhu,L., Lang,J., Hai,N., Wong,F., Comparing</td><td>Sample size

N = 55</td><td>Interventions

TOT was performed</td><td>Details

All operations were performed by the same</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported at 12 months</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
vaginal tape and transobturator tape for the treatment of mild and moderate stress incontinence. A prospective randomized controlled study, International Journal of Gynecology and Obstetrics, 99, 14-17, 2007 **Ref Id** 135063 **Country/ies where the study was carried out** China **Study type** Randomized controlled trial **Aim of the study** "To compare the two approaches and determine whether the TVT-O procedure could be recommended for widespread use in Chinese women with mild or moderate SUI." **Study dates** January 2004 to	TVT-O (transoburator inside out) = 27 TVT (bottom-up tension-free vaginal tape) = 28 **Characteristics** Gender – Female/N (% female) 55/55 (100%) Age (years)- Mean ± SD TVT-O = 53.3 ± 11.5 TVT = 56.2 ± 12.5 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported **Inclusion criteria** 1] Mild or moderate SUI not improved by conservative therapy **Exclusion criteria** 1] Pregnancy	according to the technique described by Delorme (2001). TVT was performed according to the technique described by Ulmsten (1996). In both procedures the needles and woven polypropylene tape were Gynecare products (Gynecare, Ethicon Inc, Somerville, NJ, USA).	surgeon. The two procedures were performed under local anaesthesia supplemented by an intravenous sedative, unless patients were also undergoing hysterectomy when they were given general or spinal anaesthesia. In the TVT group, after needles were in place but before the tape was pulled upward, cystoscopy was performed because of the risk of bladder perforation. Cystoscopy was not performed in the TVT-O group owing to the minimal risk of bladder perforation with this procedure. **Power calculation** Not reported **Intention to treat analysis** Not reported	Self reported rate of absolute symptom reduction per day Not reported at 12 months Continence status Not reported at 12 months Incontinence-specific quality of life Not reported at 12 months Adverse effects of treatment **Peri-operative** Bladder injury TVT: O/28 (0%) TVT-O: 0/27 (0%) Urethral injury TVT: O/28 (0%) TVT-O: 0/27 (0%) Bowel injury TVT: O/28 (0%) TVT-O: 0/27 (0%) Blood loss > 200ml TVT: O/28 (0%) TVT-O: 0/27 (0%) Post-operative Not reported at 12 months Psychological outcomes Not reported Clinical measures Not reported	checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: yes A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes Level of bias: low B Performance bias B1 - Did groups get same level of care: yes B2 - Were participants blinded: no B3 - Were clinical staff blinded: no Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low D Detection bias D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: no - definition of cure and the timing of outcome assessment is unclear D3 - Was a valid and reliable method used to assess outcome: unclear what

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>September 2005

Source of funding

Not reported</td>
<td>2] Urinary tract infection
3] Urge incontinence
4] Post void residual volume > 100 ml</td>
<td></td>
<td></td>
<td>Peri-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>0</td><td>28</td></tr>
<tr><td>Control</td><td>0</td><td>27</td></tr>
</table>
</td>
<td>outcome(s) questionnaire was designed to measure and unclear how definition of cure can be appropriately interpreted
D4 - Were investigators blinded to interventions: unclear
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: high

Indirectness

Population: none.

Intervention: all patients underwent at least one other concomitant surgery.

Outcome: it is unclear how frequently clinical and questionnaire assessments were performed following the 6-month post-surgery questionnaire.

Other information

In the TVT-O group 15 women had mild SUI, 12 had moderate SUI. In the TVT group 12 had mild SUI, 16 had moderate SUI. Degree of SUI determined by 1-h pad test. Mild SUI defined as pad weight < 2g, moderate SUI defined as pad weight 2 – 10 g.

All patients had conditions associated with prolapse of</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					other pelvic organs. All patients underwent anterior colporrhaphy. 15/27 in TVT-O group and 14/28 in TVT group underwent concomitant hysterectomy. 20/27 in TVT-O group and 24/28 in TVT group underwent posterior colporrhaphy. Median follow-up was 27.6 months (range 22 – 30 months) It is unclear how frequently follow-up visits occurred (where "cure" or "improvement" was assessed, as defined by authors). All patients answered a standardised questionnaire 1 and 6 months after the surgery. "For long-term assessment, follow-up visits will last a lifetime".
Full citation Schierlitz,L., Dwyer,P.L., Rosamilia,A., Murray,C., Thomas,E., De,SouzaA, Lim,Y.N., Hiscock,R., Effectiveness of tension-free vaginal tape compared with transobturator tape in women with stress urinary incontinence and intrinsic sphincter deficiency: A randomized controlled trial, Obstetrics and	**Sample size** N = 164 TVT = 82 TOT = 82 **Characteristics** Gender - Female/N (% female) 164/164 (100%) Age (years) - Mean ± SD	**Interventions** TVT was performed as described by Ulmsten 1996 TOT was performed as described using the Monarc subfascial hammock system (American Medical	**Details** All women received prophylactic antibiotic treatment at the beginning of surgery. Cystoscopy was routinely used to verify the absence of bladder and urethral injury after the procedure. Tension was adjusted by placing a fine dissecting	**Results** Patient satisfaction with treatment Not reported at 12 months Self reported rate of absolute symptom reduction per day Not reported at 12 months Continence status (Zero episodes per day) Not reported at 12 months Incontinence-specific quality of life	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: Yes - computer generated A2 - Was there adequate concealment: Unclear A3 - Were groups comparable

<table>
<tr>
<th>Study details</th>
<th>Participants</th>
<th>Interventions</th>
<th>Methods</th>
<th>Outcomes and Results</th>
<th>Comments</th>
</tr>
<tr>
<td>Gynecology, 112, 1253-1261, 2008

Ref Id

135175

Country/ies where the study was carried out

Australia

Study type

Randomized controlled trial

Aim of the study

"To compare the efficacy of the TVT retropubic approach with transobturator tape in women with SUI and intrinsic sphincter deficiency"

Study dates

February 2004 to February 2007

Source of funding

Not reported</td>
<td>TVT = 60 ± 11.5
TOT = 60 ± 10.9

<u>Incontinence episodes/day</u>
Not reported

<u>Duration of SUI</u>
Not reported

<u>Detrusor overactivity</u>
Not reported

<u>Mixed urinary incontinence</u>
Not reported

Inclusion criteria

1] Women with SUI who had failed conservative treatment
2] had urodynamically proven intrinsic spincter deficiency

Exclusion criteria

1] presence of pelvic infection
2] persistent post-void residual volume > 100ml
3] malignancy
4] fistula
5] congenital or neurogenic bladder disorder</td>
<td>Systems Inc) and as described by the manufacturer</td>
<td>scissors between urethra and tape with or without the aid of a cough test. The post-operative catheter management for women who has a tape surgery alone was removal of the catheter followed by a voiding trial. Women who had concomitant prolapse surgery often had a vaginal and catheter left in for 24 to 48 hours.

A successful voiding trial was defined as two postvoid residual urine volumes < 150mL on ultrasound management.

Power calculation

Sample size calculation was performed assuming an 80% success rate in the TVT group and a chose effect size of 20%. At a power of 80% and a significance level of 0.05, the sample size estimate was 91 women per group.

Intention to treat analysis

Not reported</td>
<td>Not reported at 12 months

<u>Adverse effects of treatment</u>
Peri-operative
Bladder injury
TVT = 6/82 (7.3%)
TOT = 0/82 (0%)

Vaginal wall perforation
TVT = 0/82 (0%)
TOT = 4/82 (4.9%)

Urethral injury
TVT: 0/82 (0%)
TOT: 0/82 (0%)

Bowel injury
TVT: 0/82 (0%)
TOT: 0/82 (0%)

Blood transfusion
TVT = 0/82 (0%)
TOT = 0/82 (0%)

Blood loss > 300ml*
TVT: 7/82 (8.5%)
TOT: 14/82 (17.1%)

* Most common adverse effect in peri-operative category used in meta-analysis

Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr></table></td>
<td>at baseline: Yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: Yes
B2 - Were participants blinded: Unclear - not reported
B3 - Were clinical staff blinded: Unclear - not reported
Level of bias: low

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: Yes
C2 - Were groups comparable for dropout: Yes - all participants received treatment to which they were randomised
C3 - Were groups comparable for missing data: Yes
Level of bias: unclear

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: Yes
D3 - Was a valid and reliable method used to assess outcome: Yes
D4 - Were investigators blinded to interventions: Unclear
D5 - Were investigators blinded to confounding factors: Unclear
Level of bias: low

Indirectness</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	6] inability to give informed consent			<table><tr><td>**Experimental**</td><td>7</td><td>82</td></tr><tr><td>**Control**</td><td>14</td><td>82</td></tr></table>	Does the study reflect the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information**
Full citation Tommaselli,G.A., Di,CarloC, Gargano,V., Formisano,C., Scala,M., Nappi,C., Efficacy and safety of TVT-O and TVT-Secur in the treatment of female stress urinary incontinence: 1-Year follow-up, International urogynecology journal and pelvic floor dysfunction, 21, 1211-1217, 2010 **Ref Id** 135188 **Country/ies where the study was carried out** Italy **Study type** Randomized controlled trial	**Sample size** N = 84 TVT Secur (single incision) = 42 TVT-O (transobturator inside out) = 42 **Characteristics** <u>Gender - Female/N (% female)</u> 84/84 (100%) <u>Age (years) - Mean ± SD</u> TVT-Secur = 57.8 ± 8.5 TVT-O = 58.2 ± 9.1 <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI (years) – Mean ± SD</u> TVT-Secur = 4.0 ± 1.5	**Interventions** TVT-Secur (Gynecare, a division of Ethicon, Inc., Sommerville, NJ, USA), was performed according to the technique proposed by Neuman (2008). TVT-O (Gynecare, a division of Ethicon, Inc., Sommerville, NJ, USA) was performed according to the technique described by de Leval (2003).	**Details** All procedures were performed with patients in spinal anaesthesia. In all procedures urinary catheters were left in place for 24 hours after the procedure. All participants received antibiotic prophylaxis immediately before the procedure with cefazolin 2g IV. All procedures were performed by one investigator who had already performed more than 50 of the two procedures. **Power calculation** Not reported. **Intention to treat analysis** Not reported.	**Results** <u>Patient satisfaction with treatment at 12 months</u> Scale used – Visual Analog Scale (VAS) - 0 = minimal satisfaction, 10 = maximal satisfaction - Mean ± SD TVT-Secur = 8.5 ± 3.5 TVT-O = 7.9 ± 3.2 <u>Self reported rate of absolute symptom reduction per day</u> Episodes of incontinence Not reported Episodes of frequency Not reported <u>Continence status at 12 months</u> Scale/measure used – cough test. Cured = completely continent during cough test and during exertion in urodynamic evaluation; improved = only showed rare leakage; failed = unchanged or worsened incontinence **Cured**	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation: yes A2 - Was there adequate concealment: yes A3 - Were groups comparable at baseline: yes Level of bias: low <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: yes B3 - Were clinical staff blinded: no Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study "A comparison between the TVT-O and the TVT-Secur techniques in terms of efficacy and safety of the two procedures to assess if the new, single-incision device has similar short-term cure rates and lower complication rates." **Study dates** March 2007 to March 2008 **Source of funding** Not reported	TVT-O = 4.2 ± 1.2 <u>Detrusor overactivity - n/N (%)</u> Not reported <u>Concomitant urge incontinence - n/N (%)</u> TVT-Secur = 6/37 (16.2%) TVT-O = 5/38 (13.1%) <u>Concomitant urge - n/N (%)</u> TVT-Secur = 10/37 (27%) TVT-O = 12/38 (31.6%) **Inclusion criteria** 1] SUI lasting for at least 2 years as diagnosed by clinical evaluation and urodynamics 2] Age > 40 years **Exclusion criteria** 1] Previous surgical and/or pharmacological treatment of SUI 2] Predominant or isolated urge incontinence 3] Genital prolapse ≥ stage 2 according to PoP-Q scoring system 4] Serious contraindications to surgical procedures			TVT-Secur = 31/37 (83.8%) TVT-O = 31/38 (81.6%) **Improved** TVT-Secur = 4/37 (10.8%) TVT-O = 5/38 (13/1%) **Failed** TVT-Secur = 2/37 (5.4%) TVT-O = 2/38 (5.3%) <u>Incontinence-specific quality of life at 12 months</u> Scale use - King's Health Questionnaire (KHQ) - Mean ± SD **General health perceptions** TVT-Secur = 36.2 ± 19.8 (37) TVT-O = 40.1 ± 18.8 (38) **Incontinence impact** TVT-Secur = 28.0 ± 24.8 (37) TVT-O = 30.7 ± 25.6 (38) **Severity measures** TVT-Secur = 46.9 ± 26.3 (37) TVT-O = 54.8 ± 27.5 (38) <u>Adverse effects of treatment</u> **Prei-operative** None reported **Post operative** Urinary retention TVT-Secur = 0/37 (0%) TVT-O = 2/38 (5.2%) Vaginal erosion TVT-Secur = 1/37 (2.7%) TVT-O = 0/38 (0%)	C2 - Were groups comparable for dropout: unclear C3 - Were groups comparable for missing data: unclear Level of bias: unclear <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: Excluded women who had previous pharmacological treatment of SUI. 15% of women had urge incontinence and 29% of women had urge symptoms at baseline. Intervention: none Outcome: continence status measured by cough stress test **Other information** 9/84 (5/42 in TVT-Secur, 4/42

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Leg pain
TVT-Secur = 0/37 (0%)
TVT-O = 3/38 (7.9%)

De novo urgency*
TVT-Secur = 2/37 (5.4%)
TVT-O = 1/38 (2.6%)

Post operative pain at 1 month - Visual Analog Scale from 0 to 10 - Mean ± SD (N)
TVT-Secur = 0 (37)
TVT-O = 1.5 ± 0.5 (38)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

<u>Duration of procedure, minutes - Mean ± SD (N)</u>
TVT-Secur = 7.1 ± 2.1 (37)
TVT-O = 11.3 ± 2.9 (38)

*Most common adverse effect in post-operative category used in meta-analysis

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>31</td><td>42</td></tr></table></td><td>in TVT-O) did not complete the follow-up schedule and were considered excluded from the study. It is not clear whether drop-outs occurred before or after surgery.

Only baseline data for women followed-up at 12 months reported.

No intraoperative complications were observed in the two groups.

Time to first voiding was significantly higher in the TVT-O group compared with single incision group (93.4±32.1 min vs 65.8±18.5 min, p < 0.05).

In both groups, ICIQ-SF and KHQ scores were significantly improved at 12-month evaluation compared with baseline. There were no differences in scores at the beginning and end of the study between the two groups (data for ICIQ-6 reported graphically; data not extracted).

Only KHQ mean ± SD for general health perceptions, incontinence impact and severity measures reported in this evidence table. Authors report mean ± SD for each of the KHQ domains - general health perceptions,</td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Control</td><td>31</td><td>42</td></tr>
</table>
Incontinence QOL
<table>
<tr><th></th><th>Mean</th><th>SD</th><th>Total</th></tr>
<tr><td>Experimental</td><td>36.20</td><td>19.80</td><td>37</td></tr>
<tr><td>Control</td><td>40.10</td><td>18.80</td><td>38</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>2</td><td>37</td></tr>
<tr><td>Control</td><td>1</td><td>38</td></tr>
</table>
</td><td>incontinence impact, role limitations, physical limitations, social limitations, personal relationships, emotions, sleep/energy, severity measures.</td></tr>
<tr><td>Full citation

Oliveira,R., Botelho,F., Silva,P., Resende,A., Silva,C., Dinis,P., Cruz,F., Exploratory study assessing efficacy and complications of TVT-O, TVT-Secur, and Mini-Arc: results at 12-month follow-up, European Urology, 59, 940-944, 2011</td><td>Sample size

N = 90

TVT-O (transobturator inside out) = 30
TVT-Secur (single incision) = 30
Mini-Arc (single incision) = 30</td><td>Interventions

TVT-O (Gynecare; Ethicon Inc., Somerville, NJ, USA) was inserted according to De Leval (2003)

TVT-Secur (Gynecare; Ethicon Inc., Somerville, NJ, USA) was</td><td>Details

The surgeries were performed by the authors with the patient in the lithotomy position, with hips flexed at 90°. All the surgeons had a minimum experience of 30 cases for each procedure.

For prophylactic antibiotherapy, i.v.</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Episodes of incontinence:
Not reported

<u>Continence status at 12 months</u>
Scale used – "Patients were considered cured if they did not</td><td>Limitations

NICE guidelines manual.
Appendix D: Methodology checklist: Randomised controlled trials
<u>A Selection bias</u>
A1 - Was there appropriate randomisation: unclear
A2 - Was there adequate concealment: unclear
A3 - Were groups comparable at baseline: unclear</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 135218 **Country/ies where the study was carried out** Portugal **Study type** Randomised controlled trial **Aim of the study** The study assessed two single-incision slings, TVT-Secur and Mini-Arc and TVT-O, a conventional transobturator midurethral sling. **Study dates** January 2008 - September 2008 **Source of funding** None reported	**Characteristics** <u>Gender – Female/N (% female)</u> 90/90 (100%) <u>Age (years)- Mean ± SD</u> TVT-O = 52.0 ± 11.7 TVT-Secur = 52.7 ± 10.9 Mini-Arc = 52.6 ± 11.8 <u>Incontinence episodes/day [reported as number of pads/day] – Mean ± SD</u> TVT-O = 3.1 ± 2.0 TVT-Secur = 2.5 ± 1.3 Mini-Arc = 2.5 ± 1.8 <u>Duration of SUI (years) – Mean ± SD</u> TVT-O = 10.8 ± 8.5 TVT-Secur = 8.4 ± 5.9 Mini-Arc = 8.0 ± 6.1 <u>Detrusor overactivity – n/N (%)</u> Not reported **Inclusion criteria** 1] Clinically and urodynamically proven SUI associated with urethral hypermobility **Exclusion criteria**	positioned in the hammock position (Neuman 2007) Mini-Arc (American Medical Systems, Minnetonka, MN, USA) procedure followed the original description (Moore 2009; Kennelly 2010)	ceftriaxone 1g was used. A 16F Foley catheter was introduced and urine evacuated. Surgical incisions were closed with a 3-0 running suture, and a vaginal gauze was left in place. Postoperative analgesia included paracetamol (1g orally 3 times a day) and ibuprofen (400mg orally 3 times a day). On postoperative day 1 the vaginal gauze and Foley catheter were removed and residual volume measured after spontaneous voiding. If < 100 ml, patients were discharged on paracetamol 1g orally 3 times a day. **Power calculation** Previous case series have shown that success rates after conventional transobturator midurethral slings vary from 35% to 98%; success rates reported after Mini-Arc and TVT-Secur vary from 40% to 100%. Sample size was computed considering a one-stage procedure by Fleming. A minimum of 26	report any episodes of urine leakage, ceased to wear any incontinence protection, and had a negative cough test. If a patient reported maintenance of SUI or a positive cough test, but the number of incontinence protections necessary decreased by >50% and she answered affirmatively to the question ‘‘Are you satisfied with the result of the surgery?’’, the patient was considered improved. All other cases were deemed failures." **Cured** TVT-Secur = 20/30 (67%) Mini-Arc = 26/30 (87%) TVT-O = 25/30 (83%) **Improved** TVT-Secur = 4/30 (13%) Mini-Arc = 2/30 (7%) TVT-O = 3/30 (10%) **Failed** TVT-Secur = 6/30 (7%) Mini-Arc = 2/30 (7%) TVT-O = 2/30 (7%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Sling transection due to recurrent urinary retention TVT-Secur = 0/30 (0%) Mini-Arc = 0/30 (0%) TVT-O = 2/30 (7%)	Level of bias: unclear <u>B Performance bias</u> B1 - Did groups get same level of care: yes B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: unclear **Indirectness** Population: none Intervention: none

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>1] Previous surgery for SUI
2] Genital prolapse stage ≥ 2 (by the Pelvic Organ Prolapse Quantification System)
3] Complaints of urgency, frequency or nocturia
4] Demonsrating detrusor overactivty</td>
<td></td>
<td>patients in each group was needed assuming a higher proportion for acceptance of 0.85, a lower proportion for rejection of 0.6, an alpha of 0.05, and beta of 0.1.

Intention to treat analysis

Not reported</td>
<td>Transient urinary retention*
TVT-Secur = 1/30 (3%)
Mini-Arc = 1/30 (3%)
TVT-O = 0/30 (0%)

Post-operative
Moderate de novo urgency*
TVT-Secur = 3/30 (10%)
Mini-Arc= 3/30 (10%)
TVT-O = 5/30 (17%)

Urinary tract infection
TVT-Secur = 1/30 (3%)
Mini-Arc = 1/30 (3%)
TVT-O = 0/30 (0%)

Prolonged leg pain
TVT-Secur = 0/30 (0%)
Mini-Arc = 1/30 (3%)
TVT-O = 2/30 (7%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>46</td><td>60</td></tr><tr><td>Control</td><td>25</td><td>30</td></tr></table></td>
<td>Outcome: continence status measured by self-report plus cough stress test

Other information

Five patients had a valsava leak point pressure (VLPP) slightly below 60 cm H2O [the authors definition of intrinsic sphincter deficiency]. However, surgeons maintained the surgical option because they believed the most important component for SUI was urethral hypermobility. One patient was randomised for TVT-O (VLPP: 59 cm H_2O), two for TVT-Secur (VLPP: 58 cm H_2O each), and two for Mini-Arc (VLPP: 54 cm H_2O and 58 cm H_2O).

No cases of intra-operative major bleeding, haematuria, urethral injury or vaginal perforation were observed.

Pain score in the first 24 h was highest in TVT-O and lowest in Mini-Arc.

Data for TVT-Secur used in meta-analysis (as two other studies compared TVT-Secur with TVT-O).</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>2</td><td>60</td></tr><tr><td>Control</td><td>0</td><td>30</td></tr></table>Post-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>6</td><td>60</td></tr><tr><td>Control</td><td>5</td><td>30</td></tr></table></td><td></td></tr>
<tr><td>Full citation

Teo,R., Moran,P., Mayne,C., Tincello,D., Randomized trial of tension-free vaginal tape and tension-free vaginal tape-obturator for urodynamic stress incontinence in women, Journal of Urology, 185, 1350-1355, 2011

Ref Id</td><td>Sample size

N = 127

TVT = 66
TVT-O = 61

Characteristics

<u>Gender – Female/N (% female)</u>
127/127 (100%)

<u>Age (years)- Mean ± SD</u>
TVT = 52.4 ± 11.8</td><td>Interventions

TVT procedure was not described in detail

TVT-O was performed as described by de Leval 2005 but local (not general) anaesthetic was used.</td><td>Details

Intra-operative cystoscopy with a 70 degree cystoscope was used in all studies, included twice after each trocar pass during the TVT procedure and one at the end of the TVT-O procedure. Urethral catheterization was used intra-operatively but not postoperatively. Cough testing was used to guide TVT tension.</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status at 12 months</u>
Object cure - defined as "24 hour pad test < 5gm"
TVT: 33/41 (80.5%)
TVT-O: 25/29 (86.2%)

<u>Incontinence-specific quality of life</u></td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: Yes - computer generated
A2 - Was there adequate concealment: Yes - opaque envelopes used
A3 - Were groups comparable at baseline: Yes</td></tr>
</table>

<table>
<tr>
<th>Study details</th>
<th>Participants</th>
<th>Interventions</th>
<th>Methods</th>
<th>Outcomes and Results</th>
<th>Comments</th>
</tr>
<tr>
<td>135601

Country/ies where the study was carried out

United Kingdom

Study type

Randomized controlled trial

Aim of the study

To evaluate the effectiveness and complications of TVT and TVT-O for USI in women

Study dates

February 2005 to September 2007

Source of funding

None reported</td>
<td>TVT-O = 50.9 ± 11.4

<u>Incontinence episodes/day [reported as leakage episodes/day] – Median (Range)</u>
TVT = 3 (0 - 13)
TVT-Secur = 3 (0 - 16)

<u>Duration of SUI (years)</u>
Not reported

<u>Detrusor overactivity</u>
Not reported

Inclusion criteria

1] sole diagnosis of SUI
2] no previous continence surgery

Exclusion criteria

1] uterovaginal prolapse greater than stage I on the Pelvic Organ Prolapse Quantification staging system
2] voiding dysfunction (defined as maximal flow rate less than 15 mL per second or post-void residual urine volume 100 ml or greater</td>
<td></td>
<td>Power calculation

Using a 65% objective cure rate for TVT 100 women were required per study arm to detect a 20% difference in the cure rate with 80% power. Significance was considered at 0.05

Intention to treat analysis

ITT analysis considered women lost to follow-up considered as treatment failures for subjective and objective outcomes.</td>
<td>Not reported

<u>Adverse effects of treatment</u>
Peri-operative
Bladder perforation
TVT = 0/66 (0%)
TVT-O = 0/61 (0%)

Vaginal injury*
TVT = 0/66 (0%)
TVT-Secur = 3/61 (4.9%)

Post-operative
Leg pain*
TVT: 1/66 (1.7%)
TVT-O: 14/61 (23.0%)

Vaginal tape erosion
TVT: 3/66 (5.9%)
TVT-O: 1/61 (1.6%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Continence status

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>33</td><td>66</td></tr><tr><td>Control</td><td>25</td><td>61</td></tr></table></td>
<td>Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: Yes
B2 - Were participants blinded: No
B3 - Were clinical staff blinded: No
Level of bias: Serious

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: Yes
C2 - Were groups comparable for dropout: No
C3 - Were groups comparable for missing data: No
Level of bias: Serious

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: Yes
D3 - Was a valid and reliable method used to assess outcome: Yes
D4 - Were investigators blinded to interventions: Unclear
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: low

Indirectness

Does the study match the review protocol in terms of:
Population: Yes</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td></td>
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<td></td>
<td>Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>0</td><td>66</td></tr><tr><td>Control</td><td>3</td><td>61</td></tr></table>Post-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>3</td><td>66</td></tr><tr><td>Control</td><td>14</td><td>61</td></tr></table></td>
<td>Intervention: Yes
Outcome: Yes
Indirectness: Some

Other information

Study recruitment terminated early due to publication of 2 studies reported high adverse effect rates (leg pain) with TVT-O</td>
</tr>
<tr>
<td>Full citation

Andrada,Hamer M., Larsson,P.G., Teleman,P., Eten-Bergqvist,C., Persson,J., Short-term results of a prospective randomized evaluator blinded multicenter study comparing TVT and TVT-Secur, International Urogynecology Journal, 22, 781-787, 2011

Ref Id

135672</td>
<td>Sample size

N = 133

TVT = 62
TVT-Secur = 61

Characteristics

<u>Gender – Female/N (% female)</u>
133/133 (100%)

<u>Age (years)- Mean (Range)</u>
TVT = 48 (33 - 78)
TVT-Secur = 47 (33 - 84)</td>
<td>Interventions

TVT procedure was performed as described in Ulmsten 1996.

TVT-Secur was performed using the 'H' hammock approach to avoid risk of bladder injury and subsequent need for intra-operative cystoscopy.</td>
<td>Details

The bladder was catheterized (12-French Foley catheter for TVT-Secur and 18-French Foley catheter for TVT) immediately prior to surgery and removed as soon as the procedure was finished.

Cystoscopy was performed on surgeons discretion.

Local anaesthetic was used for both procedures</td>
<td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status</u>
Not reported at 12 months

<u>Incontinence-specific quality of life</u>
Not reported at 12 months

<u>Adverse effects of treatment</u>
Peri-operative</td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: Unclear - Not reported
A2 - Was there adequate concealment: Yes - Sealed, opaque envelopes used
A3 - Were groups comparable at baseline: Yes
Level of bias: low</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Country/ies where the study was carried out

Sweden

Study type

Randomized controlled trial

Aim of the study

"To compare the TVT-Secur with the retropubic TVT procedure in terms of safety and efficacy"

Study dates

2007 to 2009

Source of funding

Economical support from Gynecare Scandinavia</td>
<td><u>Incontinence episodes/day [reported as leakage episodes/day] – Mean (Range)</u>
TVT = 3 (0 - 9)
TVT-Secur = 3 (0 - 16)

<u>Duration of SUI (years) – Mean (Range)</u>
TVT = 9 (1 - 45)
TVT-Secur = 6.5 (1 - 40)

<u>Detrusor overactivity – n/N (%)</u>
Not reported

Inclusion criteria

1] history of SUI
2] wish for surgical treatment
3] no wish for future pregnancy
4} age ≥ 18 years
5] ≥ 3ml leakage at a standardized pad test
6] cough-synchronous leakage at stress test (up to ten coughs in standing position) the latter two with a bladder volume of 300 ml

Exclusion criteria

1] need for concomitant surgery for genital organ</td>
<td></td>
<td>Power calculation

The study was designed to detect 10% difference in cure rate at an estimated 85% level of cure and aimed to included 280 patients with an additional 28 patients to compensate for an estimated 10% dropout. An interim analysis was carried out after 14o patients or earlier if there were serious adverse events.

