National Institute for Health and Care Excellence

Draft for consultation

Rehabilitation for chronic neurological disorders including acquired brain injury

[O] Evidence reviews for access to physical activity

NICE guideline <number>

Evidence reviews underpinning recommendations 1.14.3, 1.16.3 to 1.16.5 and research recommendations in the NICE guideline

April 2025

Draft for consultation

This evidence review was developed by NICE

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Access to Physical Activity

Review question

What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Introduction

Taking part in physical activity, exercise or sport is considered important to everyone's well-being, but those with chronic neurological disorders (CND) face several barriers which make it harder for them to participate. These may include social or environmental barriers, or barriers that are intrinsic to the person with CND and, or their condition.

Different types of interventions have been developed to try and reduce these barriers and improve access to physical activity for people with CND, but it is hard to know which approaches are most effective.

This review was conducted to evaluate the interventions designed to support people with CND to participate in physical activity, exercise or sport, and to establish which are most effective at helping people with CND be more active.

Summary of the protocol

See Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	Adults and children with rehabilitation needs due to the following chronic neurological disorders: • Acquired brain injury • Acquired spinal cord injury • Acquired peripheral nerve disorders • Progressive neurological diseases • Functional neurological disorders
Intervention	Interventions designed to support people to participate in physical activity, exercise or sport: • Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist • Group exercise programmes • Person intrinsic approaches, including behaviour change and coaching • Social prescribing, including green prescribing

Comparison	Interventions compared with others in the same group or:
	• Placebo (placebo or sham)
	• Control (no intervention, waitlist, standard rehabilitation care alone, or 'usual care')
	• The same intervention (as listed under 'intervention') but varied in terms of:
	  ○ Frequency
	  ○ Intensity

	○ Timing ○ Setting
Outcomes	**Critical** • Sustained participation in exercise or physical activity (measured using an objective or subjective count of minutes per week undertaking aerobic or physical activity, change over time or proportion of the group achieving target activity time) • Personal goal attainment (measured using validated tools such as the Goal Attainment Scale [GAS]) • Cardiorespiratory fitness (measured using VO_2max) **Important** • Physical and mental health related quality of life and social care related quality of life (assessed using validated, global measures, such as EQ5D - 3L; EQ5D - 5L; NeuroQOL; PedsQL; QUOLIBRI; SF-36; WHOQOL-100; WHO-QOL BREF; ASCOT; ICECAP-A) • Anxiety (assessed using anxiety sub scales from global quality of life measures or global measures of anxiety such as HADS-A) • Depression (assessed using depression sub scales from global quality of life measures or global measures of depression such as the PHQ-9, BDI-II and HADS-D)

ASCOT: adult social care outcomes toolkit; BDI-II: beck depression inventory-II; EQ 3D: EuroQoL three dimensions; EQ 5D: EuroQoL five dimensions; HADS-A: hospital anxiety and depression scale-anxiety; HADS-D: hospital anxiety and depression scale-depression; ICECAP-A: ICEpop CAPability measure for adults; NeuroQOL: quality of life in neurological disorders; PedsQL: paediatric quality of life inventory; PHQ-9: patient health questionnaire; QUOLIBRI: quality of life after brain injury; SF-36: 36-item short form survey; VO_2max: maximal oxygen consumption; WHOQOL-100: world health organisation quality of life assessment-100 item; WHOQOL-BREF: world health organisation quality of life assessment-brief version

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and the methods document (supplement 1).

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Effectiveness evidence

Included studies

Sixteen papers were included in this review; 15 randomised controlled trials (RCTs; Busse 2017; Carter 2013; Carter 2014; Chemtob 2019; Coote 2017; Gehring 2018; Kooijmans 2017; Ma 2019; Mayo 2020; Nooiijen 2016; Paul 2019; Ryan 2020; Tallner 2016; Thomas 2017; van Nimwegen 2013) and 1 follow-up paper reporting secondary outcomes for Nooijen 2016 (Nooijen 2017).

The included studies are summarised in Table 2.

Six studies were conducted in the UK (Busse 2017; Carter 2013; Carter 2014; Paul 2019; Ryan 2020, Thomas 2017); 4 studies were conducted in the Netherlands (Gehring 2018; Kooijmans 2017; Nooijen 2016; van Nimwegen 2013); 2 studies were conducted in Canada (Chemtob 2014; Mayo 2020); 1 study was conducted in Ireland (Coote 2017); 1 study was

conducted in Germany (Tallner 2016); and 1 study was conducted in New Zealand (Ma 2019).

Four studies investigated tailored, including condition specific, exercise programmes, delivered by a specialist health or exercise therapist; 3 of these were conducted in people with progressive neurological disorders (Mayo 2020; Paul 2019; Tallner 2016) and 1 study was conducted in people with acquired brain injury (Gehring 2018).

Eight studies investigated person intrinsic approaches, including behaviour change and coaching; 5 of these were conducted in people with progressive neurological disorders (Busse 2017; Coote 2017; Ryan 2020; Thomas 2017; van Nimwegen 2013) and 3 studies were conducted in acquired spinal cord injury (Chemtob 2019; Kooijmans 2017; Nooijen 2016).

Three studies investigated the combination of tailored, including condition specific, exercise programmes, delivered by a specialist health or exercise therapist and person intrinsic approaches, including behaviour change and coaching; 1 study was conducted in people with acquired spinal cord injury (Ma 2019) and 2 studies was conducted in people with progressive neurological disorders (Carter 2013; Carter 2014).