Intention to treat analysis

Not reported</td>
<td>Bladder perforation
TVT = 2/62 (3.2%)
TVT-Secur = 0/61 (0%)

Vaginal wall perforation*
TVT = 1/62 (1.6%)
TVT-Secur = 1/61 (1.6%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

* Most common adverse effect in peri-operative category used in meta-analysis

Peri-operative adverse effects

<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>1</td><td>62</td></tr>
<tr><td>Control</td><td>1</td><td>61</td></tr>
</table>
</td>
<td><u>B Performance bias</u>
B1 - Did groups get same level of care: Yes
B2 - Were participants blinded: unclear
B3 - Were clinical staff blinded: unclear
Level of bias: unclear

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: Yes
C2 - Were groups comparable for dropout: Yes
C3 - Were groups comparable for missing data: Yes
Level of bias: low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: Yes
D2 - Were outcomes defined precisely: Yes
D3 - Was a valid and reliable method used to assess outcome: Yes
D4 - Were investigators blinded to interventions: Unclear
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: low

Indirectness

Does the study match the review protocol in terms of:
Population: No - inclusion criteria not reported</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	prolapse 2] regular pelvic floor training in previous 3 months 3] planned or current pregnancy 4] previous surgery for urinary incontinence 5] bladder capacity less than 300mL 6] residual urinary volume more than 100mL 7] known detrusor instability 8] cystitis more than 4 times in previous 12 months 9] pyelonephritis more than once in previous 5 years 10] known or suspected neurological conditions 11] current anticoagulation therapy which could not be interrupted in dur time prior to surgery 12] know abnormal coagulation 13] allergy to local anaesthetics and/or metronidazol 14] cognitive or language problems precluding comprehension of written study information or questionnaires				Intervention: Yes Outcome: Yes - some outcomes reported at < 12 months Indirectness - Some **Other information**

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Full citation

Abdelwahab,O., Shedid,I., Al-Adl,A.M., Tension-free vaginal tape versus secure tension-free vaginal tape in treatment of female stress urinary incontinence, Current Urology, 4, 93-98, 2010

Ref Id

135793

Country/ies where the study was carried out

Egypt

Study type

Randomized controlled trial

Aim of the study

"To compare the outcome of the TVT procedure versus the TVT-Secur procedure for the management of females complaining of genuine SUI"

Study dates

None reported</td>
<td>Sample size

N = 60

TVT = 30
TVT-Secur = 30

Characteristics

<u>Gender – Female/N (% female)</u>
60/60 (100%)

<u>Age (years)- Mean ± SD</u>
TVT = 39.2 ± 9
TVT-Secur = 40.2 ± 11

<u>Incontinence episodes/day</u>
Not reported

<u>Duration of SUI (years)</u>
Not reported

<u>Detrusor overactivity – n/N (%)</u>
Not reported

Inclusion criteria

Not reported

Exclusion criteria

1] detrusor overactivity
2] Low bladder volume (< 200ml)</td>
<td>Interventions

The TVT procedure performed as described by Ulmsten 1995 where the tape was placed loosely under the mid-urethra and the two ends of the tape pulled through two small supapubic incisions.

The TVT-Secur procedure was performed using the U shape technique. A single incision was made in the anterior vaginal wall over the mid-urethra. The tape was passed on both sides of the urethra to be inserted into the endopelvic fascia on both sides without passing into the retropubic space.</td>
<td>Details

None reported

Power calculation

None reported

Intention to treat analysis

None reported</td>
<td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status</u>
Not reported at 12 months

<u>Incontinence-specific quality of life</u>
Not reported at 12 months

<u>Adverse effects of treatment</u>
Peri-operative
Bladder perforation
TVT = 2/30 (6.7%)
TVT-Secur = 0/30 (0%)

Post-operative
None reported at 12 months

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Peri-operative adverse effects

<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>2</td><td>30</td></tr></table></td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: Unclear - not reported
A2 - Was there adequate concealment: Unclear - Not reported
A3 - Were groups comparable at baseline: Yes
Level of bias: Some

<u>B Performance bias</u>
B1 - Did groups get same level of care: Yes
B2 - Were participants blinded: Unclear - Not reported
B3 - Were clinical staff blinded: Unclear - Not reported
Level of bias: Some

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: Yes
C2 - Were groups comparable for dropout: Yes
C3 - Were groups comparable for missing data: Yes
Level of bias: low

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: No
D2 - Were outcomes defined</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding None reported	3] grade III or V cystocele 4] type 0 SUI (according to Blavias and Olsson classification 1988) 5] Recurrent cases			**Control** 0 30	precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: Unclear - Not reported D5 - Were investigators blinded to confounding factors: unclear - Not reported Level of bias: Some **Indirectness** Does the study reflect the review protocol in terms of : Population: Yes Intervention: Yes Outcome: No - Most outcomes reported at < 12 months Indirectness: Some **Other information**
Full citation	**Sample size**	**Interventions**	**Details**	**Results**	**Limitations**
El-Hefnawy,A.S., Wadie,B.S., El,MekreshM, Nabeeh,A., Bazeed,M.A., TOT for treatment of stress urinary incontinence: How should we assess its equivalence with TVT?, International urogynecology journal and pelvic floor dysfunction, 21,	N = 40 TOT (transobturator outside in) = 21 TVT (bottom-up retropubic tension-free vaginal tape) = 19	TOT was performed according to the original technique by Delorme (2001) TVT was performed according to the original technique	Surgery was performed with the patient under spinal anaesthesia - 2 or 3 ml of 2.5% bupivacaine hydrochloride was injected in the subarachnoid space. Cystoscopy was done only for patients who presented with mixed urinary	<u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Episodes of incontinence: Not reported <u>Continence status at 1 year follow up</u>	NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation: unclear "Patient's randomisation is accomplished through closed

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
947-953, 2010 **Ref Id** 135900 **Country/ies where the study was carried out** Egypt **Study type** Randomised controlled trial **Aim of the study** "Comparing the effectiveness and safety of TVT and TOT as a treatment for SUI in a prospective randomised manner. For more composite assessment, success was evaluated in terms of stress-related and overall success." **Study dates** January 2006 to September 2008 **Source of funding** Not reported	**Characteristics** Gender – Female/N (% female) 40/40 (100%) Age (years)- Mean ± SD TOT = 45 ± 7 TVT = 47 ± 5 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) TOT = 6/21 (28.6%) TVT = 1/19 (5.3%) Mixed urinary incontinence - n/N (%) Not reported **Inclusion criteria** Urodynamically proven SUI **Exclusion criteria** 1] Pelvic or vaginal surgery within a period less than 6 months	by Ulmsten (1996)	incontinence. Cystoscopy was carried out after TVT procedure to exclude bladder or urethral injury. Before discharge, patients were evaluated with respect to postvoid residual volume, wound status and presence of any groin and/or thigh pain. **Power calculation** Not reported **Intention to treat analysis** Not reported	Scale used – "Overall success was defined by no reporting of any type of incontinence and negative stress test and 1-h pad test" TOT = 14/21 (66.7%)* TVT = 17/19 (93.8%)* * Only percentage reported. n calculated by NCC-WCH. Incontinence-specific quality of life Not reported Adverse effects of treatment **Peri-operative** Urinary tract infection TOT = 1/21 (4.8%)** TVT = 1/19 (5.3%)** Anterior vaginal wall stitch sinus TOT= 0/21 (0%) TVT = 1/19 (5.3%) **Post-operative** Urethral erosion TOT = 1/21 (4.8%) TVT =0/19 (0%) Vaginal erosion TOT= 1/21 (4.8%)** TVT = 0/19 (0%) Postoperative thigh pain TOT = 3/21 (14.3%)** TVT = 0/19 (0%) ** Percentage calculated by NCC-WCH Psychological outcomes	envelopes. A randomly selected envelope is dispatched to a running nurse with the patient's name and ID hand typed on the envelope." A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: no -29% of TOT group had detrusor overactivity, compared with 5% in TVT group (authors do not report P value for comparison at baseline for this variable) Level of bias: high B Performance bias B1 - Did groups get same level of care: unclear B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: unclear - authors report mean follow up C2 - Were groups comparable for dropout: unclear C3 - Were groups comparable for missing data: unclear - authors report mean follow up Level of bias: unclear D Detection bias D1 - Was follow-up appropriate length: yes - mean follow up was 19.7 ± 7 months

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>2] Associated urethral and/or bladder pathology
3] Active urinary tract infection documented by urine culture
4] Reported urge incontinence as predominant complaint</td>
<td></td>
<td></td>
<td>Not reported

<u>Clinical measures</u>
Not reported

Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>14</td><td>21</td></tr>
<tr><td>Control</td><td>17</td><td>19</td></tr>
</table>
Peri-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>1</td><td>21</td></tr>
<tr><td>Control</td><td>1</td><td>19</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>3</td><td>21</td></tr>
<tr><td>Control</td><td>0</td><td>19</td></tr>
</table>
</td>
<td>D2 - Were outcomes defined precisely: yes
D3 - Was a valid and reliable method used to assess outcome: yes
D4 - Were investigators blinded to interventions: unclear
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: low

Indirectness

Population: Number of women with MUI not reported but suggestion in text that some women with MUI were included (see Other information).

Intervention: Number of women underoing concomitant surgery not reported but suggestion in text that at least one woman received concomitant sugery (see Other information).

Outcome: Results reported as mean follow up. Continence status (calculated by NCC-WCH from reported percentage "overall success rate") was defined as "no reporting of incontinence and negative stress and 1-h pad test"

Other information</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Mixed UI was not stated as inclusion or exclusion criteria but authors state that "Cystoscopy was done only for patients who presented with mixed urinary incontinence". Unclear how many participants had MUI. The authors report operative findings (operative time. blood loss and early postoperative PVR) data with and without anterior colporrhaphy. However it is unclear how many patients underwent this concomitant surgery. Patients were evaluated at 3, 6, 12 months and then every 6 months. Mean follow up was 19.7 ± 7 months; TOT = 20.8 ± 7, TVT = 18.8 ± 7. Time of data freezing was when the last patient completed 6-month follow up. Accidental bladder injury was observed in one TOT patient (4.7%) during the dissection of bladder base from anterior vaginal wall in preparation for colporrhaphy.
Full citation Barber,M.D., Kleeman,S., Karram,M.M.,	**Sample size** N= 170	**Interventions** TOT procedures were all performed	**Details** All study surgeons had substantial experience with	**Results** <u>Patient satisfaction with treatment - 12 months</u>	**Limitations** NICE guidelines manual. Appendix D: Methodology

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Paraiso,M.F.R., Walters,M.D., Vasavada,S., Ellerkmann,M., Transobturator tape compared with tension-free vaginal tape for the treatment of stress urinary incontinence: A randomized controlled trial, Obstetrics and Gynecology, 111, 611-621, 2008 **Ref Id** 135923 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** "To test the hypothesis that transobturator tape is not inferior to the TVT in the treatment of stress urinary incontinence in patients with and those without concurrent pelvic organ prolapse."	TVT = 88 TOT = 82 **Characteristics** Gender - Female/N (% female) 170/170 (100%) Age - Mean ± SD TVT = 52 ± 11 TOT = 53 ± 12 Incontinence episodes/day - Median (range) TVT = 2.3 (0 – 8.3) TOT = 2.6 (0 – 16.3) Duration of SUI - years - Median (range) TVT = 5 (0.5 - 30) TOT = 5 (0.5 - 30) Detrusor overactivity Not reported Mixed urinary incontinence -n/N (%) Defined as "stress and urge incontinence symptoms" TOT = 5 (0.5 - 30)* TOT = 54/82 (66%)* * only % reported, n calculated by NCC-WCH. 7% had undergone a	with the Monarc Subfascial Hammock system (American Medical Systems Inc., Minnetonka, MN) using the technique recommended by the manufacturer. TVT procedures were all performed using the vaginal or "bottom up" approach following the technique described by the manufacturer (Gynecare, Ethicon Inc., Somerville, NJ). For both procedures, surgeons were instructed to place the slings "tension-free". Beyond this, no other standardisation of sling tensioning was dictated.	TVT and had performed at least 10 TOT procedures before enrolling patients in the study. Method of anaesthesia was left to the discretion of the study surgeon. All patients underwent intra-operative cystoscopy to assess for lower urinary tract injury. Concomitant surgery was performed at the discretion of the surgeon but had to be declared before randomisation. Peri-operative care, including catheter management and pain management, was performed as was routine for the site in which the woman was enrolled. **Power calculation** This is a non-inferiority study design. The null hypothesis was that the difference in the proportion of women with abnormal bladder function in the TOT group compared with the TVT group was 15% or more. In a RCT comparing TVT and laparoscopic Burch colposuspension performed by two of the sites	Scale used – Global Index of Improvement (PGI-I) [data included in meta-analysis] **Very much better** TVT = 45/82 (56%) TOT = 38/75 (51%) **Much better** TVT = 18/82 (23%) TOT = 23/75 (31%) **Somewhat better** TVT = 6/82 (7%) TOT = 5/75 (7%) **No different** TVT = 7/82 (9%) TOT = 5/75 (7%) **Somewhat worse** TVT = 4/82 (5%) TOT = 3/75 (4%) **Much worse** TVT = 2/82 (2%) TOT = 1/75 (1%) Scale used - Incontinence Severity Index (ISI) **Dry** TVT = 50/85 (58.8%) TOT = 48/77 (62.3%) **Slight** TVT = 12/85 (14.1%) TOT = 9/77 (11.7%) **Moderate**	checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: yes A2 - Was there adequate concealment: yes A3 - Were groups comparable at baseline: yes Level of bias: low B Performance bias B1 - Did groups get same level of care: unclear B2 - Were participants blinded: no - "not possible postoperatively due to different incisions required for each procedure" B3 - Were clinical staff blinded: no - "not possible postoperatively due to different incisions required for each procedure" Level of bias: low C Attrition bias C1 - Was follow-up equal for both groups: unclear - authors report mean follow up C2 - Were groups comparable for dropout: yes - all participants received treatment to which they were randomised C3 - Were groups comparable for missing data: unclear - authors report mean follow up; denominators vary for reported outcome measures

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates November 2004 to January 2006 **Source of funding** American Medical Systems (Minnetonka, MN, USA)	previous incontinence procedure (retropubic urethropexy or bulking agent injection). 20% had vaginal or uterine prolapse that extended beyond the hymen with maximal straining. 10% had a history of previous surgery for pelvic organ prolapse. **Inclusion criteria** 1] Demonstrated urodynamic stress urinary incontinence on multi-channel urodynamic testing 2] ≥ 21 years of age 3] Desired surgical correction of their incontinence **Exclusion criteria** 1] Detrusor overactivity on urodynamic testing 2] Posvoid residual volume > 100 ml 3] History of previous sling procedure 4] Desired future childbearing 5] History of hidradenitis suppurativa, inguinallymphadenopathy or an inguinal or vulvar		participating in the present study, the proportion of women in the TVT arm considered cured by the present study's definition was 83% at 12 months. Assuming similar results for the present study, 82 participants in each group (164 total) provides 80% power to reject the null hypothesis using a two-group large-sample normal approximation test of proportions with a one-sided 5% significance level. Anticipating 10% loss to follow-up and/or dropout rate over the period of the study, enrolment goal was 180. **Intention to treat analysis** The primary and secondary outcomes were analysed according to original treatment assignment. Participants with missing data that did not allow an assessment of the primary outcome were considered failures for the purpose of this analysis.	TVT = 10/85 (11.8%) TOT = 13/77 (16.8%) **Severe** TVT = 13/85 (15.3%) TOT = 7/77 (9.1%) <u>Self reported rate of absolute symptom reduction per day</u> Episodes of incontinence – Bladder diary Median (range) TVT = 0 (0 - 16) (N = 70) TOT = 0 (0 - 7) (N = 64) <u>Continence status (Zero episodes per day) - 12 months</u> Standing cough stress test (300 ml) **Negative stress test** TVT = 73/79 (92.4%) TOT = 62/71 (87.3%) Scale used – 3-day bladder diary "No incontinence episodes on diary" [data included in meta-analysis] TVT = 46/70 (66%) TOT = 44/64 (69%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Bladder injury TVT = 7/88 (8%)* TOT = 0/82 (0%)* Blood transfusion	Level of bias: unclear <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes - mean follow-up was 18.2 ± 6 months D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes - all postoperative assessments and examinations were performed by a research nurse blinded to treatment assignment D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: 71% of the study population (66% in TOT and 76% in TVT group) had stress and urge symptoms (mixed urinary incontinence). Intervention: Concomitant surgery was performed in 53% of participants. Outcome: Mean follow up reported - some missing data for some reported outcomes indicated by varying reported denominators (see Other Information)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	mass 6] Current genitourinary fistula or urethral diverticulum 7] Otherwise had a contraindication for surgery			TVT = 1/88 (1.1%)* TOT = 0/82 (0%)* Vaginal wall perforation TVT = 1/88 (1.1%)* TOT = 0/82 (0%)* Urethral injury TVT = 0/88 (0%)* TOT = 1/82 (1.2%)* Cardiac arrhythmia TVT = 1/88 (1.1%)* TOT = 0/82 (0%)* **Postoperative** Infection requiring antibiotics (excluding urinary tract infections requiring antibiotics) TVT = 11/88 (12.5%)* TOT = 13/82 (15.9%)* Urinary tract infection TVT = 12/88 (13.6%)* TOT = 11/82 (13.4%)* Pulmonary TVT = 0/88 (0%)* TOT = 1/82 (1.2%)* Pelvic abscess TVT = 1/88 (1.1%)* TOT = 1/82 (1.2%)* Blood transfusion TVT = 1/88 (1.1%)* TOT = 0/82 (0%)* Emergency room evaluations TVT = 2/88 (2.3%)*	**Other information** Some discrepancies between numbers reported in tables/figures and those reported in the text. Where discrepancies appear data has been extracted from tables/figures. Participants were evaluated at 6, 12, 24 months with mean follow up 18.2 ± 6 months. Denominators for each outcome varied. 160/170 (94%) completed at least 12 months of follow up; TOT = 75/82, TVT = 85/88 [data taken from Fig,1 flow diagram of patient enrolment. Authors report in Results text 162/170 (95%) completed at least 12 months of follow up]. 7% of participants had undergone a previous incontinence procedure (retropubic urethropexy or bulking agent injection). Table 2 reports TOT or TVT alone was performed in 77/170 (45%) of women (TOT = 37/82, TVT = 40/88). In text and Table 3 report TOT or TVT alone was performed in 65/170 (39%) of women (not

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<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
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<td></td>
<td>TOT = 4/82 (4.9%)*

Mesh erosion
TVT = 5/88 (5.6%)
TOT = 1/82 (1.2%)

Leg pain or difficulty ambulating
TVT = 2/88 (2.4%)
TOT = 3/82 (4%)

Urinary retention
TVT = 5/88 (5.7%)*
TOT = 2/82 (2.4%)*

De novo or worsened urge incontinence
TVT = 9/88 (10%)**
TOT = 3/82 (4%)**

*percentages calculated by NCC-WCH.
** only percentages reported, n calculated by NCC-WCH.

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Patient satisfaction with treatment

<table><tr><th></th><th>Events</th><th>Total</th></tr></table></td>
<td>broken down by group). The remainder received additional surgical procedures. Concomitant procedures were comparable between groups and included hysterectomy, anterior colporrhaphy, paravaginal repair, posterior colporrhaphy, vaginal vault suspension, sacral colpopexy, colpoclesis, oophrectomy, anal sphincteroplasty, mesh/graft reinforcement of anterior and posterior vaginal walls, trachlectomy, hysterscopic surgery, benign vulvar surgery, bladder biopsy, salpingectomy, abdominoplasty and laparoscopic cholecysytectomy.

The proportion of participants who were classified as "dry" after surgery by the ISI was similar between those with and those without concurrent prolapse surgery (59% compared with 55%, p = 0.91)

Postoperative complications requiring emergency room evaluations included vaginal bleeding (n = 2), chest pain (n = 1), acute abdominal pain with negative workup (n = 1) and bladder spasms (n = 2).

Five of the six mesh erosions (83%) required a return to the operating room for excision.</td>
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Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Experimental 63 88 **Control** 41 82 **Continence status** **Events** **Total** **Experimental** 73 88 **Control** 62 82 **Peri-operative adverse effects** **Events** **Total** **Experimental** 7 88 **Control** 0 82 **Post-operative adverse effects** **Events** **Total** **Experimental** 11 88	Reported observed denominators for each outcome vary as follows. Patient satisfaction measured with PGI-I: TOT = 75, TVT = 82 Patient satisfaction measured with ISI: TOT = 77, TVT = 85 Incontinence episodes measured with bladder diary: TOT = 64, TVT = 70 Continence status measured with cough stress test: TOT = 71, TVT = 79 Adverse effect - urinary retention: TOT = 77, TVT = 85 Where more than one measure for an outcome was reported, the measure reporting the lowest effect was included in the meta-anaylsis (to produce an underestimate of effect).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Control 13 82	
Full citation Araco,F., Gravante,G., Sorge,R., Overton,J., De,VitaD, Sesti,F., Piccione,E., TVT-O vs TVT: A randomized trial in patients with different degrees of urinary stress incontinence, International urogynecology journal and pelvic floor dysfunction, 19, 917-926, 2008 **Ref Id** 135971 **Country/ies where the study was carried out** Italy **Study type** Randomised controlled trial **Aim of the study** "We compared TVT-O with TVT in SUI1 and SUI2 patients to evaluate the efficacy of both techniques, the eventual urodynamic changes and complications rates in each subgroup of	**Sample size** N = 240 TVT-O (transobturator inside out) = 120 TVT (bottom-up tension-free vaginal tape) = 120 **Characteristics** Gender – Female/N (% female) 240/240 (100%) Age (years) - Mean ± SD TVT-O SUI1 = 53.2 ± 4.9 TVT-O SUI2 = 54.0 ± 5.1 TVT SUI1 = 53.6 ± 3.4 TVT SUI2 = 54.5 ± 7.9 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI (years) – Mean ± SD TVT-O SUI1 = 4.4 ± 1.1 TVT-O SUI2 = 5 ± 1.4 TVT SUI1 = 4.8 ± 1.9 TVT SUI2 = 5 ± 1.7 Detrusor overactivity – n/N (%) Not reported	**Interventions** TVT-O procedure was performed using the TVT Obturator System (Gynecare Ethicon, Somerville, NJ, USA). TVT procedure was performed using the TVT kit (Gynecare Ethicon, Somerville, NJ, USA).	**Details** Two surgeons performed the procedures within an inpatient setting, both of whom had previously performed more than 40 TVT-O and TVT each. Oral anticoagulants were discontinued 7 days before surgery where appropriate. NICE guidelines were adopted for preoperative testing, Standard prophylaxis measures of deep vein thrombosis and infections were implemented. All patients underwent spinal anaesthesia. No additional doses of antibiotics were administered unless an infection or an intra-operative complication was present. Ketorolac was usually given on patient's request as an analgesic. Early mobilisation was encouraged 1–3 h postoperatively, and elastic bands or garments were maintained for 6–12 h postoperatively.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Episodes of incontinence: Not reported Continence status at 12 months Scale used – "Incontinence **cure** was evaluated with the postoperative ambulatory urodynamic tests 1 year after and failures defined as the persistency of SUI on that occasion." TVT-O SUI1 = 50/50 (100%) TVT-O SUI2 = 33/50 (66%) TVT SUI1 = 50/50 (100%) TVT SUI2 = 58/58 (100%) Incontinence-specific quality of life at 12 months Scale used - Incontinence Quality of Life Questionnaire (I-QOL) - Mean ± SD (N) TVT-O SUI1 = 104 ± 6.3 (50) TVT-O SUI2 = 73 ± 31.0 (50) [this is as reported in paper but SD of 31.0 seems out of keeping with other reported SDs] TVT SUI1 = 96 ±5.7 (50) TVT SUI2 = 104 ±5.8 (58) Adverse effects of treatment **Peri-operative**	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: "two surgeons explained experimental nature of the trial, obtained the informed consent signed and presented 2 identical closed envelopes to patients, one containing the paper 'TVT' and the other 'TVT-O'. After choosing and opening of the envelope, further stratification was performed with a sampling chart." A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes Level of bias: unclear B Performance bias B1 - Did groups get same level of care: yes B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: no Level of bias: unclear C Attrition bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
patients." **Study dates** January 2004 to March 2007 **Source of funding** Not reported	<u>Incontinence-specific quality of life</u> Scale used - Incontinence Quality of Life Questionnaire (I-QOL) - Mean ± SD (N) TVT-O SUI1 = 54 ± 13.5 (50) TVT-O SUI2 = 32 ± 7.3 (50) TVT SUI1 = 52 ± 16.5 (50) TVT SUI2 = 32 ± 7.3 (58) **Inclusion criteria** 1] Symptomatic SUI grade 1 (loss of urine during excessive strains) and grade 2 (loss of urine during minor strains) **Exclusion criteria** 1] SUI grade 3 (loss of urine at rest) 2] Overactive bladder 3] Associated prolapses 4] Neurovegetative disorders 5] Recurrent SUI 6] Rehabilitative or medical therapies for SUI (i.e. pelvic floor muscle training or duloxetine)		Urinary catheter was removed 6–12 h after surgery. After removal, if a urinary residual greater than 100cc was present, the patient performed intermittent catheterisation. If she still failed to resume normal voiding after 3 weeks, a permanent bladder obstruction was considered and tape resection planned. Patients without complications were discharged 24 h after the operation. **Power calculation** Sample size of the study was determined assuming a significance level (α) of 0.05 and a desired power of the experiment of 87–90% (87%: drop-out of 25%, 90% absence of drop-out). For all these reasons, the study enrolled 240 subjects. **Intention to treat analysis** Not reported	Bladder obstructions* TVT-O SUI1 = 0/50 (0%) TVT-O SUI2 = 0/50 (0%) TVT SUI1 = 12/50 (24%) TVT SUI2 = 0/58 (0%) Vaginal perforations TVT-O SUI1 = 2/50 (4%) TVT-O SUI2 = 4/50 (8%) TVT SUI1 = 0/50 (0%) TVT SUI2 = 0/58 (0%) Bladder perforations TVT-O SUI1 = 0/50 (0%) TVT-O SUI2 = 0/50 (0%) TVT SUI1 = 1/50 (2%) TVT SUI2 = 2/58% (3%) Haematomas TVT-O SUI1 = 0/50 (0%) TVT-O SUI2 = 0/50 (0%) TVT SUI1 = 3/50 (6%) TVT SUI2 = 3/58 (6%) **Post operative** Detrusor overactivity TVT-O SUI1 = 2/50 (4%) TVT-O SUI2 = 1/50 (2%) TVT SUI1 = 2/50 (4%) TVT SUI2 = 0/58 (0%) Re-catheterisations TVT-O SUI1 = 8/50 (16%) TVT-O SUI2 = 9/50 (18%) TVT SUI1 = 7/50 (14%) TVT SUI2 = 8/58 (14%) Vaginal erosions TVT-O SUI1 = 2/50 (4%) TVT-O SUI2 = 1/50 (2%)	C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes - 100/120 in TVT-O and 108/120 in TVT were assessed at 12 month follow up Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: unclear exactly which urodynamic measures were used to determine incontinence cure D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: No Intervention: No Outcome: Unclear exactly which urodynamic measures were used to determine incontinence cure (continence status)

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<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
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<td>TVT SUI1 = 0/50 (0%)
TVT SUI2 = 1/58 (2%)

Reoperations
TVT-O SUI1 = 0/50 (0%)
TVT-O SUI2 = 17/50 (34%)
TVT SUI1 = 15/50 (30%)
TVT SUI2 =4/58 (7%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures at 12 months</u>
Postvoid residual volume (ml) - Mean ± SD (N)
TVT-O SUI1 = 19 ± 15 (50)
TVT-O SUI2 = 20 ± 13 (50)
TVT SUI1 = 52 ± 44 (50)
TVT SUI2 = 19 ± 14 (50)

* Most common adverse effects in peri-operative and post-operative categories used in meta-analyses

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>108</td><td>120</td></tr><tr><td>Control</td><td>83</td><td>120</td></tr></table>
Peri-operative adverse effects</td>
<td>Other information

A stratified randomisation was carried out. Results are reported separately for SUI grade 1 and SUI grade 2 populations randomised to TVT-O or TVT. Patients were classified according to the SUI system on the basis of urodynamics studies (McGuire classification: SUI1 = abdominal leak-point pressure (ALPP) greater than 90cm water, SUI2 = ALPP of 60–90 cam water, SUI3 = intrinsic sphincter deficiency and ALPP less than 60 cm water).

208/240 completed follow up at 12 months: TVT-O = 100/120, TVT = 108/120

Reoperations:
In TVT/SUI1 group, 12 were conducted for bladder obstructions and 3 to drain haematomas.
In TVT/SUI2 group. 3 were to drain haematomas and 1 for cystoscopic resection of the tape that perforated the bladder during initial surgery.
In TVT-O/SUI2 group, 17 patients underwent TVT procedure due to failure of TVT-O to cure incontinence.</td>
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<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>12</td><td>108</td></tr>
<tr><td>Control</td><td>0</td><td>100</td></tr>
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Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>19</td><td>108</td></tr>
<tr><td>Control</td><td>17</td><td>100</td></tr>
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<td>Results for SUI1 and SUI2 subgroups were pooled for meta-analysis as per Cochrane Handbook (http://www.cochrane.org.uk)

As I-QOL uses high scores to indicate better quality of life we have added a minus sign in the meta-analysis to account for this.</td>
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<td>Full citation

Freeman,R., Holmes,D., Hillard,T., Smith,P., James,M., Sultan,A., Morley,R., Yang,Q., Abrams,P., What patients think: Patient-reported outcomes of retropubic versus trans-obturator mid-urethral slings for urodynamic stress incontinence-a multi-centre randomised controlled trial, International urogynecology journal and pelvic floor dysfunction, 22, 279-286, 2011</td>
<td>Sample size

N = 193

TVT (bottom-up tension-free vaginal tape) = 93
TOT (transobturator outside in) = 100

Characteristics

Gender – Female/N (% female)
193/193 (100%)

Age (years)- Median (interquartile range)</td>
<td>Interventions

TOT (Monarc, American Medical Systems) and TVT (Gynecare) were performed using standard techniques for both procedures, as agreed by all investigators.</td>
<td>Details

Patients had a choice of local, regional or general anaesthetic. Antibiotic and venous thromboembolism prophylaxes were provided in all cases.

Patients were discharged when they were voiding volumes of > 200 ml with post-void residuals of < 100 ml.

Power calculation

"The proportion of subjects in the TVT arm expecting</td>
<td>Results

Patient satisfaction with treatment at 12 months
Scale used – Patient Global Impression of Improvement (PGI-I)

Very much better
TVT = 58/85 (68.2%)
TOT = 56/95 (58.9%)

Much better
TVT = 13/85 (15.3%)
TOT = 20/95 (21.1%)

A little better
TVT = 7/85 (8.2%)
TOT = 3/95 (3.2%)</td>
<td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

A Selection bias
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: yes
A3 - Were groups comparable at baseline: yes
Level of bias: low

B Performance bias
B1 - Did groups get same level of care: yes</td>
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Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 136054 **Country/ies where the study was carried out** UK **Study type** Randomized controlled trial **Aim of the study** "To use patient-report outcomes to determine if the trans-obturator MUS was equivalent (but not inferior) to the retropubic MUS in a randomised controlled trial." **Study dates** Not reported **Source of funding** "Independent research commissioned by the National Institute for Health Research (NIHR)".	TVT = 50 (44 – 60) TOT = 54 (45 – 59) <u>Incontinence episodes/day – Median (interquartile range)</u> TVT = 7 (6 – 8) TOT = 7 (6 – 9) <u>Duration of SUI</u> Not reported <u>Detrusor overactivity – n/N (%)</u> Not reported <u>Mixed incontinence - n/N (%)</u> Not reported **Inclusion criteria** 1] Women over age 21 years with urodynamic stress incontinence or mixed urinary incontinence where SUI was predominant symptom 2] Failed pelvic floor muscle training 3] Willing and able to complete a 4-day urinary diary **Exclusion criteria** 1] Women with		cure at 12 months is 82%. Assuming that the TOT group showed 15% or less difference in the primary outcome when compared to the TVT group, then a clinically equivalent rate of cure would be accepted. Using a statistical power of 80% (1-β) and a one-sided significant level of 0.05 (α), the sample size was calculated as 160, basing on a two-group large sample normal approximation test of proportion, 80 for each group. Anticipating a 10% loss to follow-up, the target sample size was 180. **Intention to treat analysis** "The analysis and outcome measures were by 'intention to treat'".	**No change** TVT = 2/85 (2.4%) TOT = 4/95 (4.1%) **A little worse** TVT = 1/85 (1.2%) TOT = 0/95 (0%) **Much worse** TVT = 0/85 (0%) TOT = 1/95 (1.1%) **Very much worse** TVT = 0/85 (0%) TOT = 0/95 (0%) **Missing data** TVT = 4/85 (4.7%) TOT = 11/95 (11/6%) <u>Self reported rate of absolute symptom reduction per day</u> Episodes of incontinence Not reported <u>Continence status at 12 months</u> Scale used – International Consultation on Incontinence Modular Questionnaire - Female Urinary Tract Symptoms (ICIQ-FLUTS) "'Cured' being defined as the answer 'no' to the ICIQ-FLUTS question 'does urine leak when you are physically active, exert yourself, cough or sneeze?' Possible answers are 'no' (i.e. never) or 'yes' (i.e. occasionally, sometimes, most of the time, all of the time)."	B2 - Were participants blinded: yes B3 - Were clinical staff blinded: surgeons - not possible; ward staff - yes Level of bias: low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: unclear C3 - Were groups comparable for missing data: unclear - denominators for each outcome vary slightly Level of bias: unclear <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: unclear **Indirectness** Population: Inclusion criteria state women with MUI were included but numbers not reported. Intervention: No.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	neurological disease 2] Previous surgery for urodynamic stress incontinence (those with previous prolapse surgery were not excluded) 3] Urodynamic detrusor overactivity or low compliance 4] Postvoid residual volume > 100 ml on two occasions 5] Pregnant within last 3 months or planning pregnancy during study period 6] Inguinal or vulval mass 7] Lymphadenopathy or abscess or history of hidradenitis suppurativa 8] Bleeding diathesis or current anticoagulation therapy 9] Pelvic organ prolapse extending beyond the hymen			**Cured** TOT = 59/93 (63.4%)* TVT = 55/84 (65.5%)* **Not cured** TOT = 34/93 (36.6%)* TVT = 29/84 (34.5%)* * N not reported; calculated from combining n reported for cured and not cured <u>Incontinence-specific quality of life at 12 months - Mean (range)</u> Scale used - International Consultation on Incontinence Modular Questionnaire - Female Lower Urinary Tract Symptoms (ICIQ-FLUTS) question "Overall, how much do urinary symptoms affect your everyday life?" Not at all (0), a great deal (10). TOT = 3.1 (1-10) (N = 91) TVT = 3.3 (1-8) (N = 83) <u>Adverse effects of treatment**</u> **Peri-operative** Bladder perforation TOT = 0/100 TVT = 2/92 Vaginal skin perforation TOT= 4/100 TVT = 0/92 Groin pain** TOT= 8/100 TVT = 1/92 **Post-operative**	Outcome: No. **Other information** Women with urodynamic stress incontinence or mixed urinary incontinence where stress urinary incontinence was predominant symptom were included. The number of women with MUI in each group was not reported. One patient withdrew from the TVT group before surgery. 180/193 (93.3%) were followed up at 12 months; TOT = 95/100 (95%), TVT = 85/93 (91.4%). Overall urgency was not improved by either procedure, as 74.7 % of the TOT group and 82.4% of the TVT group reported urgency at 12 months (measured by response to ICIQ-FLUTS question "Do you have a sudden need to rush to the toilet to urinate?"). The only within-group difference was an increase in those who did not have urgency in the TOT group (11% at baseline increasing to 23.2% at 12 months; McNemar's test $P < 0.01$).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Removal of tape for pain TOT= 1/100 TVT = 0/92 Tape extrusion TOT= 3/100 TVT = 2/92 Voiding difficulty requiring catheterisation** TOT= 5/100 TVT = 5/92 Required ISC at 4 weeks [no definition of ISC given] TOT= 4/100 TVT = 3/92 Required ISC at 12 months [no definition of ISC given] TOT= 2/100 TVT = 1/92 Urinary tract infection requiring antibiotics TOT= 2/100 TVT = 7/92 De novo overactive bladder symptoms TOT= 4/100 TVT = 4/92 Wound infections TOT= 2/100 TVT = 0/92 Vaginal infection/discharge TOT= 4/100 TVT = 0/92	

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

** Most common adverse effects in peri-operative and post-operative categories used in meta-analyses

Patient satisfaction with treatment
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>71</td><td>93</td></tr>
<tr><td>Control</td><td>76</td><td>100</td></tr>
</table>
Continence status
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>55</td><td>93</td></tr>
<tr><td>Control</td><td>59</td><td>100</td></tr>
</table>
Peri-operative adverse effects
</td><td></td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>1</td><td>92</td></tr>
<tr><td>Control</td><td>8</td><td>100</td></tr>
</table>
Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>5</td><td>92</td></tr>
<tr><td>Control</td><td>5</td><td>100</td></tr>
</table>
</td><td></td></tr>
<tr><td>Full citation

Tseng,L.-H., Wang,A.C., Lin,Y.-H., Li,S.-J., Ko,Y.-J., Randomized comparison of the suprapubic arc sling procedure vs tension-free vaginal taping for stress incontinent women, International Urogynecology Journal, 16, 230-235, 2005

Ref Id

155642

Country/ies where the study was carried out</td><td>Sample size

N = 62

SPARC (retropubic top-down) = 31
TVT (bottom-up tension-free vaginal tape) = 31

Characteristics

<u>Gender - Female/N (%)</u>
62/62 (100%)

<u>Age (years) - Mean ± SD</u>
SPARC = 50.43 ± 11.15
TVT = 51.57 ± 12.45

<u>Incontinence</u></td><td>Interventions

SPARC procedures were performed as described by Plzak and Staskin (2002) using SPARC devices manufactured by American Medical Systems (Minnetonka, MN, USA)

TVT procedures were performed as described by Ulmsten et al</td><td>Details

Procedures were performed under regional or local anaesthesia.

Anterior colporrhaphy with or without posterior colporrhaphy was performed in women with symptomatic vaginal prolapse. Vaginal total hysterectomy with or without sacrospinous ligament fixation was performed for those with pelvic prolapse greater than ICS stage II.

All patients underwent</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of symptom reduction per day</u>
Episodes of incontinence:
Not reported

Episodes of urgency:
Not reported

<u>Continence status</u>
Scale used - "Objective cure was defined as pad weight 1g or less; patients whose loss decreased to less than half of the preoperative value were considered improved"</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: unclear
A3 - Were groups comparable at baseline: yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: unclear</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Taiwan **Study type** Randomized controlled trial **Aim of the study** "To compare the surgical outcomes of these two continence taping procedures [TVT and SPARC] and to determine whether a finer and downward pass SPARC needle caused less iatrogenic injury" **Study dates** October 2001 to April 2002 **Source of funding** Not reported	<u>episodes/day - Mean ± SD</u> Not reported <u>Duration of SUI (years) - Mean ± SD</u> Not reported <u>Detrusor overactivity - n/N (%)</u> Not reported **Inclusion criteria** 1] Genuine stress incontinence alone or combined with pelvic prolapse **Exclusion criteria** 1] Pelvic prolapse greater than stage II of the International Continence Society grading system 2] Previous anti-incontinence surgery	(1995) using devices manufactured by Gynecare (Ethicon, Somerville, NJ, USA)	routine suprapubic ultrasonography for detecting unrecognised subcutaneous or retropubic haematoma on the day immediately after the operation. No catheterisation was instituted postoperatively except in those patients for whom concurrent vaginal repair was undertaken. In these patients, catheters were removed on the third postoperative day. Sterile, intermittent catheterisation was offered every 4 hours for women without an indwelling catheter when they left the operating room. Patients were discharged once the amount of postvoid residuals was less than 20% of that from self-voiding consecutively four times. **Power calculation** Since one of the study objectives was to determine the difference in iatrogenic injury rate, the cystotomy rate was used to calculate sample size. Two (20%) bladder perforations occurred in a pilot study of 10 SPARC procedures.	**Cured** SPARC = 25/31 (80.7%) TVT = 27/31 (87.1%) **Improved** SPARC = 6/31 (19.3%) TVT = 4/31 (12.9%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Bladder injury SPARC = 4/31 (12.9%) TVT = 0/31 (0%) Retrpubic haematoma SPARC = 3/31 (9.7%) TVT = 5/31 (16.1%) Rejection of tape SPARC = 1/31 (3.2%) TVT = 2/31 (6.5%) **Post-operative** Defective vaginal wound healing SPARC = 1/31 (3.2%) TVT = 3/31 (9.7%) Protrusion of tape edge SPARC = 1/31 (3.2% TVT = 4/31 (12.9%) Nocturia SPARC = 2/31 (6.5%) TVT = 1/31 (3.2%) Frequency SPARC = 5/31 (16.1%)	B2 - Were participants blinded: yes B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Population: None Intervention: Percentage of study population undergoing concomitant surgery not reported Outcome: Continence status

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Perforation rate for TVT was only 0.8% in a series of 600 cases. To detect a 19.2% difference (20-0.8), with a significance level of 0.05 and power of 0.8, at least 28 participants in each group were required.

Intention to treat analysis

Not reported</td>
<td>TVT = 3/31 (9.7%)

Urgency
SPARC = 5/31 (16.1%)
TVT = 3/31 (9.7%)

Urge incontinence
SPARC = 5/31 (16.1%)
TVT = 2/31 (6.5%)

Dysuria
SPARC = 1/31 (3.2%
TVT = 0/31 (0%)

Incomplete voiding
SPARC = 10/31 (32.3%)
TVT = 6/31 (19.4%)

Strain to void
SPARC = 3/31 (9.7%)
TVT = 2/31 (6.5%)

Post-micturition dribble
SPARC = 4/31 (12.9%)
TVT = 0/31 (0%)

<u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Continence status

<table><tr><th></th><th>Events</th><th>Total</th></tr></table></td>
<td>was defined as pad weight of 1g or less. Unclear when continence status outcome was measured. Follow-up was performed at 1, 6, 12 and 24 months.

Other information

Rate of bladder perforation in TVT case series, used in power calculation, seems low compared to rates reported in other studies included in this question.

All procedures performed by one surgeon.

Authors state exclusion criteria as "pelvic prolapse greater than stage II of ICS"; however in methods authors state "vaginal total hysterectomy... was performed in those with pelvic prolapse greater than ICS stage II"</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Experimental</td><td>27</td><td>31</td></tr>
<tr><td>Control</td><td>25</td><td>31</td></tr>
</table>
Peri-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>5</td><td>31</td></tr>
<tr><td>Control</td><td>3</td><td>31</td></tr>
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Post-operative adverse effects
<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>6</td><td>31</td></tr>
<tr><td>Control</td><td>10</td><td>31</td></tr>
</table>
</td><td></td></tr>
<tr><td>Full citation

Wang,Y.J., Li,F.P., Wang,Q., Yang,S., Cai,X.G., Chen,Y.H., Comparison of three mid-urethral tension-free tapes (TVT, TVT-O, and TVT-Secur) in the treatment of female stress urinary</td><td>Sample size

N = 102

TVT = 32
TVT-O = 36
TVT-Secur = 34

Characteristics</td><td>Interventions

TVT was performed as described by Ulmsten et al.

TVT-O was performed as described by De</td><td>Details

During the U procedure, 50mL normal saline was injected into the bladder before withdrawing the inserter. This was then retracted and observed for blood. If blood was observed a cystoscopy was ordered to</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status at 12 months</u></td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: Yes - computer</td></tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
incontinence: 1-year follow-up, International urogynecology journal and pelvic floor dysfunction, 22, 1369-1374, 2011 **Ref Id** 188102 **Country/ies where the study was carried out** China **Study type** Randomized controlled trial **Aim of the study** To compare the efficacy and possible post-operative complications of the TVT-Secur with TVT and TVT-O procedures **Study dates** October 2008 to December 2009 **Source of funding** No funding reported	Gender – Female/N (% female) 102/102 (100%) Age (years)- Mean ± SD TVT = 56.6 ± 9.6 TVT-O = 56.0 ± 9.1 TVT-Secur = 57.3 ± 9.5 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI(years) – Mean ± SD TVT = 6.1 ± 5.5 TVT-O = 4.4 ± 3.6 TVT-Secur = 4.8 ± 4.4 Detrusor overactivity – n/N (%) Not reported **Inclusion criteria** Not reported **Exclusion criteria** 1] previous surgical procedure for SUI	Leval. For TVT-Secur the hammock position was selected for patients with a higher ALPP (≥ H2O) and were performed as recommended by the manufacturer or as described by Tartaglia. All procedures were performed by experienced surgeons who had received the appropriate training.	identify any bladder injury. Unlike TVT or TVT-O, the TVT-Secur was inserted as close to the urethra as possible to maintain the necessary pull-out force between the two ends. **Power calculation** A sample-size calculation showed objective cure rates for SUI, which included 90% for TVT and 88% for TVT-O and assuming a cure rate of 55% for TVT-Secur, 90 patients would be needed (30 in each group) to detect a difference of 35% in cure rates among the three procedures with 90% power and α value of 0.05. Assuming a drop-out rate of 20% study aimed to recruit 108 patients in total. **Intention to treat analysis** Not reported	Negative cough stress test and the absence of urine leak by patients report - n/N (%) TVT = 30/32 (93.8%) TVT-O = 33/36 (91.7%) TVT-Secur = 23/34 (76.6%) Incontinence-specific quality of life at 12 months Not reported Adverse effects of treatment Bladder perforation TVT = 1/32 (3.1%) TVT-O = 0/36 (0%) TVT-Secur = 1/34 (2.9%) Patients with > 100ml blood loss TVT = 2/32 (6.3%) TVT-O = 1/36 (2.8%) TVT-Secur = 0/34 (0%) Complete retention TVT = 1/32 (3.1%) TVT-O = 1/36 (2.9%) TVT-Secur = 0/34 (70%) Thigh pain TVT = 0/32 (0%) TVT-O = 5/36 (13.9%) TVT-Secur = 0/34 (0%) Psychological outcomes Not reported Clinical measures Not reported	generated A2 - Was there adequate concealment: Yes - Seale, opaque envelopes used A3 - Were groups comparable at baseline: yes Level of bias: low B Performance bias B1 - Did groups get same level of care: Yes B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: Yes C2 - Were groups comparable for dropout: Yes C3 - Were groups comparable for missing data: Yes Level of bias: low D Detection bias D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: Unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Indirectness Does the study match teh review protocol in terms of: Population: No - no inclusion criteria listed Intervention: Yes Outcome: Yes - continence status measured by cough stress test and patient report Indirectness - Some **Other information**
Full citation Barber,M.D., Weidner,A.C., Sokol,A.I., Amundsen,C.L., Jelovsek,J.E., Karram,M.M., Ellerkmann,M., Rardin,C.R., Iglesia,C.B., Toglia,M., Single-incision mini-sling compared with tension-free vaginal tape for the treatment of stress urinary incontinence: A randomized controlled trial, Obstetrics and gynecology, 119, 328-337, 2012	**Sample size** N = 263 TVT = 127 TVT-Secur = 136 **Characteristics** <u>Gender – Female/N (% female)</u> 263/263 (100%) <u>Age (years)- Mean ± SD</u> TVT = 54.6 <u>±</u> 11.3 TVT-Secur = 54.6 <u>±</u> 10.5	**Interventions** TVT was performed using the vaginal or 'bottom-up' approach recommended by the manufacturer (Ethicon) with tension set free so a spacer could be placed between the sling and the urethra. TVT-Secur was used by the	**Details** All patients underwent intra-operative cystoscopy at the end of the procedure. Peri-operative care and pain management were performed as per the routine at the study site. **Power calculation** Assuming a subjective cure rate for TVT of 82%, 127 individuals in each group would provide 80% to reject the null hypothesis that the	**Results** <u>Patient satisfaction with treatment at 12 months</u> Scale used – Patient Global Impression of Improvement (PGI-I). "Patient-reported success rate defined as 'Very much improved' or 'Much improved'" TVT = 91/127 (71.7%) TVT-Secur = 87/136 (64.0%) <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 12 months</u> Subjective cure = "incontinence	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation: yes - computer-generated A2 - Was there adequate concealment: yes - sealed opaque envelopes used A3 - Were groups comparable at baseline: yes Level of bias: low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 188330 **Country/ies where the study was carried out** United States **Study type** Randomized controlled trial **Aim of the study** 'To compare efficacy of a single-incision mini-sling placed in the "U" position with retropubic TVT in the treatment of SUI in patients with and without concurrent pelvic organ prolapse' **Study dates** August 2007 to March 2010 **Source of funding** Foundation for Female Health Awareness	<u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u> TVT = 0/127 (0%) TVT-Secur = 0/136 (0%) <u>Mixed urinary incontinence - n/N (%)</u> Not reported per group but overall mixed UI = 63% **Inclusion criteria** 1] > 21 years of age 2] multi-channel urodynamic proven SUI 3] desired surgical treatment for incontinence **Exclusion criteria** 1] urodynamic proven detrusor overactivity 2] postvoid residual volume > 100mL 3] history of previous synthetic, biologic, or fascial suburethral sling surgery	retropubic 'U' approach with tension set tightly.	true difference in cure rates between the two procedures is less than or equal to 12% in favour of the alternate hypothesis. Assuming a 10% loss to follow up or drop-out rate for the duration of the study, the total enrolment goal was 280. **Intention to treat analysis** Reports on intention to treat (ITT) analysis for primary and secondary outcomes but no details given.	severity index score = 0 (dry) and no retreatment for stress incontinence" TVT = 77/127 (60.6%) TVT-Secur = 77/136 (56.6%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Bladder injury* TVT = 6/127 (4.7%) TOT-Secur = 1/136 (0.8%) Blood transfusion needed TVT = 1/127 (0.8%) TVT-Secur = 0/136 (0%) **Post-operative** Mesh erosion TVT = 1/127 (0.08%) TVT-Secur = 0/136 (0%) Tape release / reoperations* TVT = 7/127 (5.5%) TVT-Secur = 4/136 (2.9%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported * Most common adverse effects in peri-operative and post-operative categories used in meta-analyses **Patient satisfaction with**	<u>B Performance bias</u> B1 - Did groups get same level of care: Yes B2 - Were participants blinded: yes - sham incisions made B3 - Were clinical staff blinded: Unclear Level of bias: low <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes - postoperative assessment at 1 year performed by clinician blinded to intervention D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Does the study reflect the review protocol in terms of:

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td></td>
<td>4] desires future childbearing
5] currently using anticoagulation therapy or had a known bleeding diathesis
6] had a current urethral diverticulum or fistula of the lower urinary tract
7] another contraindication for surgery</td>
<td></td>
<td></td>
<td>treatment
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>91</td><td>127</td></tr><tr><td>Control</td><td>87</td><td>136</td></tr></table>Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>77</td><td>127</td></tr><tr><td>Control</td><td>77</td><td>136</td></tr></table>Peri-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>6</td><td>127</td></tr><tr><td>Control</td><td>1</td><td>136</td></tr></table>Post-operative adverse effects</td>
<td>Population: No - Included women with MUI and women with previous incontinence surgery

Intervention: Yes

Outcome: No - Continence status was subjective and no objective cure rates given

Indirectness: Serious

Other information</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
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<table>
<tr><th></th><th>Events</th><th>Total</th></tr>
<tr><td>Experimental</td><td>7</td><td>127</td></tr>
<tr><td>Control</td><td>4</td><td>136</td></tr>
</table>
</td><td></td></tr>
<tr><td>Full citation

Hota,L.S., Hanaway,K., Hacker,M.R., Disciullo,A., Elkadry,E., Dramitinos,P., Shapiro,A., Ferzandi,T., Rosenblatt,P.L., TVT-Secur (Hammock) versus TVT-Obturator: a randomized trial of suburethral sling operative procedures, Female pelvic medicine & reconstructive surgery, 18, 41-45, 2012

Ref Id

188440

Country/ies where the study was carried out

USA

Study type

Randomized controlled trial

Aim of the study

To compare objective</td><td>Sample size

N = 86

TVT-Secur (single incision) = 42
TVT-Obturator (transobturator inside out) = 44

Characteristics

<u>Gender – Female/N (% female)</u>
87/87 (100%)

<u>Age (years)- median (interquartile range)</u>
TVT-Secur = 52.0 (45.0 – 62.0)
TVT-O = 50.5 (45.5 – 60.0)

<u>Incontinence episodes/day – Mean ± SD</u>
Not reported

<u>Duration of SUI – Mean ± SD</u></td><td>Interventions

TVT-Secur "hammock method" (Ethicon Women's Health & Urology, Somerville, NJ, USA)

TVT-Obturator (Ethicon Women's Health & Urology, Somervile, NJ, USA)</td><td>Details

Women with urodynamic SUI and symptomatic prolapse underwent a suburethral sling procedure with concomitant prolapse repair procedure, determined by the surgeon.

Women undergoing sling procedure alone had a weight lifting restriction of 5lb for 2 weeks after surgery, women undergoing concomitant procedures for prolapse had a 10-week restriction period.

Power calculation

Authors hypothesised that one of the procedures would be successful for 80% of women while the other would be successful for 95% of women. Using a one-sided test the sample size required to have 80% power to detect this effect size with</td><td>Results

<u>Patient satisfaction with treatment</u>
Not reported

<u>Self reported rate of absolute symptom reduction per day</u>
Not reported

<u>Continence status</u>
defined as a negative cough stress test
TVT-S: 11/42 (26.2%)
TVT-O: 20/44 (45.5%)

<u>Incontinence-specific quality of life - Median (Interquartile range)</u>
Scale used = PFIQ change score at 12 months
TVT-S: 33.3 (7.6 - 42.9)
TVT-O: 23.8 (14.3 - 42.8)

<u>Adverse effects of treatment</u>
Peri-operative
Not reported

Post-operative
Tape exposure
TVT-S: 8/42 (19.1%)
TVT-O: 0/44 (0%)</td><td>Limitations

NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials

<u>A Selection bias</u>
A1 - Was there appropriate randomisation: yes
A2 - Was there adequate concealment: yes
A3 - Were groups comparable at baseline: yes
Level of bias: low

<u>B Performance bias</u>
B1 - Did groups get same level of care: unclear
B2 - Were participants blinded: no
B3 - Were clinical staff blinded: no
Level of bias: unclear

<u>C Attrition bias</u>
C1 - Was follow-up equal for both groups: unclear
C2 - Were groups comparable for dropout: yes
C3 - Were groups comparable</td></tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>outcomes, as well as changes in quality of life, after TVT-O and TVT-S ("Hammock" method) for the treatment of SUI

Study dates

May 2007 to April 2009

Source of funding

Support from Harvard Catalyst, The Harvard Clinical and Translational Science Center (National Institutes of Health Award No. UL1 RR 025758 and financial contributions from Harvard University and its affiliated academic health care centers. Financial support was obtained from Ethicon Women's Health & Urology, a division of Ethicon Inc, a Johnson & Johnson Company, as an investigator-initiated study.</td>
<td>Not reported

<u>Detrusor overactivity – n/N (%)</u>
Not reported

Inclusion criteria

1] History of SUI with a demonstrable impact of SUI as seen on quality of life questionnaires
2] Positive cough stress test during urodynamic testing

Exclusion criteria

1] Intrinsic sphincter deficiency (maximum urethral closure pressure < 20cm H_2O)
2] Previous suburethral sling
3] Predominant overactive bladder symptoms
4] Planning a pregnancy
5] Elevated postvoid residual volume >100ml
6] Bleeding condition or undergoing anticoagulent therapy
7] Immunosuppression
8] Progressive neurological disease
9] Evidence of systemic infection</td>
<td></td>
<td>α = 0.05 was 67 women in each treatment arm. The sample size was increased by six in each group to account for loss to follow up.

Intention to treat analysis

Authors report intention to treat results (unclear when measured) and per protocol results at 1 year</td>
<td><u>Psychological outcomes</u>
Not reported

<u>Clinical measures</u>
Not reported

Continence status
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>11</td><td>42</td></tr><tr><td>Control</td><td>20</td><td>44</td></tr></table>
Post-operative adverse effects
<table><tr><th></th><th>Events</th><th>Total</th></tr><tr><td>Experimental</td><td>8</td><td>42</td></tr><tr><td>Control</td><td>0</td><td>44</td></tr></table></td>
<td>for missing data: unclear
Level of bias: unclear

<u>D Detection bias</u>
D1 - Was follow-up appropriate length: yes
D2 - Were outcomes defined precisely: yes
D3 - Was a valid and reliable method used to assess outcome: yes
D4 - Were investigators blinded to interventions: unclear
D5 - Were investigators blinded to confounding factors: unclear
Level of bias: low

Indirectness

Population:
Intervention:
Outcome:

Other information

Women included in the study were permitted to undergo concomitant procedures to treat prolapse and/or fecal incontinence.