There were no trials reporting data for interventions to support access to physical activity for children and young people with a chronic neurological disorder, nor were there any studies on group exercise programmes or social prescribing, including green prescribing for adults or children and young people. Additionally, none of the included studies reported data from adults with an acquired peripheral nerve disorder or a functional neurological disorder.

Data for the following outcomes were identified through analysis of the included studies:

- Sustained participation in exercise or physical activity
- Cardiorespiratory fitness
- Physical and mental health related quality of life and social care related quality of life
- Anxiety
- Depression

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included studies

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included studies

Study	Population	Intervention	Comparison	Outcomes
Busse 2017 RCT UK	N=46 adults with Huntington's disease • Engage-HD n=22	Engage-HD 14-week physical Activity intervention was grounded within the framework of self-	Social control At each visit, the social activity coach engaged the participant in a talking and communication	• Sustained participation in exercise or physical activity • Physical and mental

Study	Population	Intervention	Comparison	Outcomes
	• Social control n=24 Age in years [mean (SD)] • Engage-HD: 56.1 (10.3) • Social control: 53.7 (9.9) Sex (M/F) • Engage-HD: n=12/n=10 • Social control: n=13/n=11 Chronic neurological disorder category: progressive neurological diseases	determination theory, and consisted of three main elements: the participant/coach interaction, the Engage-HD Workbook, and an exercise DVD 6 home visits over 14 weeks (weeks 1, 2, 3, 6, 10, and 14) and 3 interim phone calls (weeks 4, 8, and 12) that served to provide encouragement Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching	interaction. Conversation cards representing a wide range of topics stimulated discussions. Health and falls diaries were completed. Home visits were conducted at weeks 1, 2, 3, 6, 10, and 14, and supportive phone calls at weeks 4, 8, and 12.	health related quality of life and social care related quality of life
Carter 2013 RCT UK	N=30 adults with multiple sclerosis • Pragmatic exercise therapy intervention n=16 • Usual care n=14 Age in years [mean (SD)] • Pragmatic exercise therapy intervention: 39.5 (6.5) • Usual care: 40.9 (8.7) Sex (M/F) • Pragmatic exercise therapy intervention: n=2/n=14	Pragmatic exercise therapy 10-week programme with tailored supervised exercise sessions. The sessions incorporated cognitive-behavioural techniques (for example consciousness raising, goal setting and finding social support for exercise) to promote motivation and confidence for exercise to promote long-term participation in physical activity 2 supervised 1-hour sessions and	Usual care Participants in the usual care group were offered 3 exercise sessions at the university exercise research facility and individual exercise advice after the study	• Sustained participation in exercise or physical activity • Physical and mental health related quality of life and social care related quality of life

Study	Population	Intervention	Comparison	Outcomes
	• Usual care: n=2/n=12 Chronic neurological disorder category: progressive neurological diseases	weekly 1-hour home sessions Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist plus person intrinsic approaches, including behaviour change and coaching		
Carter 2014 RCT UK	N=120 adults with multiple sclerosis • EXercise Intervention for people with MS (EXIMS) programme: n=60 • Usual care: n=60 Age in years [mean (SD)] • EXIMS: 45.7 (9.1) • Usual care: 46.0 (8.4) Sex (M/F) • EXIMS: n=17/n=43 • Usual care: n=17/n=43 Chronic neurological disorder category: progressive neurological diseases	EXIMS 12-week programme with supervised exercise sessions incorporating cognitive-behavioural techniques (e.g. goal setting, finding social support, understanding the costs/benefits of exercise, etc.) to promote long-term participation in physical activity. Weeks 1-6: 2 supervised sessions up to 1 hour in duration at the centre and 1 self-directed exercise session at home every week. Weeks 7-12: 1 supervised session at the centre and 2 self-directed exercise sessions at home every week. Protocol intervention group:	Usual care Participants in the usual care group were offered 3 exercise sessions at the university exercise research facility and individual exercise advice after the study	• Sustained participation in exercise or physical activity • Physical and mental health related quality of life and social care related quality of life

Study	Population	Intervention	Comparison	Outcomes
		Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist plus person intrinsic approaches, including behaviour change and coaching		
Chemtob 2019 RCT Canada	N=14 adults with spinal cord injury • Telehealth physical activity intervention n=6 • Usual care n=7 Age in years [Mean (SD)] • overall (no individual arm information): 52.15 (13.25) Sex (M/F) • overall (no individual arm information): n=11/n=2 Chronic neurological disorder category: acquired spinal cord injury	Telehealth physical activity intervention 8-week telehealth intervention to motivate the participants to engage in LTPA in their home or within their community. Weekly physical activity counselling session Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching	Usual care The usual care group was asked to continue with their regular routine and told that the LTPA counsellor would contact them at the end of the study. Each participant from the control group received one, one-hour physical activity counselling session.	• Sustained participation in exercise or physical activity
Coote 2017 RCT Ireland	N=65 adults with multiple sclerosis • Social cognitive theory (SCT) + exercise n=33 • Exercise + contact control education intervention n=32 Age in years [Mean (SD)]	SCT + exercise 10-week SCT plus exercise intervention. SCT for health behaviour change, namely: self-efficacy, outcome expectations, goal-setting, barriers and benefits. Group exercise class on six	Exercise + contact control education intervention Group exercise class on six occasions, supplemented with a telephone coaching call in the weeks without classes (intervention weeks 4, 6, 7 and 9)	• Sustained participation in exercise or physical activity • Cardiorespiratory fitness • Anxiety • Depression