Study was terminated early after poor interim analysis reported.</td>
</tr>
</table>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Scheiner,D.A., Betschart,C., Wiederkehr,S., Seifert,B., Fink,D., Perucchini,D., Twelve months effect on voiding function of retropubic compared with outside-in and inside-out transobturator midurethral slings, International urogynecology journal and pelvic floor dysfunction, 23, 197-206, 2012 **Ref Id** 188443 **Country/ies where the study was carried out** Switzerland **Study type** Randomized controlled trial **Aim of the study** To compare retropubic tension-free vaginal tape (TVT) with transobturator out-in (TOT) and in-out (TVT-O) for female stress urinary incontinence.	**Sample size** N = 160 TVT-O = 40 TOT = 40 TVT = 80 **Characteristics** Gender – Female/N (% female) 160/160 (100%) Age (years) - Mean ± SD TVT-O = 59.3 ± 12.1 TOT = 56.6 ± 10.3 TVT = 57.8 ± 13.0 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported Overactive bladder dry - n/N (%) TVT-O = 13/40 (32.5%) TOT = 9/40 (22.5%) TVT = 25/80 (31.3%)	**Interventions** Tension-free vaginal tape (TVT), transobturator outside-in (TOT), transobturator inside-out (TVT-O). Further details not reported.	**Details** Experienced gynaecologists performed the procedures according to the original methods (not described), preferably under analgesia and sedation. The first 10 procedures were observed by a urogynaecologist. Cefazolin or clindamycin (in case of penicillin allergy) was given as prophylactic single-shot antibiotic. Cystoscopy was mandatory for every procedure. To determine appropriate tape tension a cough test was performed, and Metzenbaum scissors were placed as a spacer between tape and urethra to ascertain a tension-free position. An indwelling catheter was placed in case of concomitant prolapse surgery, intraoperative bladder injury or increased intraoperative bleeding with need of intra-vaginal packing. **Power calculation**	**Results** Patient satisfaction with treatment at 12 months - n/N (%) "Patient's global impression of improvement (cured)" TVT-O = 29/27 (78.4%) TOT = 28/34 (82.4%) TVT = 57 (87.7%) Self reported rate of absolute symptom reduction per day Not reported Continence status at 12 months - n/N (%) "Both a negative cough (supine position) and a negative short-pad test [weight gain < 3g, performed with a bladder filling at 300ml" TVT-O = 33/37 (89.2%) TOT = 31/34 (91.2%) TVT = 58/65 (93.6%) Incontinence-specific quality of life at 12 months Scale used - Visual Analogue Scale on incontinence impact (0 = no urinary complaints, 10 = unbearable urinary complaints) - mean ± SD, N TVT-O = 1.3 ± 1.8, 28 TOT = 1.2 ± 1.7, 28 TVT = 0.7 ± 1.3, 47 Scale used - King's Health Questionnaire (higher scores,	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: Yes - computer generated A2 - Was there adequate concealment: Unclear - not reported A3 - Were groups comparable at baseline: Unclear - not reported Level of bias: B Performance bias B1 - Did groups get same level of care: unclear B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates January 2006 to October 2009 **Source of funding** "No funding received"	<u>Overactive bladder wet - n/N (%)</u> TVT-O = 3/40 (7.5%) TOT = 2/40 (5.0%) TVT = 8/80 (10.0%) <u>Incontinence-specific quality of life at baseline</u> Scale used - Visual Analogue Scale on incontinence impact (0 = no urinary complaints, 10 = unbearable urinary complaints) - mean ± SD, N TVT-O = 7.1 ± 2.6, 37 TOT = 7.7 ± 1.9, 38 TVT = 7.5 ± 2.1, 74 Scale used - King's Health Questionnaire (higher scores, greater impairment) General Health Perception - mean ± SD, N TVT-O = 33.6 ± 26.4, 37 TOT = 42.9 ± 24.7, 38 TVT = 36.1 ±21.8, 74 Scale used - King's Health Questionnaire (higher scores, greater impairment) Incontinence impact - mean ± SD, N TVT-O = 68.6 ± 31.3, 37 TOT = 82.9 ± 26.0, 38 TVT = 75.9 ± 24.5, 74		Equivalence for all techniques in regard to efficacy and continence was assumed, but fewer obstructions in the two transobturator approach groups (TVT-O and TOT). A postoperative Qmax of 25 and 30 ml/s (SD ± 10) in the TVT and transobtruator groups, respectively. Based on 0.8 power to detect this difference, a total of 200 patients was estimated (P = 0.05, two-sided). **Intention to treat analysis** Not reported	greater impairment) General Health Perception - mean ± SD, N TVT-O = 25.0 ± 2.08, 28 TOT = 22.3 ± 19.6, 28 TVT = 22.3 ± 18.4, 47 Scale used - King's Health Questionnaire (higher scores, greater impairment) Incontinence impact - mean ± SD, N TVT-O = 10.7 ± 18.6, 28 TOT = 11.9 ± 22.6, 28 TVT = 8.5 ± 14.7, 47 Scale used - King's Health Questionnaire (higher scores, greater impairment) Overactive bladder - mean ± SD, N TVT-O = 4.9 ± 14.5, 28 TOT = 5.2 ± 19.3, 28 TVT = 3.9 ± 13.0, 47 <u>Adverse effects of treatment</u> Bladder perforation TVT-O = 0/40 (0%) TOT = 0/40 (0%) TVT = 3/80 (3.75%) Vaginal perforation TVT-O = 4/40 (10%) TOT = 6/40 (15%) TVT = 1/80 (1.25 %) Haemorrhage TVT-O = 0/40 (0%) TOT = 0/40 (0%) TVT = 1/80 (1.25%)	<u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Does the study reflect the review protocol in terms of: Population: Yes. 38% of women had MUI (wet or dry OAB), 8% underwent concomitant surgery Intervention: Yes Outcome: Yes Indirectness: None **Other information** The trial was stopped early due to an unexpected occurrence of de novo female sexual dysfunction in TOT. Study therefore underpowered. Preoperatively conservative

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Scale used - King's Health Questionnaire (higher scores, greater impairment) Overactive bladder - mean ± SD, N TVT-O = 48.7 ± 39.6, 37 TOT = 44.6 ± 33.3, 38 TVT = 46.9 ± 31.7, 74 **Inclusion criteria** 1] Urodynamically confirmed SUI 2] Mixed urinary incontinence with predominant component of SUI 3] Women with concomitant sling insertion to prolapse repair were eligible **Exclusion criteria** 1] Missing urodynamic assessment 2] Previous sling procedure 3] Predominant overactive bladder syndrome 4] Post-void residual volume above 100 ml 5] Pregnancy or considering further pregnancy 6] Known or suspected			Tape loosening within first week TVT-O = 0/40 (0%) TOT = 1/40 (2.5%) TVT = 1/80 (1.25%) Tape release within 12 months by complete incision, including partial excision TVT-O = 1/40 (2.5%) TOT = 0/40 (0%) TVT = 2/80 (2.5%) Second sling insertion TVT-O = 0/40 (0%) TOT = 1/40 (2.5%) TVT = 1/80 (1.25%) Vaginal tape exposure TVT-O = 0/40 (0%) TOT = 4/40 (10%) TVT = 1/80 (1.5%) Thigh or groin pain TVT-O = 1/40 (2.7%) TOT = 3/40 (8.3%) TVT = 1/80 (1.5%) Female sexual dysfunction (in sexually active women; not associated with tape exposure) TVT-O = 0/25 (0%) TOT = 5/29 (17.2%) TVT = 1/52 (1.9%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	measures for SUI were recommended. Symptomatic cystocele stage 2 or higher according to POP-Q were corrected first. After excluding women with concomitant prolpase surgery, no statistically significant differences were found for either objective or subjective continence status outcomes. One woman undergoing TVT experienced haemorrhage in the retropubic space requiring laparotomy the next day. She received TOT 6 months later and became continent.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	coagulopathy 7] Known allergy to local anaesthetics 8] Unable to understand German 9] Unable or unwilling for follow up				
Full citation Masata,J., Svabik,K., Zvara,K., Drahoradova,P., El,Haddad R., Hubka,P., Martan,A., Randomized trial of a comparison of the efficacy of TVT-O and single-incision tape TVT SECUR systems in the treatment of stress urinary incontinent women--2-year follow-up, International Urogynecology Journal, 23, 1403-1412, 2012 **Ref Id** 215843 **Country/ies where the study was carried out** Czech Republic **Study type** Randomized controlled trial	**Sample size** N = 197 Transobturator Inside-Out (TVT-O) = 68 TVT-Secur (H) = 64 TVT-Secur (U) = 65 **Characteristics** Gender – Female/N (% female) 160/160 (100%) Age (years) - Mean ± SD TVT-O = 56.6 ± 9.7 TVT-Secur H = 55.2 ± 10.2 TVT-Secur U = 57.7 ± 10.1 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported	**Interventions** TVT-O was performed as decribed by de Leval 2003. To avoid excess tension during the plastic sheath removal, the Mayo scissors were placed between the tape and urethra. Cystoscopy was not routinely performed for these patients. The TVT-S was performed as per manufacturer's instructions. During placement in the H position, the needle driver and device were parallel to the pelvic floor and the device was rotated	**Details** All surgeries were preformed under general anaethetic with laryngeal mask airway. The patient was placed in the lithotomy position (90 degress between table and thigh) with a urethral catheter. Vaginal incision was initiated after infiltration with Supracain 4% (one 2ml ampoule diluted in 18ml of water). **Power calculation** The required sample based on 10% dropout rate was 72 per group. **Intention to treat analysis** Not reported	**Results** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 12 months</u> Derfined as positive stress test TVT-O = 64/68 (93.9%) TVT-Secur H = 50/64 (77.4%) TVT-Secur U = 45/65 (68.8%) <u>Incontinence-specific quality of life at 12 months</u> Not reported <u>Adverse effects of treatment</u> **Peri-operative** Bladder perforation* TVT-O = 0/68 (0%) TVT-Secur H = 1/64 (1.6%) TVT-Secur U = 0/65 (0%) Urethral injury TVT-O = 0/68 (0%) TVT-Secur H = 0/64 (0%) TVT-Secur U = 0/65 (0%)	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials <u>A Selection bias</u> A1 - Was there appropriate randomisation: yes A2 - Was there adequate concealment: Yes envelopes used A3 - Were groups comparable at baseline: yes Level of bias: low <u>B Performance bias</u> B1 - Did groups get same level of care: unclear B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: Some <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To compare the efficacy of the TVT-O and TVT-Secur systems in the treatment of stress urinary incontinent women **Study dates** January 2007 to November 2009 **Source of funding** Ministry of Health of the Czech Republic	Detrusor overactivity – n/N (%) Not reported **Inclusion criteria** 1] age > 18 years 2] signed informed consent 3] urodynamic stress urinary incontinence 4] agreement with post-operative follow-up **Exclusion criteria** 1] predominant urge incontinence 2] urodynamic detrusor instability 3] immobile urethra 4] previously failed anti-incontinence surgery 5] previous radiotherapy 6] post-void residual volume > 100ml 7] bladder capacity < 300ml 8] pelvic organ prolapse stage II or greater according to the ICSPOPQS 9] planned concomitant surgery 10] age < 18 years	with the inserter tip at an angle of 45% from the patient's midline towards the ischiopubic ramus. For the U position, the tip of the device was pointed upward, teh needlie driver was rotated for the sagittal midline to aim the device toward the ipsilateral shoulder		Vaginal wall perforation* TVT-O = 0/68 (0%) TVT-Secur H = 2/64 (3.1%) TVT-Secur U = 0/65 (0%) Urinary tract infection TVT-O = 6/68 (8.8%) TVT-Secur H = 3/64 (4.5%) TVT-Secur U = 4/65 (6.2%) **Post-operative** Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	for dropout: yes C3 - Were groups comparable for missing data: yes Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: No D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information**

What is the long-term effectiveness of surgical approaches for mid-urethral procedures in women undergoing their primary surgical tape procedure?

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Castillo-Pino,E., Sasson,A., Pons,J.E., Comparison of retropubic and transobturator tension-free vaginal implants for the treatment of stress urinary incontinence, International Journal of Gynaecology and Obstetrics, 110, 23-26, 2010 **Ref Id** 100575 **Country/ies where the study was carried out** Uruguay **Study type** Prospective cohort study **Aim of the study** To compare the surgical results and frequency of complications associated with two suburethral slings in the management of stress urinary incontinence in women - tension-free vaginal tape	**Sample size** N = 104 TVT = 55 TOT = 49 **Characteristics** Gender – Female/N (% female) 104/104 (100%) Age (years)- Mean (range) TVT = 50 (33 - 75) TOT = 51 (34 - 63) Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported Mixed urinary incontinence - n/N (%) TVT = 6/55 (11%) TOT = 6/49 (12%)	**Interventions** TVT (Johnson & Johnson, New Brunswick, NJ, USA) Safyre-t plus (Promedon, Cordoba, Argentina) was used in the TOT group	**Details** Participants were assigned to one of the non-randomised convenience samples - TVT or TOT. The operating room was equipped with an endoscope so that cystoscopy could be performed. All participants received a prophylactic dose of antibiotics. Depending on the surgical technique selected and the operative indications, the anaesthetic technique used was local plus midazolam, epidural or general. Participants were followed for 2 years. At each visit women were interviewed and underwent a stress test **Power calculation** Not reported **Intention to treat analysis** Not reported	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status at 24 months Scale used - objective cure rate = no leakage symptoms and negative stress test TVT = 45/55 (81.8%) Incontinence-specific quality of life Not reported Adverse effects of treatment Tape erosion TVT = 1/55 (1.82%) Retention Not reported Voiding dysfunction TVT = 10/55 (18.2%)	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? no loss to follow up

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
(TVT) and transobturator tape (TOT) **Study dates** March 2003 to December 2007 **Source of funding** Not reported	**Inclusion criteria** 1] Primary or recurrent urinary incontinence 2] Urethral hypermotility 3] Intrinsic urethral deficiency **Exclusion criteria** 1] Overactive bladder 2] Extra-urethral leakage 3] Coagulopathies 4] Urinary tract infections 5] Desire for future pregnancy 6] Contraindication for surgery			De novo OAB symptoms TVT = 10/49* (20%) * 49 women had pure SUI <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	7b. Was the follow up of subjects long enough? yes **Indirectness** Does the study match the review protocol in terms of Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** Data for TOT procedure not extracted as < 50 women in TOT group (see methodology chapter)
Full citation Meschia,M., Pifarotti,P., Bernasconi,F., Magatti,F., Vigano,R., Bertozzi,R., Barbacini,P., Tension-free vaginal tape (TVT) and intravaginal slingplasty (IVS) for stress urinary incontinence: a multicenter randomized trial, American Journal of Obstetrics and Gynecology, 195, 1338-1342, 2006 **Ref Id**	**Sample size** N = 95 **Characteristics** Gender -Female/N (% female) 95/95 (100%) Age (years)-Mean ± SD 56 ± 10 Incontinence episodes/day-Mean ± SD Not reported	**Interventions** Retropubic "bottom-up" was performed as described by Ulmsten 1996 The procedure was performed under local anaesthesia, with the use of 2 small abdominal incisions on each side of the mideline just above the pubic symphysis, with a small sagittal incision in	**Details** Post-operative evaluations were at 12 and 24 months. Assessments included onjective and subjective cure, operative factors and complications **Power calculation** N/A **Intention to treat analysis** N/A	**Results** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 36 months</u> Cure was defined as "no leakage of urine during a cough stress	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes 4. Was the exposure accurately measured to

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
100694 **Country/ies where the study was carried out** Italy **Study type** Randomised controlled trial **Aim of the study** Not reported **Study dates** January 2002 to December 2002 **Source of funding** Not reported	Duration of SUI-Mean ± SD Not reported Detrusor overactivity - n/N (%) 0/95 (0%) Number with OAB symptoms 35/95 (37%) **Inclusion criteria** 1] urodynamically proven stress urinary incontinence 2] urethral hypermobility **Exclusion criteria** 1] Previous anti-incontinence surgery 2] vaginal prolapse requiring treatment 3] coexisting pelvic pathology 4] known bleeding diathesis or concurrent anticoagulant therapy 5] detrusor overactivity 6] urethral hypomobility (Q-tip ≤ 20 degrees from the horizontal with straining)	the midline of the anterior vaginal wall approximately equal to 1cm below the external urethral meatus. As recommended the Mayo scissors were used as a spacer between the tape and the urethra during positioning and tensioning of the tape.		test, with at least 300ml of saline solution in the bladder and a pad weight gain less than 1gm during the 1-hour test" Cured = 78/95 (83%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> Tape erosion 0/95 (0%) Retention 9/95 (9.5%) Voiding dysfunction Not reported De novo OAB symptoms 8/60* (13%) *60 women had pure stress UI <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	minimise bias? yes 5. Was the outcome accurately measured to minimise bias? Yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? - 14/191 (7%) loss to follow up 7b. Was the follow up of subjects long enough? yes Detection bias: low risk **Indirectness** Does the study match the review protocol in terms of Population: Yes Intervention: Yes Ooutcomes: Yes Indirectness: None **Other information** Data from retropubic "bottom-up" only extracted and used in review

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Viereck,V., Nebel,M., Bader,W., Harms,L., Lange,R., Hilgers,R., Emons,G., Role of bladder neck mobility and urethral closure pressure in predicting outcome of tension-free vaginal tape (TVT) procedure, Ultrasound in Obstetrics and Gynecology, 28, 214-220, 2006 **Ref Id** 110091 **Country/ies where the study was carried out** Switzerland **Study type** Prospective cohort study **Aim of the study** To investigate how urethral mobility and urethral closure pressure affect the outcome of tension-free vaginal tape (TVT) insertion for stress incontinence.	**Sample size** N = 191 **Characteristics** Gender - Female/N (% female) 191/191 (100%) Age (years)-Median (range) 59 (22-81) Incontinence episodes/day-Mean ± SD Not reported Duration of SUI-Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported **Inclusion criteria** Patients whose symptoms had an adverse effect on quality of life and who had failed to respond to conservative measures were offered TVT procedure. The presence of intrinsic	**Interventions** Tension-free vaginal tape (TVT) procedures were performed as described by Ulmsten et al 1996.	**Details** 191 consecutive women with genuine stress urinary incontinence with or without intrinsic sphincter deficiency were evaluated prospectively with multichannel urodynamics, 24-h voiding diaries, clinical stress tests and introital ultrasound measurements preoperatively and 6 months after surgery. Immediately after the operation, outcome was evaluated objectively and subjectively as well as at follow-up after 6, 12, 24 and 36 months. Postoperative subjective assessment included a condition-specific quality of life tool, the Kings Health Questionnaire, the patient's history and 24-h vodiing diaries. Objective assessment was by supine and standing cough stress test, clinical examination and ultrasound. **Power calculation** Not reported	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status at 36 months Cure was defined as "a dry, symptom-free patient without objective urine loss during vigorous coughing and other provocative activities at a standard bladder filling on 300ml, and a demonstrable positive urethral closure pressure during stress provocation. Additional criteria were no episodes of stress or urge incontinence in the 24-h voiding diary and no post void residual volume. Moreoever the definition of cure comprised assessment of subjective continence by means of a self-completed	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? continence status - measure as described in study likely to overestimate number of women continent 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates February 1999 to December 2004 **Source of funding** Not reported	sphincter deficiency (defined as a maximum urethral closure pressure of < 20 cmH_2O was not considered a contraindication to surgery. Concomitant detrusor instability was not an absolute contraindication to surgery, provided it was very mild and had responded to bladder drill and anticholinergic therapy preoperatively. **Exclusion criteria** Not reported		**Intention to treat analysis** Not reported	questionnaire and the patient's history." Cured = 171/191 (89.5%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	enough? - 14/191 (7%) loss to follow up 7b. Was the follow up of subjects long enough? yes Detection bias: high risk **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** 36-month follow-up: 177/191 (93%) The TVT procedure failed (defined as not becoming continent within 6 months of procedure) in 8/191 (4.2%) of women. Recurrence was seen in 6.3% of cases.
Full citation Chene,G., Amblard,J., Tardieu,A.S., Escalona,J.R., Viallon,A., Fatton,B., Jacquetin,B., Long-term	**Sample size** N = 94 **Characteristics**	**Interventions** TVT was performed as described by Ulmsten 1996 with the exception that spinal anaesthesia	**Details** Postoperative check-ups were at 12 and 30 months and these included clinical and urodynamic assessments (24 hour pad test,	**Results** <u>Patient satisfaction with treatment</u> Not reported	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
results of tension-free vaginal tape (TVT) for the treatment of female urinary stress incontinence, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 134, 87-94, 2007 **Ref Id** 124205 **Country/ies where the study was carried out** France **Study type** Prospective cohort study **Aim of the study** Not reported **Study dates** April 1997 to December 1998 **Source of funding** Not reported	Gender -Female/N (% female) 94/94 (100%) Age (years)-Mean (range) 54.6 (19 - 80) Incontinence episodes/day-Mean ± SD Not reported Duration of SUI-Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported Mixed Urinary incontinence - n/N (%) **Inclusion criteria** 1] Women who were treated for stess urinary incontinence with a single TVT procedure **Exclusion criteria** 1] Associated procedure e.g. hysterectomy, prolapse treatment	was used for patient comfort and the paticipation of the cough test (with 250 ml of water in the bladder) when adjusting the tape	quality of life assessment, current symptoms questionnaire, flow measurement) **Power calculation** N/A **Intention to treat analysis** N/A	<u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 60 months</u> Cured = 65/94 (65.2%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> Tape erosion 0/94 (0%) Retention 2/94 (2.1%) Voiding dysfunction Not reported De novo OAB symptoms 12/64* (18.8%) * 64 women had pure stress UI <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? Yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? Yes - 12/94 (72.8) loss to follow up 7b. Was the follow up of subjects long enough? yes Detection bias: Low risk **Indirectness** Does the study match the review protocol in terms of Population: Yes Intervention: Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Outcomes: Yes Indirectness: None **Other information** None
Full citation Deffieux,X., Daher,N., Mansoor,A., Debodinance,P., Muhlstein,J., Fernandez,H., Transobturator TVT-O versus retropubic TVT: results of a multicenter randomized controlled trial at 24 months follow-up, International Urogynecology Journal, 21, 1337-1345, 2010 **Ref Id** 124241 **Country/ies where the study was carried out** France **Study type** Randomised controlled trial **Aim of the study** "To compare the retropubic	**Sample size** N = 149 TVT-O (transobturator inside out) = 74 TVT (botton-up retropubic tension-free vaginal tape) = 75 **Characteristics** Gender – Female/N (% female) 149/149 (100%) Age (years)- Mean ± SD TVT-O = 52.8 ± 9.8 TVT = 54.6 ± 10.9 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N	**Interventions** TVT-O (Johnson and Johnson, Ethicon, Gynecare) procedures were all performed using the vaginal approach from inside to outside, as described by de Leval. TVT procedures were all performed using the vaginal approach in accordance with the technique described by Ulmsten and the manufacturer (Johnson and Johnson, Ethicon, Gynecare).	**Details** The method of anaesthesia was left to the discretion of each surgeon. Vaginal incision was made in the same fashion in both groups. The polypropylene sling was identical in both procedures. For both procedures, the surgeons were instructed to place the slings "tension-free". Beyond this no other standardisation of the sling tension was imposed. No per-operative cough stress test was required. All patients, including those in the TVT-O group, underwent an intraoperative cystoscopy to check for the presence of lower urinary tract injury.	**Results** Patient satisfaction with treatment at 24 months Scale used - subjective cure rate = "no referred leakage at interview" TVT-O = 56/67 (83%) TVT = 55/65 (84%) Self reported rate of absolute symptom reduction per day Not reported Continence status at 24 months Scale used - objective cure rate = negative stress test TVT-O = 65/67 (97%) TVT = 61/65 (94%) Incontinence-specific quality of life Not reported Adverse effects of treatment	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? Yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
TVT and transobturator TVT-O procedures (both using the same macroporous monofilament polypropylene sling), with emphasis being placed on cure rates and intraoperative and post-operative complications, with a minimum follow-up of 24 months." **Study dates** January 2005 to December 2007 **Source of funding** Not reported	(%) Not reported Mixed urinary incontinence - n/N (%) TVT-O = 20/74 (27%) TVT = 26/75 (35%) **Inclusion criteria** 1] Isolated or mixed urodynamic stress incontinence (USI; according to the International Continence Society classification) 2] Indication for surgical treatment of USI 3] Positive cough stress test (cough stress test was performed during cystometry in sitting position, volume 200 – 300 ml) 4] At least 18 years of age **Exclusion criteria** 1] Concomitant pelvic organ prolapse surgery 2] Concomitant hysterectomy 3] Previous incontinence surgery 4] Pregnancy 5] Anticoagulation therapy 6] Higher than first stage urogenital prolapse 7] Patient unable to		**Power calculation** The sample size calculation (SPSS analysis) was performed assuming a bladder injury rate of 8% for TVT and 0.5% for TVT-O. With α equal to 5% and 80% power (1-β) the sample size should be 180 patients, with 90 patients in each group, to reveal a 7.5% difference. The number of subjects included in the trial did not reach this figure because of insufficient enrolment in some centres. **Intention to treat analysis** Not reported	Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms Not reported Psychological outcomes Not reported Clinical measures Not reported	7a. Was the follow up of subjects complete enough? - 14/191 (7%) loss to follow up 7b. Was the follow up of subjects long enough? yes Detection bias: low risk **Indirectness** Does the study match the review protocol in terms of: Population: Yes - 31% of the study population had mixed urinary stress incontinence. Intervention: Yes Outcome: Yes Indirectness: None **Other information** 24 month follow up: 132/149 (89%) The authors state that "Gynecare (Johnson and Johnson, Ethicon) had no role in the design, implementation or anaylsis of this study or in the writing of the present publication." Three patients required repeat surgery: one

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	understand the purpose of the trial				patient in TVT-O group as a result of vaginal sling extrusion, two patients in the TVT group as a result of persistent bladder outlet obstruction symptoms and a major postvoid residual volume. The authors report that improvements in most items of the CONTILIFE questionnaire, including global quality of life were observed in both groups with no difference between the groups. 12-month data (and all adverse event data) from this study is extracted in the evidence table for the question "What is the comparative (short-term) effectiveness of surgical approaches for mid-urethral procedures in women undergoing primary surgical tape procedure?"
Full citation Doo,C.K., Hong,B., Chung,B.J., Kim,J.Y., Jung,H.C., Lee,K.S., Choo,M.S., Five-year	**Sample size** N = 155	**Interventions** Tension-free vaginal tape (TVT) procedure was performed by experienced surgeons	**Details** 155 consecutive women with complaints of SUI underwent TVT procedure in three institutions in Korea. All women underwent	**Results** <u>Patient satisfaction with treatment at 60 months</u> Patient perception was categorised as very	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
outcomes of the tension-free vaginal tape procedure for treatment of female stress urinary incontinence, European Urology, 50, 333-338, 2006 **Ref Id** 124253 **Country/ies where the study was carried out** Korea **Study type** Prospective cohort study **Aim of the study** "We therefore evaluated the long-term efficacy and safety of the TVT procedure, with a follow-up of >5 years for the treatment of female SUI" **Study dates** March 1999 to June 2000 **Source of funding** Not reported	**Characteristics** Gender – Female/N (% female) 155/155 (100%) Age (years)- Mean ± SD 52.3 ± 9.3 Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Mixed urinary incontinence - n/N (%) 25/134 (19%) **Inclusion criteria** Not reported **Exclusion criteria** Women who underwent concomitant surgery were excluded from the analysis.	using the standard technique by Ulmsten et al 1996 with some modifications. Operations were usually performed using a combination of light sedation and local anaesthesia, but general or spinal anaesthesia was used if requested or when concomitant procedures were performed.	preoperative evaluations including urodynamics and a 3-day voiding diary. All women visited the clinics 12 months and 60 months after surgery, and were evaluated by physical examination, uroflowmetry and postvoid residual volume measurement. Patient global satisfaction was assessed at 60 months. **Power calculation** Not reported **Intention to treat analysis** Not reported	satisfied, satisfied, so-so, and dissatisfied, with both very satisfied and satisfied scored as satisfied Satisfied = 116/134 (86.6%) Self reported rate of absolute symptom reduction per day Not reported Continence status at 60 months Cured defined as absence of any episodes of involuntary urine leakage during the stressful activities and stress cough test Cured = 103/134 (76.9%) Incontinence-specific quality of life Not reported Adverse effects of treatment Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported	clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? - 21/155 (14%) loss to follow up 7b. Was the follow up of subjects long enough? yes Risk of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes though

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				De novo OAB sytoms 16/109* (15.4%) * 109 women had pure stress UI <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	7/134 (5.2%) women had previously undergone anti-incontinence surgery (Raz procedure, anterior vaginal wall sling or bladder neck suspension) and 25/134 (19%) women had mixed urinary incontinence. Intervention: No 11/134 (8%) women underwent concomitant posterior repair surgery Outcome: No - Unclear whether standardised questionnaire was used to measure subjective cure. Indirectness: Serious **Other information** 60-months follow-up: 134/155 (86%) 17/155 women were not followed up because they did not respond to mail or telephone contact. 4/138 underwent concomitant surgery and were excluded from the analysis. 131/155 (85%) were observed at 12 months. Women undergoing concomitant procedures (hysterectomy, caruncle