Study	Population	Intervention	Comparison	Outcomes
	• SCT + exercise: 43.3 (9.9) • exercise + contact control education intervention: 41.9 (9.3) Sex (M/F) • SCT + exercise: n=4/n=29 • exercise + contact control education intervention: n=6/n=26 Chronic neurological disorder category: progressive neurological diseases	occasions, supplemented with a telephone coaching call in the weeks without classes (intervention weeks 4, 6, 7 and 9) + SCT-based education sessions will be delivered after each exercise class session. Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching		
Gehring 2018 RCT The Netherlands	N=34 adults with stable grade II and III gliomas • Home-based exercise intervention with remote guidance n=23 • Waitlist control n=11 Age in years [Mean (SD)] • Home-based exercise intervention with remote guidance: 48.0 (9.4) • Waitlist control: 48.0 (11.9) Sex (M/F) • Home-based exercise intervention with remote	Home-based exercise intervention with remote guidance 6-months individualized exercise prescription, based on their level of aerobic fitness, to exercise at 60–85% of their maximum heart rate. 3 home-based aerobic training sessions per week. The physiotherapist monitored the training data on the platform on a weekly basis and provided additional personal feedback by e-mail.	Waitlist control Patients in this group also received bimonthly phone calls from the research-assistant during which general questions about their health were asked.	• Sustained participation in exercise or physical activity • Cardiorespiratory fitness

Study	Population	Intervention	Comparison	Outcomes
	guidance: n=10 /n=13 • Waitlist control: n=5/n=6 Chronic neurological disorder category: acquired brain injury	Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist		
Kooijmans 2017 RCT The Netherlands	N=64 adults with spinal cord injury • HABITS n=33 • Control n=31 Age in years [Mean (SD)] • HABITS: 48 (10) • Control: 49 (11) Sex (M/F) • HABITS: n=21/n=12 • Control: n=24/n=7 Chronic neurological disorder category: acquired spinal cord injury	HABITS 16-week self-management intervention. The HABITS intervention specifically targeted on 2 conditions for behaviour change: optimizing intentions toward a healthier lifestyle and improving perceived behavioural control. 1 home visit, 5 individual and 5 group sessions. Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching	Information about active lifestyle The control group received information about active lifestyle in SCI including one information group meeting in the first week of the study.	• Sustained participation in exercise or physical activity • Cardiorespiratory fitness • Physical and mental health related quality of life and social care related quality of life
Ma 2019 RCT New Zealand	N=32 adults with spinal cord injury • ProACTIVE SCI n=17 • Waitlist control n=15 Age in years [Mean (SD)] • ProACTIVE SCI: 45.79 (13.63)	ProACTIVE SCI 8-week behaviour change and tailored exercise programme. Tailoring and the individual's behaviour change theory stage was used throughout the intervention to match BCT strategies to	Waitlist control Continued to receive any concomitant care they were already receiving, with no additional treatment.	• Sustained participation in exercise or physical activity • Cardiorespiratory fitness

Study	Population	Intervention	Comparison	Outcomes
	• Waitlist control: 45.57 (10.49) Sex (M/F) • ProACTIVE SCI: n=10/5 • Waitlist control: n=8/n=6 Chronic neurological disorder category: acquired spinal cord injury	participant needs and preferences. 1-h introductory session followed by eight once-weekly 10- to 15-min behavioural PA coaching sessions for a total time commitment of 140–180 min over 8 weeks Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist plus person intrinsic approaches, including behaviour change and coaching		
Mayo 2020 RCT Canada	N=137* adults with multiple sclerosis • MSTEP n=66 • Guideline group n=71 Age in years [Mean (SD)] • MSTEP: 47.4 (9.7) • Guideline group: 47.1 (9.7) Sex (M/F) • MSTEP: n=8/n=26 • Guideline group: n=9/n=28 Chronic neurological disorder category:	MSTEP 12-month MSTEP intervention, a personally adapted exercise regimen including a variety of exercises targeting endurance, muscular, and core strength, balance, flexibility, muscular power, and speed of movement. Cardio-intensive x 2 times a week using the concept of interval training + 2 private sessions Protocol intervention group: Tailored, including condition specific exercise	Guideline group The Guideline group received instructions based on the 2013 exercise guidelines for adults with multiple sclerosis from the Canadian Society for Exercise Physiology.	• Cardiorespiratory fitness

Study	Population	Intervention	Comparison	Outcomes
	progressive neurological diseases *Baseline data only available for n=34 and n=37 in the MSTEP and guideline group, respectively.	programmes, delivered by a specialist health or exercise therapist		
Nooijen 2016 RCT The Netherlands	N=45* adults with subacute spinal cord injury • Behavioural intervention: n=23 • Usual care: n=22 Age in years [mean (SD)] • Behavioural intervention: 44 (15) • Usual care: 44 (15) Sex (M/F) • Behavioural intervention: n=17/n=3 • Usual care: n=16/n=3 Chronic neurological disorder category: acquired spinal cord injury *Baseline data only available for n=20 and n=19 in the behavioural intervention group and usual care group, respectively.	Behavioural intervention 13 individual face-to-face sessions: 2 sessions were scheduled per month from 2 months before discharge until 3 months after discharge; thereafter, in the following 3 months there was 1 session per month. Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching	Usual care Continued to receive any concomitant care they were already receiving, with no additional treatment.	• Sustained participation in exercise or physical activity
Nooijen 2017	See Nooijen 2016	See Nooijen 2016	See Nooijen 2016	• Cardiorespiratory fitness