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					excision and cystocele repair) were excluded from the analysis. However, 11 women (8.2%) underwent concomitant posterior repair and were included in the analysis.
Full citation Liapis,A., Bakas,P., Creatsas,G., Long-term efficacy of tension-free vaginal tape in the management of stress urinary incontinence in women: efficacy at 5- and 7-year follow-up, International Urogynecology Journal, 19, 1509-1512, 2008 **Ref Id** 124427 **Country/ies where the study was carried out** Greece **Study type** Prospective cohort study **Aim of the study**	**Sample size** N = 70 **Characteristics** Gender - Female/N (% female) 70/70 (100%) Age (years)- Mean ± SD 58.1 ± 10.4 Incontinence episodes/day-Mean ± SD Not reported Duration of SUI-Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported **Inclusion criteria**	**Interventions** Tension-free vaginal tape. Further details not reported	**Details** All patients were operated on with epidural anaesthesia Patient assessment at 5 years included cysometry, uroflow and 1-h pad test. Assessment at 7 years also included patient satisfaction **Power calculation** It was estimated that, for a type I error-alpha 0.10 and a type II error-beta 0.10 (power of the study 90%) and an 82% success rate for TVT at 5-years follow up requires a sample size of at least 54 patients **Intention to treat analysis** Not reported	**Results** Patient satisfaction with treatment Not reported Self reported rate ofabsolute symptom reduction per day Not reported Continence status at 5 years Objective cure rate = negative stress test and pad test <1g TVT = 54/70 (77%) Continence status at 7 years Objective cure rate = negative stress test TVT = 49/70 (70%) Incontinence-specific quality of life Not reported	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
To assess the long-term efficacy of TVT procedure for the management of stress urinary incontinence in women **Study dates** Not reported **Source of funding** Not reported	1] Urinary stress incontinence with stage I prolapse or less of the anterior compartment (according to ICSC) **Exclusion criteria** 1] Urodynamic findings of detrusor overactivity 2] Previous operation in the genital tract 3] Maximum urethral closure pressure of < 20cm H_2O 4] Prolapse of the anterior compartment > stage I according to ICSC 5] Prolapse of the middle or posterior compartment requiring management			<u>Adverse effects of treatment</u> Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? 9/70 lost to follow up at 7 years 7b. Was the follow up of subjects long enough? yes **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None **Other information** None
Full citation Palva,K., Rinne,K., Aukee,P., Kivela,A., Laurikainen,E., Takala,T., Valpas,A., Nilsson,C.G., A randomized trial comparing tension-free vaginal tape with tension-free vaginal tape-obturator: 36-Month results, International urogynecology journal and pelvic floor dysfunction, 21,	**Sample size** N = 267 TVT-O (transobturator inside out = 132 TVT (bottom-up tension-free vaginal tape) = 136 **Characteristics** <u>Gender - Female/N (%)</u>	**Interventions** TVT-O procedures were performed as described by de Leval (2003) TVT procedures were performed as described by Ulmsten (1996)	**Details** Eight specialists in gynaecology, with wide experience in urogynaecology and TVT operations, were specially trained to perform the TVT-O procedure. After the training period, they had to perform at least 5 TVT-O operations independently including patients in the study.	**Results** <u>Patient satisfaction with treatment at 36 months</u> Scale used – unclear. "Patients were asked if they were satisfied with the operation completely, partly or not at all." **Completely satisfied** TVT-O = 115/126	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1049-1055, 2010 **Ref Id** 134948 **Country/ies where the study was carried out** Finland **Study type** Randomised controlled trial **Aim of the study** "To randomly compare two mid-urethrea tape procedures, the TVT with the TVT-O, in the treatment of primary stress urinary incontinence." **Study dates** March 2004 to November 2005 **Source of funding** University-administered funding	267/267 (100%) <u>Age- Mean ± SD</u> Not reported <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity - n/N (%)</u> Not reported <u>Incontinence-specific quality of life</u> Scale used - Urinary Incontience Severity Score (UISS) - Mean ± SD (N) TVT-O = 11 ± 3 (126) TVT = 11 ± 3 (131) Scale used - Incontinence Impact Questionnaire-Short form (IIQ-7) - Mean ± SD (N) TVT-O = 17 ± 4 (126) TVT = 16 ± 4 (131) Scale used - Urinary Distress Inventory-Short form (UDI-6) - Mean ± SD (N) TVT-O = 17 ± 3 (126) TVT = 14 ± 3 (131) Scale use - Visual Analog Scale (VAS), 0 = no urinary problems, 100 = unbearable		Prophylactic antibiotics were given at the beginning of the operation: a single dose of cefuroxime 1.5g or metronidazole 500 mg intravenously. All procedures were performed in local infiltration anaesthesia using 0/25% prilocain with adrenalin. A cough stress test was performed during the operation with 300 ml saline in the bladder for adjustment of the tape. Cystoscopy with 70° optic was performed twice during TVT and once during TVT-O to detect possible bladder injury. The bladder was emptied at the end of the operation and no catheter was left in the bladder. Spontaneous voiding was attempted at the latest 3 hours after the operation and PVR volume was measured by ultrasound or by catheterisation **Power calculation** Sample size calculation was performed assuming a 95% success rate for the TVT procedure and that a 10% difference in either success rate or rates of complications would be clinically important, with a 70% power to show a 10% difference; the sample size should be 260	(91%)* TVT = 118/131 (90%)* **Partly or not at all satisfied** TVT-O = 11/126 (9%)* TVT = 13/131 (10%)* * Only percentage reported for "completely satisfied". All other values calculated using N at 36 months. <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 36 months</u> Scale used - cough stress test. "Objective cure was defined as a negative stress test". **Per protocol: Cured** TVT-O = 112/126 (89.5%)** TVT = 124/131 (94.6%)** **Intention to treat: Cured** TVT-O = 112/132 (84.7%)** TVT = 124/136 (91.2%)**	recruited in an appropriate way? yes 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? Yes 7b. Was the follow up of subjects long enough? yes Risk of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Unclear - Baseline characteristics not adequately described to allow full assessment of indirectness Intervention: Yes Outcome: Yes - Continence status assessed by cough stress

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	urinary complaints - Median (range) TVT-O = 71 (18-100) TVT = 70 (11-100) <u>24-hour pad test</u> Mean ± SD TVT-O = 42g ± 53g TVT = 41g ± 38g **Inclusion criteria** 1] History of SUI 2] Indication for surgical treatment of SUI 3] Positive cough stress test 4] Detrusor instability score ≤ 7 **Exclusion criteria** 1] Previous incontinence surgery 2] Postvoid residual (PVR) urine volume > 100 ml 3] Lower urinary tract anomaly 4] Current urinary tract infection (UTI) or > 3 UTI episodes within the past year 5] Urogenital prolapse of more than second degree (Baden-Walker) 6] BMI > 35 kg/m² 7] Previous radiation therapy of the pelvis 8] Active malignancy		patients with 130 in each group. **Intention to treat analysis** "Cure rates" [reported here as continence status] for both groups were calculated on an intention-to-treat basis, postulating that all losses to follow up were treatment failures.	**Authors report % cured in a per protocol and intention to treat analysis. All other values calculated using reported % and N at 36 months for per protocol result and N randomised for intention to treat result <u>Incontinence-specific quality of life at 36 months</u> Scale used - Urinary Incontience Severity Score (UISS) - Mean ± SD (N) TVT-O = 0.9 ± 1.8 (126) TVT = 1.2 ± 2.3 (131) Scale used - Incontinence Impact Questionnaire-Short form (IIQ-7) - Mean ± SD (N) TVT-O = 7.4 ± 1.2 (126) TVT = 7.8 ± 2.1 (131) Scale used - Urinary Distress Inventory-Short form (UDI-6) - Mean ± SD (N) TVT-O = 7.7 ± 2.1 (126) TVT = 8.0 ± 2.4 (131) Scale use - Visual Analog Scale (VAS), 0 = no urinary problems,	test, satisfaction measured with unvalidated questionnaire Indirectness: Some **Other information** 36 month follow up: 257/267 (96%); TVT-O = 126/132 (95.5%), TVT = 131/136 (96.3%) Type of tape used in all procedures was not reported Five patients (1.8%) withdrew from the study before the procedure. It is unclear to which groups they were randomised. One patient randomised to TVT-O received TVT due to techincal difficulties with the TVT-O procedure. Tape resection was performed in one TVT-O patient with tape erosion at 12 month follow up visit, which resulted in recurrent incontinence and a TVT re-operation was performed. One TVT-O patient had retention problems; division of tape was

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	9] Anticoagulation 10] Hemophilia 11] Neurogenic disease that can associated with bladder disorders 12] Use of anticholinergics/duloxetine 13] Inability to understand purpose of study 14] Immobilisation			100 = unbearable urinary complaints - Median (range) TVT-O = 2 (0-87) TVT = 2 (0-91) <u>Adverse effects of treatment at 36 months</u> Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms TVT-O = 7/126 (5.6%) TVT = 12/131 (9.2%) <u>Psychological outcomes</u> Not reported <u>Clinical measures at 36 months</u> Post-void residual volume - Median (range) TVT-O = 10ml (0 - 302) TVT = 5ml (0 - 115)	performed twice and retention was resolved but the patient developed de novo urge symptoms. This study report does not include baseline mixed urinary incontinence data. The 12-month outcomes report of this study[Palva 2011, included in 12-month outcomes review] indicates that 75% of the study population had preoperative frequency symptoms and 66% had preoperative urgency urinary incontinence symptoms. Intention to treat result for continence status used in meta-analysis.
Full citation Lleberia-Juanos,J., Bataller-Sanchez,E., Pubill-Soler,J.,	**Sample size** N = 366	**Interventions** TVT (Gynecare, Johnson & Johnson,	**Details** Consecutive women with SUI underwent continence surgery.	**Results** <u>Patient satisfaction with treatment</u>	**Limitations** Critical Appraisal Skills Programme. Cohort study

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Mestre-Costa,M., Ribot-Luna,L., Vizcaino,M.A.C., De novo urgency after tension-free vaginal tape versus transobturator tape procedure for stress urinary incontinence, European Journal of Obstetrics Gynecology and Reproductive Biology, 155, 229-232, 2011 **Ref Id** 135124 **Country/ies where the study was carried out** Spain **Study type** Prospective cohort study **Aim of the study** "The objective of this prospective study was to compare the frequency of de novo urgency after TVT and TOT procedures in women with SUI" **Study dates** January 2000 to January	TOT = 123 TVT = 243 **Characteristics** <u>Gender – Female/N (% female)</u> 366/366 (100%) <u>Age (years)- Mean ± SD</u> TOT = 57.7 (range 35 – 85) TVT = 60.5 (range 32 – 84) <u>Incontinence episodes/day – Mean ± SD</u> Not reported <u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u> Not reported **Inclusion criteria** Only patients with SUI due to urethral hypermobility of longer than 1 year's duration were eligible. **Exclusion criteria** 1] Intrinsic sphincter deficiency 2] Intrinsic sphincter	Somerville, NJ, USA) was carried out as described by Ulmsten et al 1995. From 2005, consecutive patients underwent the TOT (Gynecare, Johnson & Johnson, Somerville, NJ, USA) procedure as described by de Leval et al 2003.	After 2005 women underwent TOT. Preoperative evaluation included detailed history, urogynaecological examination and urodynamic studies. An assessment of perioperative and postoperative complication was made for each patient. All patients were asked to visit the clinic 1, 6 and 12 months after surgery at which time the surgeon performed a clinical examination. At 6 and 12 months patients also conducted a self-evaluation of the severity of their symptoms compared with preoperative symptomatology into four categories - cured, improved, similar and worse. Follow-up checks at 24 and 36 months were performed by standardised telephone interviews. **Power calculation** Not reported **Intention to treat analysis** Not reported	Scale used – patients conducted a self-evaluation of the severity of their symptoms as compared with preoperative symptomatology into four categories: cured, improved, similar or worse (failed) 24 months: TOT = 55/57 (96.5%) TVT = 214/241 (88.8%) 36 months: TOT = 14/14 (100%) TVT = 199/227 (87.7%) <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status</u> Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> 24 months Tape erosion Retention Voiding dysfunction De novo OAB symptoms	checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? no - losses to follow up in TOT group significantly higher than in TVT group (see Other information) 7b. Was the follow up of subjects long enough? yes Detection bias: high

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
2008 **Source of funding** Not reported	deficiency with urethral hypermobility 3] Mixed incontinence 4] Occult SUI 5] Involuntary detrusor contractions or filling defects on urodynamic evaluation			TVT = 60/241 (24.8%) 36 months: Tape erosion Retention Voiding dysfunction De novo OAB symptoms TVT = 56/227 (24.7%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	**Indirectness** Does the study match the review protocol in terms of: Population: Yes - 3/123 (2/4%) in TOT group and 4/243 (1.6%) in TVT group had undergone previous anti-incontinence procedures Intervention: Yes Outcome: Yes Indirectness: None **Other information** 24 months follow up: TOT = 57/123 (46%), TVT = 241/243 (99%) so data form this group not used in the analyses 36 months follow up: TOT = 14/123 (11%), TVT = 227/243 (94%) The majority of patients in both groups were operated on under spinal anaesthesia. Women with de novo urgency were treated with anticholinergics.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Koops,S.E.S., Bisseling,T.M., Heintz,A.P.M., Vervest,H.A.M., The effectiveness of tension-free vaginal tape (TVT) and quality of life measured in women with previous urogynecologic surgery: Analysis from The Netherlands TVT database, American Journal of Obstetrics and Gynecology, 195, 439-444, 2006 **Ref Id** 135829 **Country/ies where the study was carried out** The Netherlands **Study type** Prospective cohort study **Aim of the study** "We present the outcome and follow-up of 3 years of low-tension midurethral sling (TVT) in women with previous incontinence or prolapse surgery, by means of objective (patient self-reported) health-related	**Sample size** N = 809 **Characteristics** Gender – Female/N (% female) 809/809 (100%) Age (years)- Mean ± SD No prior surgery: 50.5 ± 10.2 Prior surgery: 55.5 ± 10.5 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity – n/N (%) Not reported **Inclusion criteria** 1] Willing to participate in the study 2] Indication for TVT 3] History of previous incontinence or prolapse surgery **Exclusion criteria**	**Interventions** TVT (Gynecare, Ethicon Inc, Sommerville, NJ, USA) was performed as described by Ulmsten et al (1995, 1996). Procedures took place in 41 different hospitals by 54 gynaecologists and urologists.	**Details** A standardised history was taken and physical examination was performed preoperatively and again at 2, 6, 12, 24 and 36 months after the procedure. All women were asked to complete the short version of the IIQ-7 and UDI-6 before and at 2, 6, 12, 24 and 36 months. Questionnaires were administered by mail. **Power calculation** Not reported **Intention to treat analysis** Not reported	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status at 24 and 36 months Defined as "Women's reply to the UDI questionnaire, on the question: 'Do you experience urinary leakage during physical activity, coughing or sneezing?' compared with their preoperative status" 24 months: Improved =644/678 (95%) 36 months: Improved = 628/678 (92.6%) * Data reported separately for women with and women without previous incontinence surgery. Data presented here for women without previous incontinence surgery. Only	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 only 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? unclear whether women were enrolled consecutively 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? losses to follow up not reported 7b. Was the follow up of subjects long enough? yes Risk of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
quality of life (HRQOL) questionnaires (the Incontinence Impact Questionnaire [IIQ] and the Urogeital Distress Inventory [UDI])." **Study dates** March 2000 to September 2001 **Source of funding** Not reported	1] Recurrent and difficult-to-treat urinary tract infections 2] Predominant symptoms of urge urinary incontinence (defined as urge incontinence being more prevailing than stress incontinence) 3] Detrusor overactivity at cystometry 4] Post void bladder retention (> 150 ml) 5] Bladder capacity less than 200 ml 6] Physical/mental impairment that would make participation impossible			percentage reported, n calculated by NCC-WCH using N with no prior surgery (678) reported in Table IV <u>Incontinence-specific quality of life at 24 and 36 months</u> Urogenital Distress Inventory (UDI-6) 24 months: 23.1 (SD not reported) 36 months: 24.5 (SD not reported) Incontinence Impact Questionnaire (IIQ-7) 24 months: 12.2 (SD not reported) 36 months: 13.6 (SD not reported) <u>Adverse effects of treatment</u> 24 months Tape erosion Retention Voiding dysfunction De novo OAB symptoms 36 months Tape erosion Retention Voiding dysfunction De novo OAB symptoms	**Indirectness** Does the study match the review protocol in terms of: Population: Yes - data extracted for 'no priory surgery' population only Intervention: Unclear - authors state concomitant surgery performed, unclear whether this was in full study population, or just those women who had previous incontinence and/or prolapse surgery. Outcome: Unclear - unclear how many women were followed up at 24 and 36 months Indirectness: Some **Other information** Study focuses on results in women with prior surgery but data for women with 'no prior surgery' extracted by NCC-WCH. Authors do not report number of women followed up at 24 and 36 months.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Psychological outcomes Not reported Clinical measures Not reported	
Full citation Al Taweel,W., Rabah,D.M., Transobturator tape for female stress incontinence: follow-up after 24 months, Canadian Urological Association Journal, , 33-36, 2010 **Ref Id** 135929 **Country/ies where the study was carried out** Saudi Arabia **Study type** Prospective cohort study **Aim of the study** To report on the objective and subjective outcomes of transobturator "outside-in" after 24 months follow-up.	**Sample size** N = 52 **Characteristics** Gender - Female/N (% female) 52/52 (100%) Age (years)-Mean (range) 50 (37-72) Incontinence episodes/day-Mean ± SD Not reported Duration of SUI-Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported **Inclusion criteria** 1] All female patients with SUI undergoing transobturator "outside-in"	**Interventions** The transobturator approach was performed as described by Delorme in 2001 using a helical tunneler from the outside entrance point to adjust the tape without any tension.	**Details** Cystoscopy was performed during the procedures in all patients and the catheter removed in the recovery room before the patients were discharged. **Power calculation** Not applicable **Intention to treat analysis** Not applicable	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status at 24 months Cure was defined "negative cough test on physical examination after 24 months." Cured = 42/52 (80%) Incontinence-specific quality of life Not reported Adverse effects of treatment Tape erosion 0/52 (0%) Retention 2/52 (3.8%)	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? continence status - measure as described in study likely to overestimate number of women continent 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates December 2004 to January 2006 **Source of funding** None reported	**Exclusion criteria** 1] urge incontinence 2] pure intrinsic sphincter			Voiding dysfunction Not reported De novo OAB symptoms 4/52 (7.7%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? 7b. Was the follow up of subjects long enough? yes Detection bias: high risk **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None **Other information** None
Full citation Serati,M., Ghezzi,F., Cattoni,E., Braga,A., Siesto,G., Torella,M., Cromi,A., Vitobello,D., Salvatore,S., Tension-free vaginal tape for the treatment of urodynamic stress incontinence: efficacy and adverse effects at 10-year	**Sample size** N = 63 **Characteristics** <u>Gender -Female/N (% female)</u> 63/63 (100%) <u>Age (years) - Median</u>	**Interventions** All retropubic tension-free vaginal tape procedure (TVT; Gynecare, Ethicon, Somerville, NJ, USA) was performed by the same surgeon according to the technique described by	**Details** 207 consecutive women were assessed for SUI, 144 were excluded from the study: 53 had mixed urinary incontinence and 91 had evidence of pelvic organ prolapse. 63 women with proven SUI underwent TVT. Anaesthesia was general or spinal in accordance with the	**Results** <u>Patient satisfaction with treatment</u> Subjective cure using 3-point symptom assessment scale (0 = failure, 1 = improved, 2 = cured). [Data for 'cured' only]	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 only 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
follow-up, European Urology, 61, 939-946, 2012 **Ref Id** 176957 **Country/ies where the study was carried out** Italy **Study type** Prospective cohort study **Aim of the study** To report the long-term subjective, objective and urodynamic outcomes of women with TVT with a follow-up of at least 10 years to assess the efficacy for SUI and the safety of this procedure. **Study dates** January 2000 to June 2001 **Source of funding** None reported	(interquartile range) 58 (48-69) Incontinence episodes/day - Mean ± SD Not reported Duration of SUI - Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported **Inclusion criteria** 1] Women with symptoms of pure SUI with urodynamic stress incontinence **Exclusion criteria** 1] Previous history of anti-incontinence or radical pelvic surgery 2] Psychiatric disorder 3] Neurologic disorder 4] Concomitant vaginal prolapse higher than stage 1 according to POP-Q system 5] Overactive bladder symptoms 6] Urodynamically proven detrusor overactivity 7] Postvoid residual volume >100 ml	Ulmsten et al. 1996	anaesthesiologic requirements and/or the patient's preference. Follow-up evaluations were scheduled at 3 and 12 months, and once per year thereafter, including anamnestic and physical examination, cough test and evaluation of subjective satisfaction. All women received urodynamics only at the 10-year follow-up visit. Additional urodynamics at other follow-up examinations was performed only in the case of de novo overactive bladder symptoms. De novo overactive bladder was treated with 2mg tolterodine BID. **Power calculation** Not reported **Intention to treat analysis** Authors report last observation carried forward analysis and 'worst case scenario' analysis (where all losses to follow up were considered treatment failures)	Assuming losses to follow up were failures - n/N (%): 2 years= 58/63 (92.1%) 3 years= 55/63 (87.3%) 4 years = 55/63 (87.3%) 5 years= 54/63 (85.7%) 6 years= 54/63 (85.7%) 7 years = 54/63 (85.7%) 8 years = 54/63 (85.7%) 9 years = 54/63 (85.7%) 10 years = 52/63 (82.5%) Last observation carried forward - n/N (%): 2 years= 59/63 (93.7%) 3 years= 59/63 (93.7%) 4 years = 59/63 (93.7%) 5 years= 58/63 (92.1%) 6 years= 58/63 (92.1%) 7 years = 58/63 (92.1%) 8 years = 58/63 (92.1%) 9 years = 58/63 (92.1%) 10 years = 56/63 (88.9%) Self reported rate of absolute symptom reduction per day Not reported Continence status Objective cure defined as absence of leakage during cough stress test Assuming losses to follow up were failures -	3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? - 5/63 (8%) loss to follow up 7b. Was the follow up of subjects long enough? yes Risk of bias: Low **Indirectness** Doe sthe study match the review protocol in terms of Population: Yes Intervention: Yes Outcome: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				n/N(%): 2 years= 59/63 (93.7%) 3 years= 55/63 (87.3%) 4 years = 55/63 (87.3%) 5 years= 54/63 (85.7%) 6 years= 54/63 (85.7%) 7 years = 54/63 (85.7%) 8 years = 54/63 (85.7%) 9 years = 54/63 (85.7%) 10 years = 54/63 (85.7%) Last observation carried forward - n/N (%): 2 years= 60/63 (95.2%) 3 years= 59/63 (93.7%) 4 years = 59/63 (93.7%) 5 years= 58/63 (92.1%) 6 years= 58/63 (92.1%) 7 years = 58/63 (92.1%) 8 years = 58/63 (92.1%) 9 years = 58/63 (92.1%) 10 years =58/63 (92.1%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment at 10 years</u> Tape erosion Not reported Retention Not reported Voiding dysfunction	**Other information** 207 women were assessed for SUI, 144 were excluded from the study: 53 had mixed urinary incontinence and 91 had evidence of pelvic organ prolapse.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				De novo OAB symptoms = 11/58 (18.9%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	
Full citation Shin,Y.S., Cha,J.S., Cheon,M.W., Kim,Y.G., Kim,M.K., Efficacy and safety of the TVT-SECUR[REGISTERED] and impact on quality of life in women with stress urinary incontinence: a 2-year follow-up, Korean Journal of Urology, 52, 335-339, 2011 **Ref Id** 188144 **Country/ies where the study was carried out** Korea **Study type** Cohort study [unclear whether prospective or retrospective]	**Sample size** N = 51 **Characteristics** Gender - Female/N (% female) 51/51 (100%) Age (years) - Mean (range) 57.89 ± (41-77) Incontinence episodes/day - Mean ± SD Not reported Duration of SUI (years) - Mean (range) 5.09 (1-15) Detrusor overactivity - n/N (%) Not reported Mixed urinary incontinence -	**Interventions** Surgical approach of TVT-SECUR® was through the U approach.	**Details** Surgery was done under general or spinal anaesthesia by one experienced surgery. Preoperative evaluation included history, cough stress test, urodynamic study and incontinence quality of life (I-QOL) questionnaire. All women underwent pelvic examination. Surgical management for pelvic organ prolapse was not performed. Postoperative evaluation was through physical examination and the I-QOL questionnaire completed in an outpatient setting or by telephone. **Power calculation** Not reported	**Results** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 24 months</u> Objective cure defined as absence of any episodes of involuntary urine leakage during stressful activities and stress test Cured = 35/46 (76%) <u>Incontinence-specific quality of life at 24 months</u> Scale used - Incontinence-Quality of Life questionnaire	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 only 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? unclear whether consecutive women were enrolled in to the study, unclear whether cohort were identified prospectively or retrospectively 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To evaluate the long-term results of TVT-SECUR® in women with stress urinary incontinence **Study dates** March 2008 to February 2009 **Source of funding** None reported	n/N (%) 5/46 (10.8%) Previous anti-incontinence surgery - n/N (%) 2/46 (4.3%) Incontinence-specific quality of life at baseline Scale used - Incontinence-Quality of Life questionnaire [higher score = higher QOL] Mean total I-QOL score = 35.44 (SD not reported), N = 46 **Inclusion criteria** 1] Clinical and urodynamically diagnosis of stress urinary incontinence needing anti-incontinence surgery [including stress-predominant mixed urinary incontinence] **Exclusion criteria** 1] Urinary tract infection 2] Urogynaecological malignancy 3] Neurogenic bladder		**Intention to treat analysis** Not reported	[higher score = higher QOL] Mean total I-QOL score = 67.57 (SD not reported), N = 46 <u>Adverse effects of treatment at 24 months</u> Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? - 5/51 (10%) loss to follow up 7b. Was the follow up of subjects long enough? yes Possible selection bias - Some **Indirectness** Does the study match the review protocol in terms of: Population: Yes - 10.8% of women had mixed urinary incontinence, 4.3% of women had previous anti-incontinence surgery Intervention: Yes Outcome: Yes Indirectness: None **Other information** Five women were lost to follow up - results and baseline data reported for women only completing 24

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					months follow up.
Full citation Groutz,A., Rosen,G., Gold,R., Lessing,J.B., Gordon,D., Long-term outcome of transobturator tension-free vaginal tape: Efficacy and risk factors for surgical failure, Journal of Women's Health, 20, 1525-1528, 2011 **Ref Id** 188198 **Country/ies where the study was carried out** Israel **Study type** Prospective cohort study **Aim of the study** To assess the 5-year efficacy of TVT-O for the treatment of stress urinary incontinence and to explore predictors for long-term failure **Study dates**	**Sample size** N=65 **Characteristics** Gender -Female/N (% female) 65/65 (100%) Age (years) - Mean ± SD 56.6 ± 10.2 Incontinence episodes/day - Mean ± SD Not reported Duration of SUI - Mean ± SD Not reported Detrusor overactivity - n/N (%) 22/61 (36.0%) Concomitant overactive bladder - n/N (%) 44/61 (72.1%) Concomitant urge urinary continence - n/N (%) 41/61 (67.2%) Previous incontinence surgery - n/N (%)	**Interventions** Inside-out transobturator tension-free vaginal tape (TVT-O; Gynecare TVT Obturator System, Somerville, NJ, USA)	**Details** All procedures were carried out in one university-affiliated tertiary medical centre. Postoperatively women were evaluated at 1, 3, 6, 12 months and annually thereafter. Each visit comprised medical history, focused questionning abou occurence and severity of lower urinary tract symptoms, pelvic examination with full bladder, stress test and uroflow and sonographic measurement of postvoid residual volume. Women were also asked about their global satisfaction (cure, improvement or failure) and whether or not they would recommend surgery to a friend. **Power calculation** Not reported **Intention to treat analysis** Not reported	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status at 5 years Cured was defined as negative stress test, no episodes of SUI and positive (cured) global satisfaction Cured = 45/61 (74%) Incontinence-specific quality of life Not reported Adverse effects of treatment at 5 years Tape erosion Retention Voiding dysfunction De novo OAB symptoms Psychological outcomes Not reported	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? yes - 4/65 (6.2%) loss to follow up 7b. Was the follow up of

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
2005 **Source of funding** None reported	5/61 (8.3%) **Inclusion criteria** 1] Urodynamically confimed overt stress urinary incontinence **Exclusion criteria** 1] Concomitant anterior or apical pelvic organ prolapse repair 2] Urodynamically occult stress urinary incontinence			<u>Clinical measures</u> Not reported	subjects long enough? yes Risk of bias: Low **Indirectness** Doe sthe study match the review protocol in terms of: Population: Yes - 72.1% of women had concomitant overactive bladder and 8.3% of women had previous incontinence surgery Intervention: Yes Outcome: Yes Indirectness: None **Other information** Women with urodynamic SUI or mixed incontinence with SUI as the predominant symptom were offered TVT-O only after conservative treatment failed (lifestyle changes, behaviour modification, antimuscarinic drugs, and pelvic floor physiotherapy). Four women were lost to follow up - results and baseline data reported for women only completing 5-

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					year follow up.
Full citation Groutz,A., Rosen,G., Cohen,A., Gold,R., Lessing,J.B., Gordon,D., Ten-Year Subjective Outcome Results of the Retropubic Tension-Free Vaginal Tape for Treatment of Stress Urinary Incontinence, Journal of Minimally Invasive Gynecology, 18, 726-729, 2011 **Ref Id** 188373 **Country/ies where the study was carried out** Israel **Study type** Prospective cohort study **Aim of the study** To assess the 10-year subjective outcome of retropubic TVT for treatment of SUI and to explore possible predictors of long-term	**Sample size** N = 60 **Characteristics** Gender -Female/N (% female) 60/60 (100%) Age (years) - Mean ± SD 62.4 ± 9.3 Incontinence episodes/day - Mean ± SD Not reported Duration of SUI - Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported Concomitant urge urinary incontinence - n/N (%) 28/52 (53.8%) Previous anti-incontinence surgery 5/52 (10%)	**Interventions** Retropubic tension-free vaginal tape (TVT; manufacturer not described) in accordance with the technique described by Ulmsten et al 1996.	**Details** All surgical procedures were performed under general or spinal anaesthesia. Postoperatively women were evaluated at 1, 3, 6, 12 months and annually thereafter for up to 5 years. Each visit comprised medical history, focused questionning abou occurence and severity of lower urinary tract symptoms, pelvic examination with full bladder, stress test and uroflow and sonographic measurement of postvoid residual volume. The 10-year subjective outcome of TVT was assessed using a structured telephone interview conducted by a research nurse. Women were asked about frequency and severity of lower urinary tract symptoms and episodes of incontinence, long-term postoperative complications such as recurrent UTIs and vaginal erosions, whether they received further treatments and what their global satisfaction was (cured, improved, failed).	**Results** <u>Patient satisfaction with treatment at 10 years</u> Subjective cure defined as 'cured' on global satisfaction question (cured, improved, failed) Cured = 34/52 (65.4%) <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 10 years</u> Not reported <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment at 10 years</u> Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? no - subjective cure data and subjective report of adverse events collected at 10 years (no clinical evaluation) 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis?

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
success **Study dates** 2000 **Source of funding** None reported	**Inclusion criteria** 1] Urodynamically confirmed stress urinary incontinence **Exclusion criteria** 1] Concomitant anterior or apical pelvic organ prolapse repair 2] Urodynamically occult stress urinary incontinence		**Power calculation** Not reported **Intention to treat analysis** Not reported	De novo OAB symptoms 9/52 (17.3%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	unclear 7a. Was the follow up of subjects complete enough? yes - 8/60 (8.7%) loss to follow up 7b. Was the follow up of subjects long enough? yes **Indirectness** Does the study match the review protocol in terms of: Population: Yes - 53.8% of women had urge urinary incontinence and 10% of women had previous incontinence surgery Intervention: Yes Outcome: Yes Indirectness: None **Other information** Eight women were lost to follow up - results and baseline data reported for women only completing 10-year follow up. All procedures were performed by two surgeons

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Cheng,D., Liu,C., Tension-free vaginal tape-obturator in the treatment of stress urinary incontinence: a prospective study with five-year follow-up, European Journal of Obstetrics, Gynecology, and Reproductive Biology, , 228-231, 2012 **Ref Id** 188378 **Country/ies where the study was carried out** China **Study type** Prospective cohort study **Aim of the study** To assess the objective success rate of the TVT-O with inside-out modification procedure, and to determine the safety and efficacy of the procedure, including complications, patient satisfaction with surgery and the impact on the patients' quality of life.	**Sample size** N = 103 **Characteristics** Gender - Female/N (% female) 103/103(100%) Age (years) - Mean ± SD 52.4 ± 11.1 Incontinence episodes/day - Mean ± SD Not reported Duration of SUI - Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported Urge incontinence symptoms - n/N (%) 59/103 (57%) Incontinence-specific quality of life Scale used - short Urinary Distress Inventory (SDUI) [lower scores are better] Mean score = 46.21 ± 20.3 (103) Scale used - short Incontinence Impact	**Interventions** Inside-out transobutator tension-free vaginal tape (TVT-O; Johnson & Johnson) in accordance with the technique described by de Leval 2005.	**Details** Follow-up evaluations were performed at 1 and 5 years, consisting of physical examination with postvoid residual volume, uroflow study and urinary stress tests. Quality of life was assessed with the short urogenital distress inventory, short incontinence impact questionnaire, and European quality of life questionnaire. A urogenital history and verbal analogue score about patient satisfaction were also obtained **Power calculation** Not reported **Intention to treat analysis** Not reported	**Results** <u>Patient satisfaction with treatment at 5 years</u> Women reporting high satisfaction ['high satisfaction' not defined] - n/N (%) Satisfied = 69/100 (69%) <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 5 years</u> Objective cure defined as negative urinary stress test - n/N (%) Cured = 92/100 (92%) <u>Incontinence-specific quality of life</u> Scale used - short Urinary Distress Inventory (SDUI) [lower scores are better] Mean score = 12.21 ± 22.3 (100) Scale used - short Incontinence Impact Questionnaire (SIIQ) [lower scores are better] Mean score = 10.72 ± 24.6 (100)	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? measurement and definition of patient satisfaction unclear 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? yes - 3/103 (2.9%) loss to follow up 7b. Was the follow up of subjects long enough? yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates December 2004 to November 2005 **Source of funding** None reported	Questionnaire (SIIQ) [lower scores are better] Mean score = 50.72 ± 24.3 (103) **Inclusion criteria** 1] Diagnosis of urinary stress incontinence, based on subjective complaints and objective clinical signs and confirmed with urodynamic diagnosis including a stress test and uroflowmetry **Exclusion criteria** 1] Detrusor overactivity 2] Impaired bladder contractility 3] Postvoid residual volume ≥ 100 ml 4] Contraindication to anaesthesia 5] Pregnancy 6] Neurogenic bladder 7] Active urinary or vaginal infection			<u>Adverse effects of treatment at 5 years</u> Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	Risk of bias: Low **Indirectness** Does the study match the review protocol in terms of: Population: Yes - 57% of women has urge urinary incontinence symptoms Intervention: Yes Outcome: Yes Indirectness: None **Other information** Three women were lost to follow up - baseline data reported for all 103 women, those lost to follow up were excluded from the analysis
Full citation	**Sample size**	**Interventions**	**Details**	**Results**	**Limitations**
Neuman,M., Sosnovski,V., Kais,M., Ophir,E., Bornstein,J., Transobturator vs Single-Incision Suburethral	N =152 TVT-SECUR (single incision) = 79	Inside-out transobturator tension-free vaginal tape (TVT-O; manufacturer not	All patients were given 1g cefonicid intravenously 1 hour before surgery. All underwent an iodine antiseptic vaginal wash	Patient satisfaction with treatment Not reported	Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Mini-slings for Treatment of Female Stress Urinary Incontinence: Early Postoperative Pain and 3-Year Follow-up, Journal of Minimally Invasive Gynecology, 18, 769-773, 2011 **Ref Id** 188428 **Country/ies where the study was carried out** Israel **Study type** Cohort study [unclear whether prospective or retrospective] **Aim of the study** To analyse and compare the midterm outcomes of TVT-O and TVT-SECUR procedures **Study dates** Not reported - women were recruited over a period of 17 months	TVT-O (transobturator inside out) = 73 **Characteristics** Gender - Female/N (%) 152/152 (100%) Age- Mean ± SD TVT-SECUR = 53 ± 10.6 TVT-O = 54 ± 11.8 Incontinence episodes/day – Mean ± SD Not reported Duration of SUI – Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported Urgency - n/N (%) TVT-SECUR = 42/79 (54.5%) TVT-O = 28/73 (37.8%) Frequency - n/N (%) TVT-SECUR = 33/79 (42.9%) TVT-O = 24/73 (32.4%) Previous stress incontinence corrective surgery - n/N (%) TVT-SECUR = 3/79 (3.9%) TVT-O = 3/73 (4.2%)	reported) using the technique described by de Leval 2003 and TVT-SECUR with the hammock method (single incision approach; Gynecare, Ethicon, Somerville, NJ, USA) using the technique described by Neuman 2008	before surgery. The mode of anaesthesia was per patient request. Urinary bladder catheterisation or diagnostic cystoscopy were not routinely performed. Patients with vaginal wall relaxation underwent anterior and/or posterior colporrhaphy. Patients were followed up at 1, 6 and 12 months after surgery and yearly thereafter. Subjective data were collected using a visual analogue scale, Urinary Distress Inventory-6 and Incontinence Impact Questionnaire-7 at each visit. Objective outcome was assessed via pelvic examination and cough stress test with a filled bladder. **Power calculation** Sample size calculation was based on reports that demonstrated an incidence of significant postoperative pain of 25% with TVT-O and 5% with TVT-SECUR. 160 patients were required in the TVT-O and TVT-SECUR arms to detect a 20% increase in postoperative pain rate, with 80% power and 95% confidence (0.05 significance).	Self reported rate of absolute symptom reduction per day Not reported Continence status at 3 years Objective cure defined as "no leakage at all" - n/N (%) TVT-O = 60/69 (86.9%) TVT-SECUR = 70/77 (90.9%) Incontinence-specific quality of life Not reported Adverse effects of treatment at 3 years Tape erosion Retention Voiding dysfunction Denovo OAB symptoms Psychological outcomes Not reported Clinical measures Not reported	clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? unclear whether consecutive women were enrolled in to the study 4. Was the exposure accurately measured to minimise bias? unclear how women chose their preferred surgical approach 5. Was the outcome accurately measured to minimise bias? unclear whether "cure" was defined purely by a positive or negative cough stress test 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear - twice as many losses to follow up in TVT-O group; higher occurrence of urgency at baseline in the TVT-SECUR group 7a. Was the follow up of subjects complete

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding None reported	**Inclusion criteria** 1] Diagnosis of SUI based on patient's personal history and a positive cough test with bladder holding 300 to 400 ml. **Exclusion criteria** 1] Refusal to participate 2] Presence of connective tissue disorder 3] Need for concomitant surgery other than colporrhaphy		**Intention to treat analysis** Not reported		enough? yes - 6/152 (3.9%) loss to follow up; TVT-SECUR=2/79 (2.5%), TVT-O = 5.5%) 7b. Was the follow up of subjects long enough? yes Performance bias: high **Indirectness** Does the study match the review protocol in terms of: Population: Yes - 4% of women had undergone previous anti-incontinence surgery Intervention: No - concomitant anterior colporrhaphy was performed in 75% of women, concomitant posterior colporrhaphy was performed in 56% of women. Outcome: Yes Indirectness: None **Other information** 162 women with SUI were referred for corrective surgery; 3 women who received TVT-SECUR and 7 women who received TVT-O were excluded from the study in

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					accordance with the study exclusion criteria. Women were asked to choose either TVT-SECUR or TVT-O, respecting the woman's right to make an informed decision about the operative method. All study participants either failed or refused pelvic floor rehabilitation physical therapy.
Full citation Bernasconi,F., Napolitano,V., Natale,F., Leone,V., Lijoi,D., Cervigni,M., TVT SECUR System: Final results of a prospective, observational, multicentric study, International Urogynecology Journal, 23, 93-98, 2012 **Ref Id** 188442 **Country/ies where the study was carried out** Italy	**Sample size** N = 136 **Characteristics** Gender -Female/N (% female) 136/136 (100%) Age (years) - Mean ± SD 59.50 ± 9.66 Incontinence episodes/day-Mean ± SD Not reported Duration of SUI - Mean ± SD Not reported	**Interventions** All women were treated with TVT SECUR™ in either the U- or H-position depending on the preferred method of the particular centre.	**Details** Complete urodynamic examination was carried out in all women according to ICS recommendations. A gynaecological examination was carried out to exclude possible associated pelvic pathologies. SUI was evaluated subjectively using the bladder stress test (at 200ml and 400ml) in both standing and lying positions. Subjective evaluation was made using a visual analogue scale and Patient Global Impression of Severity questionnaire with a score ranging from 1-4. A micturition diary and Women	**Results** <u>Patient satisfaction with treatment</u> Scale used - subjective cure = Patient Global Impression of Severity Score ≤2 (1=absence of any urine leakage on exertion 4=daily leakage of urine) Cured = 113/123 (91.8%) <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 24</u>	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 only 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? unclear whether consecutive women were enrolled in to the study, unclear whether cohort were identified prospectively or retrospectively

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Prospective cohort study **Aim of the study** A multicentre prospective study into the complications and therapeutic effectiveness of TVT SECUR™ over a follow-up of 24 months **Study dates** 1 March to 31 December 2007 **Source of funding** Not reported	Detrusor overactivity - n/N (%) Not reported Urgency - n/N (%) 50/136 (36.8%) Urge urinary incontinence - n/N (%) 25/136 (18.4%) Urodynamic SUI - n/N (%) 95/136 (69.9%) Occult SUI - n/N (%) 41/136 (30.1%) **Inclusion criteria** Not reported **Exclusion criteria** 1] Previous pelvic surgery 2] Intrinsic sphincter deficiency, defined as maximum urethral closure pressure ≤ 20 cm of water		Irritative Prostate Symptoms Score (W-IPSS) questionnaire was used to assess symptoms of overactive bladder. Follow-up was carried out at 6, 12, and 24 months. **Power calculation** The authors aimed to include 120 patients in the final analysis of outcomes. Assuming a 10% drop-out rate during the study period, the authors sought to enrol at least 132 patients in the study. **Intention to treat analysis** Not reported	<u>months</u> Scale used - objective cure rate = stress test [negative stress test not defined] Cured = 110/123 (89.4%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment at 24 months</u> Tape erosion 2/123 (1.62%) Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? - 3/136 (10%) loss to follow up 7b. Was the follow up of subjects long enough? Possible selection bias - difficult to assess from study report **Indirectness** Does the study match the review protocol in terms of: Population: Yes- 18.4% of women had urge urinary incontinence and 36.8% had urgency. 30.1% of women had occult SUI, 69.9% had urodynamic SUI. Intervention: Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Outcome: Yes Indirectness: None **Other information** Study centres used TVT SECUR™ in either U- or H-position depending on the preferred method of that centre. Authors state it would have been preferrable to randomise treatment but asking centres to practice a less familiar technique would have led to different results. Transobturator H position was most common approach (80.9% of cases compared to 19.1% of retropubic U position cases).
Full citation Kennelly,M.J., Moore,R., Nguyen,J.N., Lukban,J., Siegel,S., Miniarc single-incision sling for treatment of stress urinary incontinence: 2-year clinical outcomes, International Urogynecology Journal, 23, 1285-1291, 2012	**Sample size** N = 188 **Characteristics** Gender - Female/N (% female) 188/188 (100%)	**Interventions** The MiniArc single-incision sling system (American Medical Systems, Minnetonka, MN, USA) was used. Self-fixating tips were attched to the obturator internus muscles via a small (1.5 cm) incision	**Details** Participants were evaluated at 1 week, 6 weeks 12 and 24 months after surgery. Cough stress test, 1-hour pad test, Urogenital Distress Iventory -Short form (UDI-6), Incontinence Impact Questionnaire-Short form (11Q-7) and safety were assessed.	**Results** <u>Patient satisfaction with treatment</u> Not reported <u>Self reported rate of absolute symptom reduction per day</u> Not reported	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 215779 **Country/ies where the study was carried out** United States **Study type** Prospective cohort study **Aim of the study** Not reported **Study dates** September 2007 to June 2008 **Source of funding** Study sponsored by American Medical Systems	Age (years)-Median (range) 50.3 (25.9 - 79.6) Incontinence episodes/day-Mean ± SD Not reported Duration of SUI-Mean ± SD Not reported Detrusor overactivity - n/N (%) Not reported Mixed incontinence - n/N (%) 127/188 (67.6%) **Inclusion criteria** 1] age > 18 years 2] desire for surgical correction of stress urinary incontinence 3] objective demonstration of stress urinary incontinence by one of the follow a/ urodynamic documentation of stress urinary incontinence b/ a 1-hour pad test > 2g c/ a positive cough stress test **Exclusion criteria** 1] previous synthetic sling 2] pelvic organ prolapse greater tha n stage 3 3] any coexisting pelvic	at the mid-urethra.	**Power calculation** N/A **Intention to treat analysis** N/A	<u>Continence status at 36 months</u> Cure was defined as a negative cough stress test or 1-hour pad weight < 1g Cured = 120/188 (63.8%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u> Tape erosion 3/188 (2.1%) Retention 6/188 (4.2%) Voiding dysfunction Not reported De novo OAB symptoms 8/67 (11.9%) <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	3. Was the cohort recruited in an appropriate way? yes - consecutive women 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors? unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? - 46/188 (24.5%) loss to follow up 7b. Was the follow up of subjects long enough? yes Detection bias: low risk **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	pathology 4] pregnancy 5] primary urgency incontince or detrusor overactivity 6] renal insufficiency and/or upper urininary tract obstruction 7] elevated post-void residual volume > 100 ml 8] blood coagulation disorderr 9] morbid obesity (BMI > 40)				**Other information** None
Full citation Nwabineli,N.J., Mittal,S., Russell,M., Coleman,S., Long-term results of urinary stress incontinence treated with mid-urethral tape as a standalone operation or in combination with pelvic floor reconstruction, Journal of Obstetrics and Gynaecology, 32, 773-777, 2012 **Ref Id** 215882 **Country/ies where the study was carried out** UK **Study type** Prospective cohort study	**Sample size** N = 124 Stand-alone TVT = 81 TVT with other procedures = 38 **Characteristics** <u>Gender – Female/N (% female)</u> 124/124 (100%) <u>Age (years)- Mean (range)</u> Stand-alone TVT = 54.6 (28 -76) TVT with other procedures = 59.5 (30 - 83) <u>Incontinence episodes/day – Mean ± SD</u> Not reported	**Interventions** TVT was performed using Gynecare kit (Ulmset et al., 1996)	**Details** All surgeries were performed by the same surgeon Stand-alone TVT was performed under local anaesthetic with sedation in 78 women and spinal anaesthesia in the remaining 7 women. All TVT in combination with pelvic floor surgery was carried out under spinal anaesthesia. Pelvic floor operations were performed only if women had grade 2 prolapse or worse and were symptomatic. All patients were seen at 6 weeks, 6 months and then yearly for 5 years **Power calculation** Not reported	**Results** <u>Patient satisfaction with treatment</u> 90/124 (72.58%) <u>Self reported rate of absolute symptom reduction per day</u> Not reported <u>Continence status at 24 months</u> Objective cure rate = no urodynamic stress incontinence on cystometry 92/124 (74.19%) <u>Incontinence-specific quality of life</u> Not reported <u>Adverse effects of treatment</u>	**Limitations** Critical Appraisal Skills Programme. Cohort study checklist. Items 1-7 1. Did the study address a clearly focused issue? yes 2. Did the authors use an appropriate method to answer their question? yes 3. Was the cohort recruited in an appropriate way? unclear whether consecutive women were included 4. Was the exposure accurately measured to minimise bias? yes 5. Was the outcome accurately measured to minimise bias? yes 6a. Have the authors identified all important confounding factors?

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To compare the outcome of TVT in women as a standalone or in combination with other pelvic floor reconstructive procedure at 2 years and 5 years postoperatively **Study dates** June 1998 to May 2003 **Source of funding** Not reported	<u>Duration of SUI – Mean ± SD</u> Not reported <u>Detrusor overactivity – n/N (%)</u> Not reported <u>Mixed urinary incontinence - n/N (%)</u> Not reported <u>Pelvic organ prolapse -n/N (%)</u> 39/124 (31%) **Inclusion criteria** 1] Stress urinary incontinence on cystometry or 1-h pad test **Exclusion criteria** Not reported		**Intention to treat analysis** Not reported	Tape erosion Not reported Retention Not reported Voiding dysfunction Not reported De novo OAB symptoms Not reported <u>Psychological outcomes</u> Not reported <u>Clinical measures</u> Not reported	unclear 6b. Have the authors taken account of confounding factors in the design and or/analysis? unclear 7a. Was the follow up of subjects complete enough? yes - 21/124 (17%) at 2 years 7b. Was the follow up of subjects long enough? yes **Indirectness** Population: 15/124 (12%) of women had previous incontinence surgery Intervention: none Outcome: none **Other information** Five year outcomes not extracted as loss to follow up >25%

What is the comparative effectiveness of interventions for women with failure of the primary tape procedure?

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation de Cuyper,E.M., Ismail,R., Maher,C.F., Laparoscopic Burch colposuspension after failed sub-urethral tape procedures: a retrospective audit, International Urogynecology Journal, 19, 681-685, 2008 **Ref Id** 124233 **Country/ies where the study was carried out** Australia **Study type** Retrospective chart review **Aim of the study** "To report on the cure rates and complications of laparoscopic Burch colposuspension after failed sub-urethral tapes"	**Sample size** n = 16 **Characteristics** Gender – Female/N (% female) 16/16 (100%) Age (years)- Mean SD 51.88 ± 8.9 Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TVT = 8/16 (50%) TVT-O = 2/16 (12.5%) IVS = 6/16 (37.5%) **Inclusion criteria** Women who present with recurrent stress urinary incontinence after previous sub-urethral tape procedure.	**Interventions** Laparoscopic Burch colposuspension using three trocar sites. The cave of Retzius was exposed through careful sharp dissection close to the pubic bone to minimise bladder and urethral injury. Once identified, tape arms were divided bilaterally at the level of the pubic bone and mobilised with sharp dissection from the peri-urethral and vesical region. The tapes were not removed, and the bladder was reflected medially. Two non-absorbable sutures (No 1 ethibond: Ethicon) were placed bilaterally at the level of the bladder neck and used to suspend the vaginal fornices to the ipsilateral iliopectineal ligament without under tension. The surgeons fingers were in the vagina while inserting sutures to ensure the placement was accurate.	**Details** Median follow-up = 24.5 months Two women lost to follow up 11 women underwent post-operative urodynamic studies - Three women were diagnosed with a co-existing overactive bladder pre-operatively	**Results** Patient satisfaction with treatment using a 0 - 10 scale Laparoscopic Burch Colposuspension = 9.36 ± 1.08 Self reported rate of absolute symptom reduction per day Not reported Continence status Laparoscopic Burch Colposuspension = 6/11 (54.6%) Incontinence-specific quality of life Not reported Adverse effects of treatment De-novo urge incontinence Laparoscopic Burch Colposuspension = 1/11 (9.1%) Recurrent urinary tract infections Laparoscopic Burch Colposuspension =	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates January 2002 - August 2006 **Source of funding** None reported	**Exclusion criteria** None reported			3/14 (21.4%) Psychological outcomes Not reported Clinical measures Not reported	equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: NA D5 - Were investigators blinded to confounding factors: NA Level of bias: Low **Other information** No information on women lost to follow up Objective cure used - defined as inability to

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					demonstrate urinary incontinence on provocative urodynamics. No information on cure rate of Laparoscopic Burch colposuspension after the different MUS procedures. **Indirectness** Populations: As specified in protocol Intervention: As specified in protocol Outcomes: As specified in protocol Indirectness: None
Full citation Eandi,J.A., Tanaka,S.T., Hellenthal,N.J., O'Connor,R.C., Stone,A.R., Self-reported urinary continence outcomes for repeat midurethral synthetic sling placement, International Braz J Urol, 34, 336-342,	**Sample size** N = 10 **Characteristics** Gender – Female/N (% female) 10/10 (100%) Age (years)- Mean SD	**Interventions** Retropubic midurethral synthetic sling placement was performed using the Gynecare (Ethicon) device, No attempt to locate or alter the previously placed-sling was made at the time of surgery.	**Details** Followed up after a median of 16 months (6 to 33 months)	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
2008 **Ref Id** 124266 **Country/ies where the study was carried out** USA **Study type** Retrospective chart review **Aim of the study** Not reported **Study dates** January 2004 - June 2006 **Source of funding** None declared	65.1 ± 12.4 Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Primary surgery TVT = 5/10 (50%) TOT = 4/10 (40%) TVT-O = 1/10 (10%) **Inclusion criteria** Women who underwent placement of a TVT due to primary or recurrent failure of a MUS surgery for the management of SUI **Exclusion criteria** None reported			Continence status at 12 months TVT then TVT = 3/5 (60%) TOT then TVT = 4/5 (80%) Incontinence-specific quality of life Not reported Adverse effects of treatment TVT = 0/10 (0%) Psychological outcomes Not reported Clinical measures Not reported	confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: No D5 - Were investigators blinded to confounding factors: No Level of bias: High **Other information** Cure was defined as a sum score of 0 on the ICIQ (Patient was required to self-report total absence of urinary leakage to quality as completely continent) **Indirectness** Population: As specified in protocol Intervention: As specified in protocol Outcome: Subjective cure used

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Indirectness: Some
Full citation Kuhn,A., Eggeman,C., Burkhard,F., Mueller,M.D., Correction of erosion after suburethral sling insertion for stress incontinence: results and related sexual function, European Urology, 56, 371-376, 2009 **Ref Id** 124398 **Country/ies where the study was carried out** Switzerland **Study type** Prospective case series **Aim of the study** "To determine the outcome after reclosure of the vaginal epithelium for sling erosion"	**Sample size** n = 21 **Characteristics** Gender – Female/N (% female) 21/21 (100%) Age (years)- Median range 52 (43 - 79) Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TVT-O = 5 TOT = 6 Unspecified = 1 TVT = 5 SPARC = 4 **Inclusion criteria** Female patients referred for	**Interventions** All women give local estrogen daily and were reviewed after 6 weeks. Those who had not healed after 6 weeks underwent surgical intervention. The edge of the vaginal epithelium was trimmed, mobilized and closed with interrupted vertical mattress sutures in a single layer using Vicryl 2-0 (Ethicon). The free edges of the tape were buried under the vaginal epithelium and, in cases in which needle like polypropylene filaments were sticking out of the vaginal epithelium, these were cut off. Women were advised to avoid sexual intercourse / insertion of any foreign bodies and to continue using topical estrogens.	**Details** Follow up at a median of 6 months (range 3 - 12)	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status at 12 months Healed with estrogen = 3/21 (14.3%) Healed with surgery = 16/18 (88.9%) Total healed 19/21 (76.2%) Incontinence-specific quality of life at 12 months Not reported Adverse effects of treatment Not reported Psychological outcomes Not reported	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: NA B3 - Were clinical staff blinded: NA Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates December 2005 - December 2007 **Source of funding** None	vaginal erosion after suburethral sling insertion for urinary stress incontinence. **Exclusion criteria** 1] Inability to communicate in one of the local languages or English and/or an unwillingness or inability to fill the FSFI questionnaire. 2] Patient clinically too unwell to participate			Clinical measures Not reported	<u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: No duration < 1 year D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: NA D5 - Were investigators blinded to confounding factors: NA Level of bias: Low **Other information** N/A

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Indirectness Population: As specified in protocol Intervention: As specified in protocol Outcomes: As specified in protocol Indirectness: None
Full citation Lee,H.N., Lee,Y.S., Han,J.Y., Jeong,J.Y., Choo,M.S., Lee,K.S., Transurethral injection of bulking agent for treatment of failed mid-urethral sling procedures, International Urogynecology Journal, 21, 1479-1483, 2010 **Ref Id** 124412 **Country/ies where the study was carried out** South Korea **Study type** Retrospective chart review	**Sample size** n = 23 **Characteristics** Gender – Female/N (% female) 23/23 (100%) Age (years)- Median (range) 74 (44 - 77) Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery	**Interventions** Transurethral injection of a bulking agent. This was given with local anesthesia under direct urethroscopic guidance, Bulking agents were injected into the submucosa through the urethra using a 20 G needle. Three or four deposits were placed at positions 0.5-1cm distal to the bladder neck. After proper coaptation was achieved, we evacuated the bladder using a 4-Fr catheter to avoid molding of the bulks. Patients were discharged after successful voiding without significant post-void residual urine (less than 100ml).	**Details** Primary outcome was subjective cure based on Sandvik questionnaire (no experience of SUI in the past 7 days) Other outcomes include Subjective Symptom Visual Analogue Scale used to measure severity of symptoms. Incontinence Quality of Life Benefit, Satisfaction and Willingness to Continue Questionnaire flow rate and postvoid residual volume Adverse events Median follow-up was 10 months (range 6 - 34 months)	**Results** Patient satisfaction with treatment 18/23 (77%) satisifed with treatment Self reported rate of absolute symptom reduction per day Not reported Continence status 8/23 (34.6%) Incontinence-specific quality of life Improved by 19.2 (SD not calculable) Adverse effects of treatment	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To examine the 'efficacy of TUI of bulking agent for the treatment of recurrent or persistent SUI after MUS' **Study dates** August 2003 - October 2007 **Source of funding** None	TVT = 8 TVT-O = 7 IRIS-TOT = 6 Anterior IVS = 2 **Inclusion criteria** Women with stress urinary incontinence who wanted retreatment of recurrent or persistent SUI after a mid-urethral procedure **Exclusion criteria** None reported			Not reported Psychological outcomes Not reported Clinical measures Postvoid residual decreased from 31.0 ± 50.7 (pre-op) to 30.8 ± 41.8 (post-op)	B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: No < median < 1 year D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: No D5 - Were investigators blinded