Study	Population	Intervention	Comparison	Outcomes
(Nooijen 2016 secondary outcomes) Netherlands				
Paul 2019 RCT UK	N=90 adults with multiple sclerosis • Web-based physiotherapy n=45 • Printed sheet of exercises n=45 Age in years [Mean (SD)] • Web-based physiotherapy: 55.6 (10.2) • Printed sheet of exercises: 56.5 (9.1) Sex (M/F) • Web-based physiotherapy: n=13/n=32 • Printed sheet of exercises: n=8/n=37 Chronic neurological disorder category: Progressive neurological diseases	Web-based physiotherapy 6-months individualised web-based exercise programme Programmes could consist of cardiovascular, strengthening and balance exercises, as well as warm up, cool down and stretching exercises, at different levels of difficulty and a prescribed number of sets/repetitions individualised to meet the participants' needs. Tailored according to exercise diaries every 2 weeks Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist	Printed sheet of exercises Participants randomised to the active comparator intervention received a printed sheet of exercises. Programmes consisted of similar exercises as intervention group. Participants completed a paper-based exercise diary that was posted to the research team every three months.	• Sustained participation in exercise or physical activity • Physical and mental health related quality of life and social care related quality of life • Anxiety • Depression
Ryan 2020 RCT UK	N=60 adults with multiple sclerosis • i-Step MS + usual care: n=30 • Usual care: n=30	i-Step MS + usual care Four physical activity sessions with behaviour change techniques (session 1+3: 45-minutes; sessions	Usual care Continued to receive any concomitant care they were already receiving, with no additional treatment.	• Sustained participation in exercise or physical activity

Study	Population	Intervention	Comparison	Outcomes
	Age in years [mean (SD)] • i-Step MS + usual care: 56.9 (9.0) • Usual care: 56.7 (9.2) Sex (M/F) • i-Step MS + usual care: n=13/n=17 • Usual care: n=6/n=24 Chronic neurological disorder category: progressive neurological diseases	2+4: 30-minutes) over 12 weeks Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching		
Tallner 2016 RCT Germany	N=126 adults with multiple sclerosis • Internet-Supported Physical Exercise Training n=59 • Waitlist control n=67 Age in years [Mean (SD)] • Internet-Supported Physical Exercise Training: 40.9 (10.4) • Waitlist control: 40.7 (9.5) Sex (M/F) • Internet-Supported Physical Exercise Training: n=15/n=44 • Waitlist control: n=17/n=50	Internet-Supported Physical Exercise Training 12-weeks e-training strength and endurance individualised exercise programme. Strength training twice weekly and endurance training once weekly. Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist	Waitlist control Continued to receive any concomitant care they were already receiving, with no additional treatment.	• Cardiorespiratory fitness • Physical and mental health related quality of life and social care related quality of life

Study	Population	Intervention	Comparison	Outcomes
	Chronic neurological disorder category: progressive neurological diseases			
Thomas 2017 RCT UK	N=30 adults with multiple sclerosis • Mii-vitaliSe + usual care: n=15 • Waitlist control: n=15 Age in years [mean (SD)] • Mii-vitaliSe + usual care: 50.9 (8.08) • Waitlist control: 47.6 (9.26) Sex (M/F) • Mii-vitaliSe + usual care: n=1/n=14 • Waitlist control: n=2/n=13 Chronic neurological disorder category: progressive neurological diseases	Mii-vitaliSe + usual care 20-week Physiotherapist-facilitated Nintendo Wii intervention package that uses commercial software and aims to support people with MS to increase their physical activity levels Weekly modules (Week 1 and 2: Orientation to Wii; Week 3: Installation of equipment and commencement of individual programme at home; Week 5: Follow-up; Week 7: Review visit; Week 12: Follow-up; Week 16: Review visit; Week 20 and thereafter: Ongoing support) Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching	Waitlist control Continued to receive any concomitant care they were already receiving, with no additional treatment.	• Sustained participation in exercise or physical activity • Physical and mental health related quality of life and social care related quality of life • Anxiety • Depression
van Nimwegen 2013 RCT	N=700* adults with Parkinson's disease • ParkFit programme: n=350	ParkFit programme (2 years) 1) Brochure ParkFit Patients receive a brochure covering	General physiotherapy programme (2 years) 1) Brochure ParkSafe 2) Physical therapy	• Sustained participation in exercise or physical activity • Physical and mental health

Study	Population	Intervention	Comparison	Outcomes
The Netherlands	• General physiotherapy programme: n=350 Age in years [Mean (SD)] • ParkFit programme: 65.1 (7.9) • General physiotherapy programme: 65.9 (7.2) Sex (M/F) • ParkFit programme: n=194/n=105 • General physiotherapy programme: n=188/n=99 Chronic neurological disorder category: progressive neurological diseases *Baseline data only available for n=299 and n=287 in the ParkFit programme and general physiotherapy programme, respectively.	specific strategies to promote a behavioural change. 2) Personal Activity Coach 3) Goal setting 4) Ambulatory Activity Monitor with visual feedback Year 1: Max 19 physical therapy sessions; 16 coaching sessions. Year 2: Max 23 physical therapy sessions; 12 coaching sessions Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching	Year 1: Max 35 physical therapy sessions. Year 2: Max 35 physical therapy sessions	related quality of life and social care related quality of life

EXIMS: EXercise Intervention for people with MS; HABITS: Healthy Active Behavioral Intervention in Spinal cord injury; HD: huntington's disease; LTPA: long term physical activity; Mii-vitaliSe: physiotherapist-facilitated Nintendo Wii intervention package; MS: multiple sclerosis; RCT: randomised controlled trial; SD: standard deviation; SCI: spinal cord injury; SCT: social cognitive theory

See the full evidence tables in appendix D and the forest plots in appendix E.Summary of the evidence

Summary of the evidence

Tailored, including condition specific, exercise programmes, delivered by a specialist health or exercise therapist

Tailored, including condition specific, exercise programmes, delivered by a specialist health or exercise therapist in adults with multiple sclerosis or stage II or III gliomas showed no important differences at all time-points compared with control in terms of subjective and objective participation in exercise or physical activity, objective cardiorespiratory fitness, physical and mental health related quality of life, anxiety and depression.

The quality of the evidence ranged from very low to low. Outcomes were typically downgraded due to concerns over risk of bias from the contributing studies and imprecision in the effect estimate. Where meta-analyses were conducted, outcomes were also downgraded for inconsistency.

Person intrinsic approaches, including behaviour change and coaching

Adults with acquired spinal cord injury

Person intrinsic approaches, including behaviour change and coaching interventions showed no evidence of important difference over control in terms of subjective participation in exercise or physical activity measured using the leisure-time physical activity questionnaire for virtually delivered interventions at post-intervention. However, no important differences were seen for in-person interventions on subjective and objective participation in exercise or physical activity at all time-points. The exception to this was a single study with insufficient data to calculate mean change scores from baseline which showed an important benefit over control in terms of subjective and objective participation in exercise or physical activity measured using the physical activity scale for individuals with physical disabilities and wheeled physical activity, respectively for an in-person delivered intervention at post-intervention and 6-months post-intervention.

Person intrinsic approaches, including behaviour change and coaching interventions showed an important benefit over control in terms of health and physical and mental health related quality of life measured using World Health Organization Quality of Life scale for an in-person delivered interventions at 26-weeks post-intervention. However, no important differences were seen at post-intervention.

No important differences were seen in other outcomes: cardiorespiratory fitness at all time points.

The quality of the evidence ranged from very low to low. Outcomes were typically downgraded due to concerns over risk of bias from the contributing studies and imprecision in the effect estimate. Where meta-analyses were conducted, outcomes were also downgraded for inconsistency.

Adults with Huntington's disease

An in-person behaviour change intervention showed an important benefit over control in terms of physical and mental health related quality of life at post-intervention. No important differences were seen in other outcomes: subjective participation in exercise or physical activity at post-intervention.

The quality of the evidence was very low. Outcomes were typically downgraded due to concerns over risk of bias from the contributing studies and imprecision in the effect estimate, and only came from 1 study.

Adults with Parkinson's disease

An in-person behaviour change intervention showed a statistically significant benefit over control in terms of objective participation in exercise or physical activity at post-intervention. The term statistically significant benefit rather than important benefit is used because although there is a statistically significant benefit, we cannot ascertain clinical importance as no standard deviations are available for the data. No statistically significant benefits or important benefits were seen for subjective participation in exercise or physical activity and physical and mental health related quality of life, respectively at post-intervention.

The quality of the evidence was low. Outcomes were typically downgraded due to concerns over risk of bias from the contributing studies, and only came from 1 study.

Adults with multiple sclerosis

Person intrinsic approaches, including behaviour change and coaching interventions showed no evidence of important difference over control in terms of depressive symptoms measured using HADS-D at 6-months post-intervention. Also, no important differences were seen at post-intervention.

No important differences were seen in other outcomes: subjective and objective participation in exercise or physical activity, physical and mental health related quality of life and anxiety.

The quality of the evidence ranged from very low to low. Outcomes were typically downgraded due to concerns over risk of bias from the contributing studies and imprecision in the effect estimate.

Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist plus person intrinsic approaches, including behaviour change and coaching

A combination of an in-person tailored exercise programme and behaviour change intervention in adults with acquired spinal cord injury showed an important benefit over control in terms of subjective participation in exercise or physical activity measured using the leisure time physical activity questionnaire and cardiorespiratory fitness using VO2 peak at post-intervention. No important differences were seen for objective participation in exercise or physical activity at post-intervention.

A combination of an in-person individualised exercise programme with cognitive behavioural techniques showed an important benefit over control in terms of subjective participation in exercise or physical activity measured using the Godin Leisure Time Exercise Questionnaire and physical and mental health related quality of life measured using MSQOL-54, at post-intervention and 6-months post-intervention, respectively. However, no important differences were seen at 6-months follow-up for subjective participation in exercise or physical activity.

The quality of the evidence was very low. Outcomes were typically downgraded due to concerns over risk of bias from the contributing studies and imprecision in the effect estimate. Where meta-analyses were conducted, outcomes were also downgraded for inconsistency.

There was no evidence for the following outcomes:

- Personal goal attainment

See appendix F for full GRADE tables.

Economic evidence

Included studies

One economic study was identified which was relevant to this question (Tosh 2014).

See supplementary material 2 for details on the economic search undertaken for this guideline.

Excluded studies

Economic studies not included in this review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included economic evidence

The systematic search of the economic literature undertaken for the guideline identified the following study:

- A UK study which assessed the cost-utility of a pragmatic exercise intervention (EXIMS) that also included cognitive-behavioural techniques to encourage long-term participation in physical activity for adults with multiple sclerosis (Tosh 2014).

See the economic evidence table in appendix H. See Table 3 for the economic evidence profile of the included study.