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					to confounding factors: No Level of bias: High **Other information** N/A **Indirectness** Population: As specified in protocol INtervention: As specified in protocol Outcome: Study reported subjective cure not objective cure Indirectness: Some
Full citation Lee,K.S., Doo,C.K., Han,D.H., Jung,B.J., Han,J.Y., Choo,M.S., Outcomes following repeat mid urethral synthetic sling after failure of the initial sling procedure: rediscovery of the tension-free vaginal tape procedure, Journal of	**Sample size** n = 29 **Characteristics** Gender – Female/N (% female) 29/29 (100%) Age (years)- Mean SD 54.1 ± 10.8 years	**Interventions** Repeat of original procedure	**Details** A search was made for previously positioned MUS tape. If found, it remained and the second tape was introduced. No indwelling catheter was used. In the absence of urinary retention or other complications patients were discharged on the afternoon of the day of surgery.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Urology, 178, 1370-1374, 2007 **Ref Id** 124416 **Country/ies where the study was carried out** South Korea **Study type** Retrospective study **Aim of the study** Not reported **Study dates** March 1999 - October 2005 **Source of funding** Not reported	Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TVT = 19 TOT = 8 TVT-0 = 8 **Inclusion criteria** Women who experienced persistent SUI (early leakage with stress events causing increased intra-abdominal pressure for less than 6 weeks) despite the first MUS procedure or recurrent SUI (later leakage more tha 6 weeks after initial MUS success) during postoperative follow-up **Exclusion criteria** None		Patients were followed for 1, 6 and 12 months postoperatively. Cure defined as the absence of any episodes of involuntary urine leaskage during stressful activities and the cough stress test.	TVT 12/13 (92.3%) TOT = 4/8 (50.0%) TVT-O = 6/8 (75.0%) Incontinence-specific quality of life Not reported Adverse effects of treatment Not reported Psychological outcomes Not reported Clinical measures Not reported	A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: NA D5 - Were investigators blinded to confounding factors: NA Level of bias: High **Other information** N/A **Indirectness** Population: As specifioed in protocol Intervention: As specified in protocol Outcome: As specified in protocol Indirectness: None
Full citation Liapis,A., Bakas,P., Creatsas,G., Tension-free	**Sample size** n = 31	**Interventions** TVT under epidural anesthesia. TVT adjustment was done using	**Details** Patients were assessed with physical examination, urinalysis,	**Results** Patient satisfaction with treatment	**Limitations** NICE guidelines manual. Appendix E:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
vaginal tape in the management of recurrent urodynamic stress incontinence after previous failed midurethral tape, European Urology, 55, 1450-1455, 2009 **Ref Id** 124428 **Country/ies where the study was carried out** Greece **Study type** Prospective case series **Aim of the study** "To assess the efficacy, complications, and indications associated with the TVT procedure on patients who had failed previous anti-incontinence surgery with the use of MUSP" **Study dates** Not reported	**Characteristics** Gender – Female/N (% female) 31/31 (100%) Age (years)- Mean SD 57.26 ± 11.47 years Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TVT = 6 TOT = 7 TVT-O = 6 TVT-Secur = 10 **Inclusion criteria** 1] Women who continued to have symptoms of SUI after surgery or developed symptoms 1 - 34 months after surgery. 2] BMI < 30 **Exclusion criteria** 1] necessity for concomitant	the cough stress test with 350-400ml in the bladder or up to maximum cystometric capacity until no leakage was noted after repeated coughing. The patient was placed in the anti-Trendelenburg position.	urine culture, voiding diary for 2-3 days, Q-tip test, uroflow, filling and voiding cystomentry, urethral profilometry, an 1-hour pad test at 12 months.	Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status TVT then TVT = 5/6 (83%) TVT-O then TVT = 6/8 (75%) TOT then TVT = 5/7 (72%) TVT-Secur then TVT = 7/10 (70%) Incontinence-specific quality of life at 12 months Not reported Adverse effects of treatment Bladder perforation 1/31 (3.2%) De novo urgency 3/31 (9.6%) Psychological outcomes Not reported Clinical measures increased from 13.22 ± 16.8 (pre-op) to 22.58 ± 20.8	Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding None	pelvic floor surgery 2] presence of mixed incontinence 3] presence of immobile urethra (fixed pipelike) 4] presence of urodynamic dysuria (defined as peak flow rate > 15ml/s)				missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: No D5 - Were investigators blinded to confounding factors: No Level of bias: Medium **Other information** N/A **Indirectness** Population: As specified in protocol Intervention: As specifid in protocol Outcome: As

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					specified in protocol Indirectness: None
Full citation Lo,T.S., Wang,A.C., Liang,C.C., Long,C.Y., Lee,S.J., Treatment for unsuccessful tension-free vaginal tape operation by shortening pre-implanted tape, Journal of Urology, 175, 2196-2199, 2006 **Ref Id** 124439 **Country/ies where the study was carried out** Taiwan, Republic of China **Study type** Case series **Aim of the study** Not reported **Study dates** Septembber 1998 - January 2004	**Sample size** n = 14 **Characteristics** Gender – Female/N (% female) 14/14 (100%) Age (years)- Mean (range) 48.7 (41 - 57) Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TVT = 14 **Inclusion criteria** Women with recurrent or persistent urinary leakage after initial TVT procedure and who requested a second anti-	**Interventions** TVT shortening Local anesthesia was injected suburethrally and paraurethrally with the patient in the lithotomy position and local anesthesia were injected. A sagittal vaginal incision was made, The paraurethral area around the vaginal tape was dissected bilaterally. The tape was identified and grasped with 2 clamps at approximately 1 cm from the midline bilaterally. A 1-zero polypropylene figure-of-8 suture was placed between the clamp and midline of the tape bilaterally. After tightening the stitches the tape was shortened with a double-fold of approximately 0.5cm bilaterally. Continence was verified with the patient straining and the bladder filled with 250ml normal saline, The vaginal mucosa was then closed.	**Details** Women were followed up at 1 week, 1 month, 6 months and 1 year with pelvic examinations and post-void residual urine. Subjective cure was defined as patient self-report of no urinary incontinence. Objective cure was defined as a pad weight of less than 2g/hour and without any leakage on urethral pressure profilometry.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status at 12 months TVT then shortening 10/14 (71.4%) Incontinence-specific quality of life at 12 months Not reported Adverse effects of treatment Not reported Psychological outcomes Not reported Clinical measures Not reported	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Not reported	incontinence operation due to unsatisfactory results of conservative treatments, **Exclusion criteria** None reported				<u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: No D5 - Were investigators blinded to confounding factors: No Level of bias: Medium **Other information** N/A

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Indirectness Population: As specified in protocol Intervention: As specified in protocol Outcomes: As specified in protocol Indirectness: None
Full citation Palva,K., Nilsson,C.G., Effectiveness of the TVT procedure as a repeat mid-urethra operation for treatment of stress incontinence, International Urogynecology Journal, 20, 769-774, 2009 **Ref Id** 124529 **Country/ies where the study was carried out** Finland **Study type** Retrospective case-series	**Sample size** n = 20 **Characteristics** Gender – Female/N (% female) 20/20 (100%) Age (years)- Mean SD 61 ± 9 Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported	**Interventions** TVT was performed according to Ulmsten under local anesthesia using 0.25% prilocaine with adrenaline, Cystoscopy was performed twice during the operation after each retropubic pass of the TVT needle to detect possible bladder injury. Adjustment of the tape was performed by using the cought test allowing for a few drops of saline to escape on vigorous coughing in order to avoid retention. The repeat TVT operations were performed by an experienced urogynecologist.	**Details** Evaluation during the follow-up visit after the repeat TVT operation included a 24-h pad weighing test, a cough stress test performed in a semilithotomy position with a comfortably filled bladder (200 - 300 ml), A careful gynecological examination to detect possible tape erosions or other adverse effects of the tape material, and a postvoid residual urine volume measurement. Subjective outcome was assessed by Incontinence Impact Questionnaire - Short-form (IIQ-7), urogenital distress inventory (UDI-6), urinary incontinence severity score	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status TVT then TVT: 11/20 (55.0%) Incontinence-specific quality of life UISS changed from a median (range) 60 (15 - 85) preoperatively to 5	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study "To evaluate the long-term effect of performing a retropubic TVT Operation on women that have a prior failed mid-urethra sling procedure" **Study dates** 1999 - 2004 **Source of funding** Finnish Medical Association	Previous surgery TVT = 20 **Inclusion criteria** Women who had a repeat mid-urethral sling procedure at least 3 years earlier **Exclusion criteria** None		(UISS), the DIS and a visual analogue score (0 - 100) Overall cure was defined as a negative stress test and a negative pad test (≤ 8/ 24h) and a VAS ≤ 15)	(0 - 60) at last folllow-up Adverse effects of treatment Not reported Psychological outcomes Not reported Clinical measures Not reported	 <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: No D5 - Were

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					investigators blinded to confounding factors: No Level of bias: Medium **Other information** N/A **Indirectness** Population: As specified in protocol Intervention: As specified in protocol Outcome: As specified in protocol Indirectness: None
Full citation Schmid,C., Bloch,E., Amann,E., Mueller,M.D., Kuhn,A., An adjustable sling in the management of recurrent urodynamic stress incontinence after previous failed midurethral tape, Neurourology and Urodynamics, 29, 573-	**Sample size** n = 25 **Characteristics** Gender – Female/N (% female) 25/25 (100%) Age (years)- Median (range) 64 (43 - 85)	**Interventions** AMI adjustable sling (made of macroporous monofilament) that can be adjusted postoperatively by pulling or loosening Polypropylene sutures that go through the sling retropubically to tighten and paravaginally to loosen the sling in case of retention.	**Details** Women had a gynecological exam and urodynamic cystometry before the procedure and 12 months later.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
577, 2010 **Ref Id** 124603 **Country/ies where the study was carried out** Switzerland **Study type** Prospective case-series **Aim of the study** "To evaluate the feasibility, clinical, subjective and urodynamic outcome after the insertion of an adjustable suburethral sling system in patients with recurrent urinary incontinence" **Study dates** December 2003 - March 2008 **Source of funding** None reported	Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TVT = 18 TOT = 7 Collagen Injections = 1 **Inclusion criteria** Women with recurrent urinary stress incontinence with 1] at least one failed surgical intervention for urinary stress incontinence and 2] a positive cough stress test **Exclusion criteria** None reported	Sling insertion was performed under spinal or general anaesthetic and intraoperatively cystoscopy was performed to exclude bladder and urethral perforation. Intraoperatively, a prophylactic antibiotic antibiotic was initiated and continued until sling adjustment was complete.		at 12 months MUS 21/25 (84.0%) Incontinence-specific quality of life Not reported Adverse effects of treatment Not reported Psychological outcomes Not reported Clinical measures Not reported	NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: Yes D2 - Were outcomes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: No D4 - Were investigators blinded to interventions: No D5 - Were investigators blinded to confounding factors: No Level of bias: Medium **Other information** Infomration on outcome of AMI after failed collagen injections was not used in the results. **Indirectness** Population: As specified in protocol Intervention: As specified in protocol Outcomes: As specified in protocol Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Van Baelen,A.A., Delaere,K.P., Repeat transobturator tape after failed mid-urethral sling procedure: follow-up with questionnaire-based assessment, Urologia Internationalis, 83, 399-403, 2009 **Ref Id** 124683 **Country/ies where the study was carried out** The Netherlands **Study type** Retrospectice case-series **Aim of the study** Not reported **Study dates** February 2005 - February 2008	**Sample size** n = 21 **Characteristics** Gender – Female/N (% female) 21/21 (100%) Age (years)- Mean (range) 56 (33 - 77) Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TOT = 16 TVT = 5 **Inclusion criteria** Women undergoing a repeat TOT procedure **Exclusion criteria** None reported	**Interventions** The TOT procedure was performed as described by Delorme under spinal or general anesthesia. A search was not performed for the previously positioned tape.	**Details** All women had postoperative clinical evaluation at 6 weeks, 3 months and on a 6-monthly basis until final discharge. Physician determined cure was defined as absence of urinary incontinence during stressful activities. Questionnaire-deduced cure was defined as leakage of urine ≤ 1 per week.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status MUS: 12/21 (57%) Incontinence-specific quality of life Assessed by the International Consultation on Incontinence Questionnaire (ICIQ) Improved for a median of 18 to 6 Adverse effects of treatment Not reported Psychological outcomes Not reported Clinical measures Not reported	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA <u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: Medium <u>C Attrition bias</u>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Not reported					C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: no - ranged for 3 to 16 months D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: No D5 - Were investigators blinded to confounding factors: No Level of bias: High **Other information** N/A

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Indirectness Population: As specified in protocol Intervention: As specified in protocol Outcomes: Indirectness due to timing of outcome assessment Indirectness: Some
Full citation Molden,S., Bracken,J., Nguyen,A., Harvie,H.S., White,A., Hammil,S.L., Patterson,D., Tarr,M., Sanses,T., Murphy,M., Rogers,R.G., A retrospective multicenter study on outcomes after midurethral polypropylene sling revision for voiding dysfunction, Female Pelvic Medicine and Reconstructive Surgery, 16, 340-344, 2010 **Ref Id** 188055 **Country/ies where the**	**Sample size** n = 197 **Characteristics** Gender – Female/N (% female) 197/197 (100%) Age (years)- Mean SD 57.7 ± 13.7 Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported	**Interventions** Surgical revision including: 1] sling cut/transected in midline or laterally 2] sling pulled, loosened or stretched 3] sling excised (any portion) 4] any combination of the above	**Details** Revision type Sling cut = 96/178 (53.9%) Sling excised = 50/178 (28.1%) Sling pulled down = 32/178 (18.0%) Timing of revision after primary surgery < 15 days later = 38/178 (21.3%) 15 - 90 days = 69/178 (38.8%) > 90 days = 71/178 (39.9%)	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status Sling revision: 144/178 (80.9%) Incontinence-specific quality of life Not reported Adverse effects of treatment	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies <u>A Selection bias</u> A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
study was carried out United States of America **Study type** Retrospective chart review **Aim of the study** 'To perform a multicenter retrospective analysis of patients undergoing sling revision for persistent voiding dysfunction' **Study dates** January 1999 - December 2007 **Source of funding** Society of Gynecologic Surgeons	Previous surgery Retropubic: 133/189 (30%)* Obturator: 56/189 (30%) * data on type of primary surgey given for 189 women, baseline data given for all 197 women **Inclusion criteria** Women who had undergone a procedure (identified by Current Procedural Terminology code = 57287 or 53500) with any of the following ICD-9 diagnoses: 596.0 - Bladder neck obstruction, 599.6 - urinary obstruction; 788.2 - retention of urine; 788.21 - incomplete bladder emptying; 788.29 - other specified retention of urine; 788.62 - slowing of urine stream; 788.38 - overflow incontinence **Exclusion criteria** 1] sling placement not utilizing mesh or midurethral placement 2] cases missing preoperative or postoperative data 3] cases of revision for reason other than voiding dysunction 4] cases of multiple sclerosis, Parkinson disease or other neuropathic bladder disorders			De-novo urge incontinence Sling revision = 13/108 (12.3%)** Urinary tract infections Sling revision: 19/103 (18.4%)** Psychological outcomes Not reported Clinical measures Not reported ** data on adverse effects on sling revision only counted women who had new symptoms after the sling revision	<u>B Performance bias</u> B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA <u>D Detection bias</u> D1 - Was follow-up appropriate length: No - Not reported D2 - Were outcomes defined precisely: No - Unclear what outcomes were used and why D3 - Was a valid and reliable method used to assess outcome: Unclear D4 - Were investigators blinded

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					to interventions: NA D5 - Were investigators blinded to confounding factors: NA Level of bias: High **Other information** **Indirectness** Populations- As specified in protocol Intervention: As specified in protocol Outcomes: As specified in protocol Indirectness: None
Full citation Sabadell,J., Poza,J.L., Esgueva,A., Morales,J.C., Sanchez-Iglesias,J.L., Xercavins,J., Usefulness of retropubic tape for recurrent stress incontinence after transobturator tape failure, International urogynecology journal and	**Sample size** N = 22 **Characteristics** Gender – Female/N (% female) 22/22 (100%) Age (years)- Median range 64 (49 - 77)	**Interventions** TVT was performed as described by Ulmsten 1996 using either TVT (Gynecare, Johnson & Johnson) or Uretex Sup/Align R (Bard) based on surgens discretion.	**Details** The primary tape was not routinely removed. Cystoscopy was performed twice during surgery to detect ay bladder injury. The tape was placed in a tension-free manner without the aid of a cough test. Surgery for pelvic organ prolapse correction was associated when needed.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status	**Limitations** **Other information** **Indirectness** Does the study match the review protocol in terms of:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
pelvic floor dysfunction, 22, 1543-1547, 2011 **Ref Id** 188459 **Country/ies where the study was carried out** Spain **Study type** Retrospective case series **Aim of the study** To evaluate the efficacy and safety of TVT in the treatment of recurrent or persistent SUI after a TOT failure in a cohort with 3 years follow up **Study dates** January 2004 to December 2008 **Source of funding** Not reported	Incontinence episodes/day Not reported Duration of SUI Not reported Detrusor overactivity Not reported Previous surgery TOT = 22 Mixed incontinence 2/22 (6.8%) **Inclusion criteria** 1] women who had a failed TOT procedure for SUI **Exclusion criteria** Not reported			12 months - TVT= 13/22 (59.1%) 24 months - TVT = 13/22 (59.1%) 36 months - TVT = 9/16 (56.3%) Incontinence-specific quality of life Not reported Adverse effects of treatment Bladder injury TVT = 2/22 (9.1%) De-novo urge incontinence TVT = 5/22 (22.7%) Mesh exposure TVT = 1/22 (4.5%) Cystitis TVT = 5/22 (22.7%) Voiding difficulty requiring intermittent self-catheterization TVT = 2/22 (9.1%) Pubic bruise TVT = 1/22 (4.5%) Thigh numbness TVT = 1/22 (4.5%)	Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Short-term pubic/thigh pain TVT = 2/22 (9.1%) Psychological outcomes Not reported Clinical measures Not reported	
Full citation Giarenis,I., Mastoroudes,H., Cardozo,L., Robinson,D., What do we do when a midurethral tape fails? Rediscovery of open colposuspension as a salvage continence operation, International Urogynecology Journal, 23, 1117-1122, 2012 **Ref Id** 188552 **Country/ies where the study was carried out** UK **Study type** Retrospective case series	**Sample size** N = 13 **Characteristics** Gender – Female/N (% female) 16/16 (100%) Age (years) - Mean ± SD 55.3 ± 9.61 Incontinence episodes/day Not reported Duration of SUI Not reported Detrusor overactivity 3/13 (23%) Previous midurethral tape TVT: 8/13 (61%) TVT-O: 5/13 (39%)	**Interventions** Modified Burch open colposuspension was performed under general anaesthesia. Women were placed in the Lloyd-Davius position. A low transverse incision was made, the rectus sheath was opened and a hysterectomy was performed if clinically indicated. The cave of Retzius was entered by a combination of sharp and blunt incisions. The midurethral tapes were identified and excised only if required to allow adequate mobilization of the bladder neck and the paravaginal tissues. The paravaginal tissues were sutured to the ipeopectineal ligament on each side, without undue tension, with four number 1 polydioxanone sutures, 1cm apart. The surgeon's fingers were in the vagina while the sutures were inserted to ensue that placement	**Details** A suprapubic catheter was inserted into the bladder at the end of the prcedure to facilitate the voiding trial with a clamping regime. It was left on free drainage until the second postoperative day whan clamping was commenced. When the residual urine was < 100ml and the woman was passing good volumes, the catheter was removed and she was allowed home. If the voiding trial was unsuccessful, the woman was discharged home with the suprapubic catheter on free drainage and re-admitted 7 days later for re-clamping. Women with persisting residuals > 100m were taught clean intermittent self-catheterization.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status Open Burch Colposuspension Subjective cure: 11/13 (85%) Objective cure: 10/13 (77%) Incontinence-specific quality of life Not reported Adverse effects of treatment	**Limitations** **Other information** **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcomes: Yes Indirectness: None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To evaluate the outcome of open colposuspension for women with urodynamic stress incontinence who has previously undergone a failed midurethral tape **Study dates** June 2005 to June 2010 **Source of funding** Not reported	**Inclusion criteria** 1] women who underwent colposuspension after a failed midurethral tape procedure **Exclusion criteria** Not reported	was accurate and care was taken not to over-elevate the bladder neck.		Open Burch colposuspension De nove detrusor overactivity 3/10 (30%) Recurrent urinary tract infections Open Burch Colposuspension = 0/13 (0%) Psychological outcomes Not reported Clinical measures Not reported	
Full citation Agnew,G., Dwyer,P.L., Rosamilia,A., Edwards,G., Lee,J.K., Functional outcomes for surgical revision of synthetic slings performed for voiding dysfunction: a retrospective study, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 163, 113-116, 2012	**Sample size** N = 63 **Characteristics** Gender – Female/N (% female) 63/63 (100%) Age (years) Not reported Incontinence episodes/day – Mean SD Not reported	**Interventions** Three approaches to tape revision were used 1] tape division (either under or lateral to the urethra) 2] partial tape excision 3] either division or excision with an immediate concomitant procedure to prevent recurrent SUI	**Details** Success of revision was defined as persistent post-void residual volumes of < 150ml	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom reduction per day Not reported Continence status Tape revision = 55/63 (87.3%) Incontinence-	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies A Selection bias A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 215651 **Country/ies where the study was carried out** Australia **Study type** Retrospective case series **Aim of the study** To evaluate the outcomes of primary tape revision after failure due to voiding dysfunction **Study dates** Review of cases between 2000 and 2010 inclusive **Source of funding** None reported	Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery TVT = 42/63 (66.7%) TVT-O = 4/63 (6.3%) Advantage = 2/63 (3.2%) Dacron = 1/63 (1.6%) InFast = 1/63 (1.6%) IVS = 4/63 (6.3%) Monarc = 7/63 (11.1%) Prolene = 2/63 (3.2%) **Inclusion criteria** Women who underwent tape revision surgery for voiding dysfunction (defined as persistently raised [immediate] post-void residual of > 150ml) **Exclusion criteria** Women whose symptoms resolved with simple loosening of the tape			specific quality of life Not reported Adverse effects of treatment De-novo urgency Tape revision = 8/63 (12.7%) Persistent voiding dysfunction Tape revision = 8/63 (12.7%) Psychological outcomes Not reported Clinical measures Not reported	for potential confounders: NA A3 - Were groups comparable at baseline: NA Level of bias: NA B Performance bias B1 - Did groups get same level of care: NA B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High C Attrition bias C1 - Was follow-up equal for both groups: NA C2 - Were groups comparable for dropout: NA C3 - Were groups comparable for missing data: NA Level of bias: NA D Detection bias D1 - Was follow-up appropriate length: Unclear D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					to assess outcome: Yes D4 - Were investigators blinded to interventions: NA D5 - Were investigators blinded to confounding factors: NA Level of bias: Low **Other information** Unclear of length of follow-up after tape revision **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None
Full citation Han,J.Y., Moon,K.H., Park,C.M., Choo,M.S., Management of recurrent stress urinary incontinence after failed midurethral sling: tape tightening or	**Sample size** N = 66 Repeat tape = 36 Tape shortening = 30	**Interventions** Repeat TVT was performed as described by Ulmsten 1996 and the repeat TOT was perfomred as described by Delorme 2001. A search for the primary tape was not carried out and the second	**Details** No indwelling catheter was used. Intraoperative cystoscopy was routinely performed for all retropubic and transobturator procedures.	**Results** Patient satisfaction with treatment Not reported Self reported rate of absolute symptom	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
repeat sling?, International Urogynecology Journal, 23, 1279-1284, 2012 **Ref Id** 215746 **Country/ies where the study was carried out** Korea **Study type** Retrospective chart review **Aim of the study** To compare outcomes of repeat midurethral tapes with those of tape shortening in women who underwent failed a primary midurethral tape **Study dates** Not reported **Source of funding** None reported	**Characteristics** Gender – Female/N (% female) 66/66 (100%) Age (years)- Mean ± SD Repeat tape 54.7 ± 11.4 Tape shortening 53.4 ± 7.6 Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported Previous surgery Not reported **Inclusion criteria** Not reported **Exclusion criteria** Not reported	tape was placed without the removal of the primary tape, if found. Tape shortening was perfomed under local anaethesia. The suburethral field was dissected to identify the tape; dissection was continued toward the lower retropubic space on both sides. The loosened tape was directly retracted and the clamp was applied to the plicated tape at its midpoint. A nonabsorbable 2-0 Prolene suture was then placed beneath the clamp as the tape (which was tightly attached to the urethra and the vaginal mucosa) was closed with an absorbable suture.		reduction per day Not reported Continence status Repeat tape: 26/36 (72.2%) Tape shortening: 14/30 (46.7%) Incontinence-specific quality of life Not reported Adverse effects of treatment De-novo urge incontinence Repeat tape: 2/22 (9.1%) Tape shortening: 3/19 (15.8%) Erosion Repeat tape: 0/36 (0%) Tape shortening: 1/30 (3.3%) Voiding dysfunction Repeat tape: 1/36 (2.8%) Tape shortening: 0/30 (0%) Psychological outcomes Not reported Clinical measures	A Selection bias A1 – Allocation unrelated to potential confounding factors: NA A2 – Were attempts made to balance comparison groups for potential confounders: Unclear A3 - Were groups comparable at baseline: Yes Level of bias: Low B Performance bias B1 - Did groups get same level of care: Yes B2 - Were participants blinded: No B3 - Were clinical staff blinded: No Level of bias: High C Attrition bias C1 - Was follow-up equal for both groups: Yes C2 - Were groups comparable for dropout: Yes C3 - Were groups comparable for missing data: NA Level of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Not reported	D Detection bias D1 - Was follow-up appropriate length: Yes D2 - Were outcomes defined precisely: Yes D3 - Was a valid and reliable method used to assess outcome: Yes D4 - Were investigators blinded to interventions: NA D5 - Were investigators blinded to confounding factors: NA Level of bias: Low **Other information** Women were followed up after 12 months **Indirectness** Does the study match the review protocol in terms of: Population: Yes Intervention: Yes Outcome: Yes Indirectness: None

What patient characteristics are predictors of primary tape failure

Study details	Participants	Factors	Results	Comments
Full citation Barber,M.D., Kleeman,S., Karram,M.M., Paraiso,M.F., Ellerkmann,M., Vasavada,S., Walters,M.D., Risk factors associated with failure 1 year after retropubic or transobturator midurethral slings, American Journal of Obstetrics and Gynecology, 199, 666-667, 2008 **Ref Id** 100119 **Country/ies where the study was carried out** USA **Study type** Ancillary analysis of data from a RCT **Study dates** November 2004 to January 2006 **Consecutive recruitment** Not reported **Funding** This study was supported in part	**Cases** Subjects in whom TVT/TOT surgery failed Treatment failure defined as either; 1) 'any recurrent incontinence' defined as an ISI score greater than zero 1 year after surgery or any retreatment of urinary incontinence since the index surgery 2) 'recurrent SUI' defined as either an affirmative response to the question 'Do you experience urine leakage related to physical activity, coughing, or sneezing?' on the PFDI-20 at the 12-month visit or any retreatment for SUI. **Diagnostic criteria** Urodynamic stress urinary incontinence on multichannel urodynamic testing **Controls** Subjects in whom TVT/TOT was successful. **Inclusion criteria** 1] subjects demonstrating	**Factors** Independent factors assessed Treatment group (TVT vs TOT) Age (per decade) Current smoking Pre-operative anticholinergic medication use Functional capacity (metabolic unit, METs) Concurrent pelvic organ prolapse (POP) surgery Number of vaginal deliveries Presence of urge urinary incontinence symptoms at baseline Lowest abdominal leak point pressure Baseline incontinence severity	**Adjusted odds ratio** ODDS RATIOS FOR THE DEVELOPMENT OF ANY URINARY INCONTINENCE Treatment group (TVT vs TOT) OR (95%CI): 1.1 (0.5 to 2.5) Age (per decade) OR (95%CI): 1.3 (0.5 to 2.7) Current smoking OR (95%CI): 0.4 (0.1 to 1.3) Preoperative anticholinergic medication use OR (95%CI): 6.7 (1.6 to 22) Functional capacity (metabolic unit, METs) OR (95%CI): 2.4 (0.4 to 15) Concurrent (pelvic organ prolapse) POP surgery OR (95%CI): 2.7 (1.1 to 6.7) Number of vaginal deliveries OR (95%CI): 0.3 (0.03 to 2.4) ODDS RATIOS FOR THE DEVELOPMENT OF RECURRENT	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: unclear A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: unclear Level of bias: unclear B Performance bias B1 - Did groups get same level of care: yes B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear C Attrition bias C1 - Was follow-up equal for both groups: unclear C2 - Were groups comparable for dropout: unclear C3 - Were groups comparable for missing data: unclear Level of bias: unclear D Detection bias D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method