Table 3: Economic evidence profile for pragmatic exercise intervention in adults with multiple sclerosis

Study	Limitations	Applicability	Other comments	Incremental			Uncertainty
				Costs	Effect (QALYs)	Cost effectiveness (cost/QALY)	
Tosh 2014 UK Cost-utility analysis	Minor [1]	Directly [2]	-Economic evaluation alongside an RCT (Carter 2013 and 2014, N=120) -12-week exercise intervention, including supervised and self-directed sessions, as well as cognitive behavioural techniques to promote long-term participation in addition to usual care, versus usual care only -Time horizon: 9 months -Outcomes: QALYs (EQ-5D-3L)	£466	0.046	£10,137	-The cost difference was not significant, 95% CI: 95% CI: –£273 to £1,310 -The QALY difference was not significant, 95% CI: –0.022 to 0.115 - Probability of being cost-effective: 75% at a threshold of £20,000 per QALY gained -For less severe disease (EDSS < 4.0), the intervention was dominated and had an 18% probability of being cost-effective at a threshold of £20,000 per QALY gained. -For more severe disease (EDSS ≥ 4.0), the intervention had an incremental cost-effectiveness ratio of £5,092 per QALY gained and an 80% probability of being cost-effective at the threshold of £20,000 per QALY gained. -The conclusions remained unchanged in the sub-group analysis by physical activity levels at baseline and when the intervention cost was increased to the level charged by private providers.

Abbreviations: CI: Confidence Interval, EDSS: Expanded Disability Status Scale, EQ-5D-3L: EuroQol 5 Dimensions 3 Level, N: Number of people, QALY: Quality-Adjusted Life Year, RCT: Randomized Controlled Trial, UK: United Kingdom

[1] Short time horizon (9 months) which is very unlikely to be sufficiently long enough to capture all important differences in costs and outcomes; baseline and effectiveness based on a small RCT (N=120)

[2] UK study, QALYs estimated using EQ-5D-5L, NHS and PSS perspective

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Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation.

The committee's discussion and interpretation of the evidence

The outcomes that matter most

Sustained participation in exercise or physical activity, personal goal attainment and cardiorespiratory fitness were prioritised as critical outcomes by the committee. This is because the aim of the question was to determine the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders.

Physical and mental health related quality of life and social care related quality of life , anxiety and depression were selected as important outcomes to assess the effect of the rehabilitation interventions on the lives of people with chronic neurological disorders. It is important to know how these interventions impact the day-to-day lives of people with chronic neurological disorders, including psychological and emotional factors.

The quality of the evidence

The evidence was assessed using GRADE methodology and the overall confidence in the findings ranged from very low to low.

Findings were downgraded due to concerns relating to risk of bias (for example, when there was a lack of blinding in a study because rehabilitation interventions and controls are difficult to conceal or if there was a large loss to follow-up) and imprecision (for example, when 95% confidence intervals crossed 1 or more decision-making threshold). Evidence was also downgraded for inconsistency. A potential reason for significant heterogeneity was that the delivery of the interventions differed to one another, therefore interventions were sub-grouped in a post-hoc analysis into categories for example, in-person intervention and virtually delivered intervention to account for this. Despite this, the content of the interventions within the group still differed leading to heterogeneity. Another potential reason for significant heterogeneity is the differences in control groups, with definitions of standard care varying across studies.

To conduct meta-analyses, outcomes were analysed as standard mean deviations as the majority of outcomes were assessed using different validated and standardised assessment tools. Single study outcomes were also reported as standard mean deviations where possible, so that the outcomes were standardised across the review.

Not all studies were meta-analysed, the main reasons were high levels of heterogeneity identified through the I^2 statistic and studies not reporting the mean differences between baseline and post-intervention or follow-up time-points. Nooiien 2016 reported the mean difference between the groups at end-point without change score from baseline, therefore the study was reported separately alongside the meta-analyses. Carter 2013 and Carter 2014 were not meta-analysed for physical and mental health related quality of life at post-intervention as the I^2 statistic was very high, therefore the studies were reported alongside each other.

There was no evidence for the following interventions:

- Group exercise programmes
- Social prescribing, including green prescribing

There was no evidence for the following outcomes:

- Personal goal attainment

See appendix F for full GRADE tables with quality ratings of all outcomes.

Benefits and harms

Pain management

The committee discussed the importance of adequate pain management during rehabilitation for people with chronic neurological disorders. While it is not a primary intervention for access to physical activity and exercise, and therefore has not been covered in this evidence review, the committee's experience and expertise shows how central proper analgesia is on the effectiveness of rehabilitation for chronic neurological disorders. Individuals are much less likely to complete rehabilitation programmes if they cause or exacerbate current pain levels. Unmanaged pain levels can also negatively impact physical functioning and emotional wellbeing, which can mask potential benefits of interventions. Therefore, the committee recommended that pain management should be discussed alongside rehabilitation goals and plans. They also highlighted the reciprocal nature of pain management, noting that interventions for access to physical activity and exercise can also act to reduce or improve pain.

Physical activity and exercise

The committee discussed the important benefit of person intrinsic approaches such as behaviour change alone or alongside tailored, including condition specific, exercise programmes to support access to physical activity. The committee highlighted that behaviour change interventions alone or alongside tailored, including condition specific, exercise programmes had important benefit on participation in physical activity and health-related quality of life based on the evidence in the review. The committee also discussed that the tailored, including condition specific, exercise programmes alone showed no important differences in participation in physical activity, cardiorespiratory fitness, health-related quality of life, anxiety and depression based on evidence in the review. The committee recognised that the quality of evidence in the review was overall very low to low, largely due to the small sample size resulting in serious or very serious imprecision. The committee agreed that behaviour change interventions are designed to give people strategies for problem solving and emphasised that these strategies should be life-long to ensure that the person with CND has the skills to successfully access physical activity once the behaviour change intervention programme is completed. The committee further highlighted the importance of family involvement in the delivery of behaviour change interventions for access to physical activity in CYP, although the interventions are not aimed at family members their involvement in the delivery of the intervention is key for success. Therefore, the committee recommended to help the person to participate in, and sustain engagement with, physical activity using behaviour change strategies if needed, which may require a family-centred approach.

The committee discussed that the behaviour change interventions used in the evidence to support access to physical activity were different in their duration, intensity, and delivery, therefore it was difficult to recommend a specific type of behaviour change intervention to support access to physical activity in people with CND. Furthermore, there was no evidence identified looking at different types of behaviour change interventions to support access to

physical activity in people with CND. The committee agreed that the behaviour change interventions used in the evidence: cognitive behavioural therapy (CBT), self-determination theory, social context theory, and motivational interviewing used sufficiently similar techniques to support access to physical activity and had similar benefits on participation in physical activity and health-related quality of life. Therefore, the committee recommended the use of CBT, self-determination theory, social context theory, motivational interviewing or coaching techniques as potential behaviour change interventions for supporting access to physical activity.

The committee discussed that motivation is not the only determining factor for people with CND to access physical activity. The committee agreed that there are often barriers that prevent access to physical activity, for example loud music or bright lights or a mixed sex facility such as a gym or swimming pool that may make it difficult for some individuals with CND to participate in physical activity. The committee discussed that these barriers may require support, which could be practical, physical or cognitive, socio-economic or cultural factors, or availability of accessible facilities to undertake physical activity. The committee discussed that currently the onus lands on the person with CND to access physical activity, however often the barriers are societal and it's important that people involved in the care of people with CND problem solve with the person or on behalf of the person their individual barriers to participate in physical activity. Therefore, the committee recommended to discuss any barriers preventing the person from achieving their physical activity goals and work together to overcome these barriers, that could relate to: the need for support, which may be practical physical or cognitive, cultural or socio-economic factors, availability of accessible facilities to undertake physical activity.

The committee discussed the role of digital applications in promoting access to physical activity, for example the NHS application couch to 5K. The committee recognised that no evidence was identified for digital applications to promote access to physical activity, nonetheless emphasised that digital applications were economically viable and gaining popularity as a self-help approach to promote access to physical activity. Therefore, the committee agreed to write a research recommendation on the effectiveness of digital applications to support access to physical activity for people with CND.

Cost effectiveness and resource use

Pain management is already integral to rehabilitation. Consistently considering pain when discussing and agreeing rehabilitation goals and plans may identify more people needing pain management. However, many existing rehabilitation interventions can reduce pain or improve pain management, so no significant increase in resource use is anticipated.

There was one existing economic evaluation which found that an exercise programme with cognitive behavioural therapy (CBT) to promote long-term physical activity, given in addition to usual care, resulted in an incremental cost-effectiveness ratio of £10,137 per Quality-Adjusted Life Year (QALY) compared with usual care only. This would be considered a cost-effective intervention using the NICE lower cost-effectiveness threshold of £20,000 per QALY gained. The committee noted that there is a 75% probability of cost-effectiveness, which suggests some confidence in the result. However, they have acknowledged a high level of uncertainty due to the non-significant differences in costs and QALYs. Nevertheless, the committee found this finding encouraging.

The committee discussed the variation in the availability of behavioural interventions to promote access and engagement with physical exercise interventions, and the potential resource impact associated with delivering such interventions. They noted that there may be

training implications as a result of these recommendations, particularly for services where there are no trained people to deliver such interventions. However, they do not anticipate substantial training costs as these will not be ongoing i.e., once people are trained, they can deliver such interventions to many individuals. It is also likely that there are already trained individuals within multidisciplinary teams who can deliver these interventions.

The committee also discussed that services should already use person/family-centred approaches. However, there may be additional resource implications where practices are suboptimal and such approaches are not implemented. The committee further explained that included behaviour change or coaching interventions are only examples, and that the exact approach will be guided by the condition and needs of a person.

The committee was aware that only small changes in practice as a result of these recommendations may have a significant impact on NHS resources due to the large population covered by this review question. However, based on their experience, the committee noted the potential benefits of regular exercise, which may include reduced fatigue, improved mental health and overall wellbeing, improved cardiovascular health, and increased participation in daily activities, and potential costs savings through reduced use of related healthcare services. Therefore, they were of a view that the recommendations in this area are likely to represent a cost-effective use of NHS resources. The committee also explained that exercise is recommended for many other patient groups. For example, people with multiple sclerosis and that there is an equality argument for encouraging access to physical exercise in people with other chronic neurological disorders.

Recommendations supported by this evidence review

This evidence review supports recommendations 1.14.3, 1.16.3 to 1.16.5 and the research recommendation on access to physical activity.