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by a research grant from American Medical Systems, Minnetonka, MN, which had no role in the design, implementation, or analysis of this study or in the writing of this manuscript.	urodynamic stress urinary incontinence on multichannel urodynamic testing 2] At least 21 years of age 3] desiring surgical correction of incontinence 4] requiring concurrent surgery for pelvic organ prolapse were also eligible **Exclusion criteria** 1] Subjects demonstrating detrusor overactivity on urodynamic testing **Statistical method** Multivariate logistic regression analysis. **Demographics** Gender – Female/N (% female) 162/162 (100%) Age (years)- Mean SD Not reported Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%)		SUI Age (per decade) (adjusted for treatment group and other selected covariates) OR (95%CI): 1.7 (1.1 to 2.6)	used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: unclear **Indirectness** Does the study match the review protocol in terms of: Population: Yes Outcome: Yes Indirectness: None **Other information** ISI: Incontinence Severity Index questionnaire PFDI-20: Pelvic Floor Distress Inventory short form Time at which treatment success/failure determined: 12 months after surgery Confounders adjusted for: unclear Sample size: 170 randomised, 162 followed 1 year or longer after surgery (subject of this report). Any recurrent incontinence i.e failure in 68 subjects (42%) and recurrent SUI in 26 subjects

Study details	Participants	Factors	Results	Comments
	Not reported			(16.5%).
Full citation Abdel-Fattah,M., Familusi,A., Ramsay,I., Ayansina,D., Mostafa,A., Preoperative determinants for failure of transobturator tapes in the management of female urodynamic stress incontinence, International Journal of Gynaecology and Obstetrics, 110, 18-22, 2010 **Ref Id** 100561 **Country/ies where the study was carried out** United Kingdom **Study type** Secondary analysis of data from a randomised propspective single-blinded study, the Evaluation of Transobturator Tapes study (E-TOT) **Study dates** April 2005 - April 2007 **Consecutive recruitment**	**Cases** Subjects in whom TOT ARIS/TVT-O failed. **Diagnostic criteria** Not reported **Controls** Subjects in whom TOT ARIS/TVT-O was successful. **Inclusion criteria** - Women with USI or with mixed incontinence but with a predominantly bothersome SI - Women with previous incontinence surgery were included - All women had failed or declined pelvic floor muscle training (PFMT) **Exclusion criteria** - Women unwilling to be randomised - Women with predominant	**Factors** - Age - BMI - MUCP - Type of incontinence - Primary/secondary surgery - Type of procedure - Nocturia - Frequency ≥ 8 per day - Urgency - Urgency incontinence - Dribbling incontinence	**Adjusted odds ratio** PATIENT REPORTED OUTCOMES Age ≤ 45:REFERENCE 45-65 OR (95% CI): 1.99 (0.82 to 4.87) >65 OR (95% CI): 1.85 (0.57 to 5.94) BMI ≤ 30:REFERENCE 31-35 OR (95% CI): 1.91 (0.95 to 3.87) >35 OR (95% CI): 6.37 (1.73 to 23.44) MUCP, cm H2O ≤ 30: OR (95% CI): 2.26 (0.996 to 5.124) ≥ 31: REFERENCE Type of incontinence Mixed group: OR (95% CI): 1.06 (0.5 to 2.24) USI group: REFERENCE Primary/secondary surgery Secondary surgery OR (95% CI): 2.33 (1.1 to 5.478) Primary surgery: REFERENCE Type of procedure TOT OR (95% CI): 1.46 (0.75 to 2.82) TVT-O: REFERENCE	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate randomisation: yes (computer generated random allocation) A2 - Was there adequate concealment: yes (Allocation was concealed using opaque sealed envelopes which were opened by the nursing staff on the morning of the operation) A3 - Were groups comparable at baseline: yes (Table 1 in paper) Level of bias: low B Performance bias B1 - Did groups get same level of care: yes B2 - Were participants blinded: no B3 - Were clinical staff blinded: yes Level of bias: low C Attrition bias C1 - Was follow-up equal for both groups: yes C2 - Were groups comparable for dropout: unclear C3 - Were groups comparable for missing data: unclear Level of bias: unclear D Detection bias

Study details	Participants	Factors	Results	Comments
Not reported **Funding** Not reported	overactive bladder symptoms - Women with specific comorbidities such as known neurological conditions (eg: multiple sclerosis) diabetes, pelvic organ prolapse (>/=stage 2 POP-Q) and/or concomitant surgery **Statistical method** Variables that had a statistically significant association with outcome on univariate analysis and other variables considered to be clinically significant were entered into multivariate logistic regression models. **Demographics** Gender – Female/N (% female) 341/341 (100%) Age (years)- Mean SD Mean not reported. <45: n = 75 (25.9%) 45-65: n = 177 (61%) >65: n = 38 (13.1) N = 290 Incontinence episodes/day – Mean SD Not reported Duration of SUI – Mean SD Not reported		Nocturia Yes OR (95% CI): 2.18 (1.04 to 4.58) No: REFERENCE Urgency Yes OR (95% CI): 3.26 (0.87 to 12.26) No: REFERENCE Urgency incontinence Yes OR(95%CI): 3.35 (1.07 to 10.51) No: REFERENCE Dribbling incontinence Yes OR (95% CI): 0.77 (0.37 to 1.61) No: REFERENCE OBJECTIVE OUTCOMES Age ≤ 45 REFERENCE 45-65 OR (95% CI): 0.80 (0.30 to 2.09) > 65 OR (95% CI): 1.32 (0.37 to 4.74) BMI ≤ 30 REFERENCE 31-35 OR (95% CI): 1.84 (0.81 to 4.17) > 35 OR (95% CI): 3.46 (0.78 to 15.32) MUCP, cm H2O ≤ 30 REFERENCE ≥31 OR (95% CI): 7.06 (2.85 to 17.48) Type of incontinence Mixed group USI group OR (95% CI): 0.72 (0.28 to 1.85)	D1 - Was follow-up appropriate length: yes (6-months) D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: yes D5 - Were investigators blinded to confounding factors: unclear Level of bias: low **Indirectness** Does the studyy match the review protocol in terms of: Population: Yes Outcome: Yes Indirectness: None **Other information** Time at which treatment success/failure determined: 6 months after surgery Randomisation method: Random allocation (computer generated) Patient reported outcome: Patient reported outcome was based on responses to the Patient Global Impression of Improvement (PFI-I) questionnaire where success was defined as 'very much improved' or 'much improved'. Objective outcome: Objective outcome was based on urodynamic assessment

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	Detrusor overactivity – n/N (%) Not reported		Primary/secondary surgery Secondary surgery Primary surgery OR (95% CI): 6.22 (2.34 to 16.52) Type of procedure TOT TVT-O OR (95% CI): 1.48 (0.68 to 3.22) Nocturia Yes No OR (95% CI): 1.23 (0.52 to 2.89) Urgency Yes No OR (95% CI): 0.45 (0.08 to 2.67) Urgency incontinence Yes No OR (95% CI): 1.18 (0.33 to 4.31) Dribbling incontinence Yes No OR (95% CI): 0.63 (0.25 to 1.58)	carried out by an independent clinician at 6 months: failure was defined as presence of USI. Confounders adjusted for: Variables that had a statistically significant association with outcome on univariate analysis and other variables thought to be clinically significant. For patient-reported outcomes- BMI, MUCP, preoperative diagnosis of mixed urinary incontinence and presence of the preoperative urinary symptoms of nocturia, urgency, urgency incontinence and dribbling incontinence plus other variables thought to be clinically significant. For objective outcomes- BMI, MUCP, and a history of previous incontinence procedures plus other variables thought to be clinically significant. Sample size: 341 recruited, 317 completed 6 month follow-up. (See table 2 of paper for number of subjects included for each predictive factor's analysis).
Full citation Paick,J.S., Kim,S.W., Ku,J.H., Oh,S.J., Son,H., Park,J.Y., Preoperative maximal flow rate may be a predictive factor for the outcome of tension-free vaginal tape procedure for stress urinary incontinence, International Urogynecology Journal, 15, 413-	**Cases** Subjects in whom primary TVT had failed (n = 10). Cure of incontinence was defined as the absence of a subjective complaint of leakage and the absence of objective leakage on stress testing. Improvement was defined as no urine loss on stress test plus patient report of some	**Factors** - Age - Parity - BMI - Hysterectomy - Symptom severity	**Adjusted odds ratio** Q-tip test < 30 degrees OR (95%CI): 0.55 (0.09 to 3.17) ≥ 30 degrees: REFERENCE Maximal flow rate OR (95% CI): 0.90 (0.82 to 0.99) REFERENCE not reported	**Limitations** NICE guidelines manual: Appendix E: Methodology checklist: cohort studies A Selection bias A1: Method of allocation to treatment groups unrelated to potential confounding factors- N/A (only one treatment group) A2: Any attempts made within the design

Study details	Participants	Factors	Results	Comments
417, 2004 **Ref Id** 110133 **Country/ies where the study was carried out** Korea **Study type** Prospective observational **Study dates** April 1999 to August 2000 **Consecutive recruitment** Not reported **Funding** Not reported	leakage but overall satisfaction. All cases except cure were considered failure. **Diagnostic criteria** Patients underwent history and physical examination, urinalysis, urine culture, 3-day frequency-volume chart, uroflowmetry, postvoid residual urine measurement, and multichannel video urodynamic studies with maximum urethral closure pressure and Valsalva leak point pressure measurements. The severity of urinary incontinence was classified using the Ingelman-Sundberg scale. **Controls** Subjects in whom TVT was successful (n=50) **Inclusion criteria** - Women with complaints of stress urinary incontinence **Exclusion criteria** - Mixed or only urge incontinence - Valsalva voider - Postoperative follow-up of less	- Duration of incontinence (months) - Urge symptoms - Cystocele grade - Postvoid residual (ml) - Maximal urethral closure pressure (cmH20) - Duration of follow-up - Q-tip test (Used to assess urethral hypermobility-defined as a maximal straining angle of more than 30 degrees). - Maximal flow rate (ml/s) - Maximal cystometric capacity (ml) - Valsalva leak point pressure (cmH20)	<u>Maximal cystometric capacity</u> OR (95% CI): 1.00 (1.00 to 1.02) REFERENCE not reported <u>Valsalva leak point pressure</u> < 60cm H20 OR (95% CI): 2.34 (0.42 to 12.89) ≥ 60cm REFERENCE	or analysis to balance the comparison groups for potential confounders - N/A (only one treatment group but have adjusted for confounders using MV analysis) A3: Groups comparable at baseline-yes (no significant differences between those who failed treatment and those who didn't: table 1 in paper) Level of bias: low <u>B Performance bias</u> B1: Comparison groups receive same care apart from intervention studied-Yes B2: Participants blinded- N/A B3: Individuals administering care blinded- N/A Level of bias: low <u>C Attrition bias</u> C1: Groups followed up for an equal length of time- yes (cure: 35 mths, failure: 36 mths p=0.937) C2: Groups comparable for treatment completion- unclear C3: Groups comparable with respect to the availability of outcome data- unclear Level of bias: unclear <u>D Detection bias</u> D1: Appropriate length of follow-up- yes (1, 6 and 12 months, annually thereafter) D2: Precise definition of outcome- yes (see other information) D3: Valid and reliable method to determine outcome- Yes D4: Investigators blinded to participants' intervention-N/A D5: Investigators blinded to confounding/prognostic factors- N/A

Study details	Participants	Factors	Results	Comments
	than 2 years **Statistical method** Multivariate logistic regression: only those variables with a P value less than 0.25 on the univariate analysis were included in the multivariate logistic model. **Demographics** Gender – Female/N (% female) 60/60 (100%) Age (years)- Mean (Range) 57.2 /-8.6 (35-71) Incontinence episodes/day – Mean (Range) Not reported Duration of SUI – Mean (Range) Cases: 7 months (3-10) Controls: 10 months (1-30) Detrusor overactivity – n/N (%) Not reported			Level of bias: low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Outcome: Yes Indirectness: None **Other information** Time at which treatment failure determined: unclear, but patients followed up at 1,6 and 12 months and annually thereafter. Confounders adjusted for: Adjusted for all variables with a P value less than 0.25 on the univariate analysis (Q-tip test, maximal flow rate, maximal cystometric capacity, Valsalva leak point pressure). Sample size: 60, cure = 50, failure = 10
Full citation Richter,H.E., Litman,H.J., Lukacz,E.S., Sirls,L.T., Rickey,L., Norton,P., Lemack,G.E., Kraus,S., Moalli,P., FitzGerald,M.P., Dandreo,K.J., Huang,L., Kusek,J.W., Urinary	**Cases** Subjects in whom TVT/TVT-O/TOT surgery failed (n=260, 46%)	**Factors** - Treatment group: Retropubic midurethral sling, Transobturator midurethral sling - Previous UI surgery,	**Adjusted odds ratio** ODDS RATIOS FOR POTENTIAL PREDICTORS OF OVERALL FAILURE COMPARED WITH OVERALL SUCCESS, CONTROLLING FOR TREATMENT GROUP AND SITE	**Limitations** NICE guidelines manual. Appendix D: Methodology checklist: Randomised controlled trials A Selection bias A1 - Was there appropriate

Study details	Participants	Factors	Results	Comments
Inc, Demographic and clinical predictors of treatment failure one year after midurethral sling surgery, Obstetrics and Gynecology, 117, 913-921, 2011 **Ref Id** 143699 **Country/ies where the study was carried out** USA **Study type** Two arm randomised equivalence trial **Study dates** Not reported **Consecutive recruitment** Not reported **Funding** Supported by the National Institute of Diabetes and Digestive and Kidney Diseases U01 DK58231, UO1 DK60379, UO1 DK60380, UO1 DK60401, UO1 DK60397, UO1 DK58225, UO1 DK60395, UO1 DK58234, UO1 DK60393, UO1 DK58229 and 2K24-DK068389 to Dr Richter.	**Diagnostic criteria** Pure or predominant stress incontinence symptoms for at least 3 months and a positive urinary stress test at a bladder volume of 300ml or less. **Controls** Subjects in whom TVT/TVT-O/TOT surgery was successful (n=305, 54%) **Inclusion criteria** - Women aged 21 years or older planning stress incontinence surgery. - Pure or predominant stress incontinence symptoms for at least 3 months and a positive urinary stress test at a bladder volume of 300mL or less. **Exclusion criteria** Not reported **Statistical method** Based on significance at the 0.05 level from the univariable logistic regression models and clinical relevance, multivariable logistic regresion models were fit for each	yes - Q-tip maximum straining less than 30 degrees, yes - Urge score (10 per unit) - Pad weight (10 per g) - Race - Marital status - Education - Smoking - Hormone therapy - Fecal incontinence symptoms - Concomitant surgery - Vaginal deliveries - Postvoid residual discharge more than 100ml. - Number of comorbidities - Q-tip delta less than 30 degrees - Empty bladder stress test	<u>Treatment group: Retropubic midurethral sling, Transobturator midurethral sling</u> Retropubic midurethral sling-Reference Transobturator midurethral sling-OR(95%CI): 1.15(0.81-1.63) <u>Previous UI surgery, yes</u> OR(95%CI): 1.99(1.14-3.47) <u>Q-tip maximum straining less than 30 degrees, yes</u> OR(95%CI): 1.89 (1.16-3.05) <u>Urge score (10 per unit)</u> OR(95%CI): 1.97 (1.21-3.21) <u>Pad weight (10 per g)</u> OR(95%CI): 1.06 (1.02-1.10)	randomisation: yes (permuted block randomisation stratified according to clinical site) A2 - Was there adequate concealment: unclear A3 - Were groups comparable at baseline: yes (Table 1) Level of bias: low <u>B Performance bias</u> B1 - Did groups get same level of care: yes B2 - Were participants blinded: unclear B3 - Were clinical staff blinded: unclear Level of bias: unclear <u>C Attrition bias</u> C1 - Was follow-up equal for both groups: yes (12 months) C2 - Were groups comparable for dropout: yes C3 - Were groups comparable for missing data: unclear Level of bias: low <u>D Detection bias</u> D1 - Was follow-up appropriate length: yes D2 - Were outcomes defined precisely: yes D3 - Was a valid and reliable method used to assess outcome: yes D4 - Were investigators blinded to interventions: unclear D5 - Were investigators blinded to confounding factors: unclear Level of bias: unclear

Study details	Participants	Factors	Results	Comments
	defined outcome. **Demographics** Gender – Female/N (% female) 565/565 (100%) Age (years)- Mean SD Cases: 54.4 /-11.4 Controls: 52.2 /-10.2 Incontinence episodes/day – Mean SD Cases: 3.9 /-3.2 Controls: 2.9 /-2.7 (reported as 'leaks per day') Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) Not reported	- Age - BMI - Estimated blood loss during sling - Brink score - UDI total - IIQ total - Stress score - Leaks per day		**Indirectness** Does the study match the review protocol in terms of: Population: Yes Outcome: Yes Indirectness: None **Other information** Randomisation method: Permuted-block randomisation stratified according to clinical site. Outcome: Objective failure, subjective failure, overall failure Outcome definition: Objective failure defined as a positive provocative stress test at 300mL or a positive 24-hour pad test (at least 15mL leakage over 24 hours) or retreatment for stress incontinence. Subjective failure included a self-reported stress-type UI symptoms on the Medical Epidemiological and Social Aspects of Aging questionnaire or leakage on a 3-day voiding diary or retreatment (behavioural, pharmacologic, or surgical) for stress incontinence. Overall failure defined as women who experienced either objective or subjective failure or both. Time at which treatment success/failure determined: 12 months after randomisation Confounders adjusted for: Based on significance at the 0.05 level from the

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				univariable models and clinical relevance: Treatment group, clinical site. Sample size: 565 (retropubic arm: 280, transobturator arm: 285), overall failure=260, treatment success=305. Note: multivariate associations of potential predictors of objective failure compared with subjective failure and objective success controlling for treatment group and site also reported in paper.
Full citation Paick,J.S., Ku,J.H., Shin,J.W., Son,H., Oh,S.J., Kim,S.W., Tension-free vaginal tape procedure for urinary incontinence with low Valsalva leak point pressure, Journal of Urology, 172, 1370-1373, 2004 **Ref Id** 144189 **Country/ies where the study was carried out** Korea **Study type** Prospective observational **Study dates**	**Cases** Subjects in whom TVT surgery failed. Cure of incontinence after the procedure was defined as an absent subjective complaint of leakage and absent objective leakage on stress testing. Improvement was defined as no urine loss on stress test plus a patient report of some leakage but overall satisfaction and it was considered failure. **Diagnostic criteria** History and physical examination, urinalysis, urine culture, uroflowmetry, post-void residual urine measurement, 1-hour pad test and multichannel videourodynamic studies. The severity of SUI was classified using the Ingelman-Sundberg	**Factors** - Age - Parity - BMI - Comorbid diseases - Hysterectomy - Previous anti-incontinence surgery - Duration of incontinence - Symptom severity - Cystocele grade - 1 hr pad test - Maximal flow rate	**Adjusted odds ratio** Urge symptoms (defined as complaints of a sudden compelling desire to pass urine that were difficult to defer) OR (95% CI): 5.703 (1.232 to 26.404) REFERENCE: no urge symptoms MUCP (defined as the difference between maximal urethral pressure and bladder pressure) OR (95%CI): 0.944 (0.895 to 0.996) REFERENCE not stated.	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies A Selection bias A1: Method of allocation to treatment groups unrelated to potential confounding factors: yes (low VLPP vs high VLPP group) A2: Any attempts made within the design or analysis to balance the comparison groups for potential confounders: yes (only one treatment group but have adjusted for potential confounders) A3: Groups comparable at baseline: no Level of bias: high B Performance bias B1: Comparison groups receive same care apart from intervention studied: N/A B2: Participants blinded: N/A B3: Individuals administering care blinded: N/A Level of bias: unclear

Study details	Participants	Factors	Results	Comments
January 2000 - December 2002 **Consecutive recruitment** Not reported **Funding** Not reported	scale. **Controls** Subjects in whom TVT surgery was successful. **Inclusion criteria** - Women with complaints of SUI with low VLPP (<60cm H20) **Exclusion criteria** - Postoperative followup of less than 6 months **Statistical method** Multivariate logistic regression- only variables with p<0.05 on univariate analysis were included in the multivariate model. **Demographics** Gender – Female/N (% female) 221/221 (100%) Age (years)- Mean (Range) 55.2 (29-80) Incontinence episodes/day – Mean SD	- Post-void residual urine - Maximal bladder capacity - Uninhibited detrusor contraction - VLPP - MUCP - Anesthesia type - Bladder injury - Urge symptoms		C Attrition bias C1: Groups followed up for an equal length of time: yes C2: Groups comparable for treatment completion: yes C3: Groups comparable with respect to the availability of outcome data: yes Level of bias: low D Detection bias D1: Appropriate length of follow-up: yes (1,6,12 months and annually thereafter) D2: Precise definition of outcome: yes D3: Valid and reliable method to determine outcome: yes D4: Investigators blinded to participants' intervention: N/A D5: Investigators blinded to confounding/prognostic factors: N/A Level of bias: low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Outcome: Yes Indirectness: None **Other information** Time at which treatment failure determined: unclear but participants followed at 1,6 and 12 months and annually thereafter. Confounders adjusted for: those with a p

Study details	Participants	Factors	Results	Comments
	Not reported Duration of SUI – Mean (Range) 103 months (2-480) Detrusor overactivity – n/N (%) Not reported			value less than 0.05 on univariate analysis-urge symptoms, MUCP Sample size: 221
Full citation Schraffordt,KoopsS, Bisseling,T.M., Van,BrummenH, Heintz,A.P.M., Vervest,H.A.M., What determines a successful tension-free vaginal tape? A prospective multicenter cohort study: Results from the Netherlands TVT database, American Journal of Obstetrics and Gynecology, 194, 65-74, 2006 **Ref Id** 144404 **Country/ies where the study was carried out** The Netherlands **Study type** Prospective observational **Study dates** March 2000 - September 2001	**Cases** Subjects in whom TVT failed. (n = 209 for outcome 1, n = 133 for outcome 2) **Diagnostic criteria** Urodynamic proven stress incontinence or SUI at history/physical examination. **Controls** Subjects in whom TVT was successful. (n=408 for outcome 1, n=478 for outcome 2) **Inclusion criteria** - Urodynamic proven stress incontinence or SUI at history/physical examination **Exclusion criteria** - Recurrent and difficult-to-treat	**Factors** - Previous incontinence surgery - Incontinence episodes - More than 20 procedures for each surgeon - Stress incontinence - No prolapse of cervix of vaginal vault - General anesthesia - Age - Parity - Menopausal status - Urogynecological history - Previous prolapse surgery	**Adjusted odds ratio** Outcome 1: The question 'Do you experience urinary leakage during physical activity, coughing or sneezing?' was selected from the Urogenital Distress Inventory questionnaire completed at 2,6,12 and 24 months after surgery - Previous incontinence surgery OR (95% CI): 0.510 (0.243 to 1.071) No previous urogynecological surgery: REFERENCE - Weekly incontinence episodes OR(95% CI): 3.01 (0.87 to 10.49) Daily episodes: REFERENCE - More than 20 procedures for each surgeon OR (95%CI): 1.918 (1.24 to 2.97) First 10 procedures for each surgeon: REFERENCE Outcome 2: Answer to the doctor's question 'Do you leak during physical activity, coughing or sneezing?' asked at the 2-year follow-up - Stress incontinence OR (95% CI): 1.84 (0.96 to 3.54)	**Limitations** NICE guidelines manual. Appendix E: Methodology checklist: Cohort studies A Selection bias A1: Method of allocation to treatment groups unrelated to potential confounding factors: N/A (only one treatment group) A2: Any attempts made within the design or analysis to balance the comparison groups for potential confounders: N/A (only one treatment group but have adjusted using multivariate analysis) A3: Groups comparable at baseline: N/A (only one treatment group) Level of bias: low B Performance bias B1: Comparison groups receive same care apart from intervention studied: N/A (only one treatment group) B2: Participants blinded: N/A B3: Individuals administering care blinded: N/A Level of bias: unclear C Attrition bias C1: Groups followed up for an equal

Study details	Participants	Factors	Results	Comments
Consecutive recruitment Not reported **Funding** Supported by an unrestricted grant from the Foundation for Scientific Research of the Gynecology Associates Tilburg.	urinary tract infection - Predominant symptoms of urge urinary incontinence (defined as urge incontinence being more prevailing than the stress incontinence) - Detrusor overactivity at cystometry - Postvoiding bladder retention (more than 150ml) - Bladder capacity less than 200mL - Physical or mental impairment **Statistical method** Multivariate logistic regression analysis including all variables with a P value less than 0.05 in the univariate analysis. **Demographics** <u>Gender – Female/N (% female)</u> <u>Outcome 1:</u> Cases = 209/209 (100%) Controls = 408/408 (100%) <u>Outcome 2:</u> Cases= 133/133 (100%) Controls= 478/478 (100%)	- Previous incontinence and prolapse surgery - Mixed incontinence - Urodynamic investigation performed - Stress incontinence at urodynamics - Detrusor overactivity at urodynamics - Intrinsic sphincter deficiency - Flow pattern preoperative - Simultaneous procedures - Pelvic floor status prior to TVT - Type of hospital settings - Type of anesthesia - Surgeon's experience - Loss at cough test	Mixed: REFERENCE - No prolapse of cervix of vaginal vault OR (95% CI): 1.25 (0.66 to 2.37) Prolapse: REFERENCE - General anesthesia OR (95% CI): 2.21 (1.07 to 4.55) Local anaesthesia: REFERENCE - More than 20 procedures for each surgeon OR (95% CI): 0.55 (0.32 to 0.96) First 10 procedures for each surgeon: REFERENCE	length of time: yes (24 months) C2: Groups comparable for treatment completion: unclear C3: Groups comparable with respect to the availability of outcome data: unclear Level of bias: unclear <u>D Detection bias</u> D1: Appropriate length of follow-up: yes D2: Precise definition of outcome: yes D3: Valid and reliable method to determine outcome: yes D4: Investigators blinded to participants' intervention: N/A D5: Investigators blinded to confounding/prognostic factors: N/A Level of bias: low **Indirectness** Does the study match the review protocol in terms of: Population: Yes Outcome: Yes Indirectness: None **Other information** <u>Outcome:</u> Success rate <u>Outcome definition:</u> - The question 'Do you experience urinary leakage during physical activity, coughing or sneezing?' was selected from the Urogenital Distress Inventory questionnaire as primary outcome measure to define success or failure for SUI. Success was defined as the answer

Study details	Participants	Factors	Results	Comments
	Age (years)- Mean SD 51.3 (20-82) - missing data for 6 out of the total of 809 in the study Incontinence episodes/day – Mean SD Mean not reported. Daytime frequency less than 8 voids per day: 300 Daytime frequency more than 8 voids per day: 298 Nighttime frequency no noctural micturition: 237 Nighttime frequency once or more per night: 396 Duration of SUI – Mean SD Not reported Detrusor overactivity – n/N (%) 41/652 (6.3%) -missing data for 187 out of the total 809 in the study			'no'. - The secondary outcome measure was the answer to the doctor's question 'Do you leak during physical activity, coughing or sneezing?' asked at 2-year follow-up. The answer 'no' was defined as success. All other answers as well as 'improved' were considered as failure. - Women who had answered to be dry in the written questionnaire as well as to the oral question at 2-year follow-up were defined to be a success. Time at which treatment success/failure determined: 24 months Confounders adjusted for: Adjusted for all variables with a P value less than 0.05 in the univariate analysis (previous incontinence surgery, weekly incontinence episodes and more than 20 procedures for each surgeon for the 1st outcome, mixed incontinence, number of prolapse of cervix of vaginal vault, general anesthesia and more than 20 procedures for each surgeon for the secondary outcome). Sample size: 809, outcome 1 results: success = 408, failure=209, outcome 2 results: success = 478, failure = 133