References – included studies

Effectiveness

Busse 2017

Busse, Monica, Quinn, Lori, Drew, Cheney et al. (2017) Physical Activity Self-Management and Coaching Compared to Social Interaction in Huntington Disease: Results From the ENGAGE-HD Randomized, Controlled Pilot Feasibility Trial. Physical therapy 97(6): 625-639

Carter 2013

Carter, A, Daley, A, Humphreys, L et al. (2014) Pragmatic intervention for increasing self-directed exercise behaviour and improving important health outcomes in people with multiple sclerosis: a randomised controlled trial. Multiple sclerosis (Houndmills, Basingstoke, England) 20(8): 1112-22

Carter 2014

Carter, Anouska M, Daley, Amanda J, Kesterton, Sue W et al. (2013) Pragmatic exercise intervention in people with mild to moderate multiple sclerosis: a randomised controlled feasibility study. Contemporary clinical trials 35(2): 40-7

Chemtob 2019

Chemtob, K., Rocchi, M., Arbour-Nicitopoulos, K. et al. (2019) Using tele-health to enhance motivation, leisure time physical activity, and quality of life in adults with spinal cord injury: A self-determination theory-based pilot randomized control trial[white star]. Psychol Sport Exerc 43: 243-252

Coote 2017

Coote, Susan, Uszynski, Marcin, Herring, Matthew P et al. (2017) Effect of exercising at minimum recommendations of the multiple sclerosis exercise guideline combined with structured education or attention control education - secondary results of the step it up randomised controlled trial. BMC neurology 17(1): 119

Gehring 2018

Gehring, Karin, Kloek, Corelien Jj, Aaronson, Neil K et al. (2018) Feasibility of a home-based exercise intervention with remote guidance for patients with stable grade II and III gliomas: a pilot randomized controlled trial. Clinical rehabilitation 32(3): 352-366

Kooijmans 2017

Kooijmans, Hedwig, Post, Marcel W M, Stam, Henk J et al. (2017) Effectiveness of a Self-Management Intervention to Promote an Active Lifestyle in Persons With Long-Term Spinal Cord Injury: The HABITS Randomized Clinical Trial. Neurorehabilitation and neural repair 31(12): 991-1004

Ma 2019

Ma, Jasmin K; West, Christopher R; Martin Ginis, Kathleen A (2019) The Effects of a Patient and Provider Co-Developed, Behavioral Physical Activity Intervention on Physical Activity, Psychosocial Predictors, and Fitness in Individuals with Spinal Cord Injury: A Randomized Controlled Trial. Sports medicine (Auckland, N.Z.) 49(7): 1117-1131

Mayo 2020

Mayo, Nancy E, Mate, Kedar Kv, Reid, Ryan et al. (2020) Participation in and outcomes from a 12-month tailored exercise programme for people with multiple sclerosis (MSTEP©): a randomized trial. Clinical rehabilitation 34(7): 927-937

Nooijen 2016

Nooijen, Carla Fj, Stam, Henk J, Bergen, Michael P et al. (2016) A behavioural intervention increases physical activity in people with subacute spinal cord injury: a randomised trial. Journal of physiotherapy 62(1): 35-41

Nooijen 2017

Nooijen, Carla Fj, Stam, Henk J, Sluis, Tebbe et al. (2017) A behavioral intervention promoting physical activity in people with subacute spinal cord injury: secondary effects on health, social participation and quality of life. Clinical rehabilitation 31(6): 772-780

Paul 2019

Paul, Lorna, Renfrew, Linda, Freeman, Jennifer et al. (2019) Web-based physiotherapy for people affected by multiple sclerosis: a single blind, randomized controlled feasibility study. Clinical rehabilitation 33(3): 473-484

Ryan 2020

Ryan, Jennifer M, Fortune, Jennifer, Stennett, Andrea et al. (2020) Safety, feasibility, acceptability and effects of a behaviour-change intervention to change physical activity behaviour among people with multiple sclerosis: Results from the iStep-MS randomised controlled trial. Multiple sclerosis (Houndmills, Basingstoke, England) 26(14): 1907-1918

Tallner 2016

Tallner, Alexander, Streber, Rene, Hentschke, Christian et al. (2016) Internet-Supported Physical Exercise Training for Persons with Multiple Sclerosis-A Randomised, Controlled Study. International journal of molecular sciences 17(10)

Thomas 2017

Thomas, Sarah, Fazakarley, Louise, Thomas, Peter W et al. (2017) Mii-vitaliSe: a pilot randomised controlled trial of a home gaming system (Nintendo Wii) to increase activity levels, vitality and well-being in people with multiple sclerosis. BMJ open 7(9): e016966

van Nimwegen 2013

van Nimwegen, Marlies, Speelman, Arlene D, Overeem, Sebastiaan et al. (2013) Promotion of physical activity and fitness in sedentary patients with Parkinson's disease: randomised controlled trial. BMJ (Clinical research ed.) 346: f576

Economic

Tosh 2014

Tosh, J., Dixon, S., Carter, A., Daley, A., Petty, J., Roalfe, A., Sharrack, B. and Saxton, J.M., 2014. Cost effectiveness of a pragmatic exercise intervention (EXIMS) for people with multiple sclerosis: economic evaluation of a randomised controlled trial. Multiple Sclerosis Journal, 20(8), pp.1123-1130.

Appendices

Appendix A Review protocols

Review protocol for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Table 4: Review protocol

ID	Field	Content
0.	PROSPERO registration number	CRD42024531892
1.	Review title	Rehabilitation for access to physical activity, exercise or sport.
2.	Review question	What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?
3.	Objective	To determine the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders.
4.	Searches	The following databases will be searched: • Medline All • Embase • Cochrane Central Register of Controlled Trials (CENTRAL) • Cochrane Database of Systematic Reviews (CDSR) • PsychInfo • Social Policy and Practice Searches will be restricted by: • Date: 2013 onwards • English language

ID	Field	Content
		• Human studies • Systematic Reviews • RCTs • Non-randomised studies Other searches: • Inclusion lists of systematic reviews With the agreement of the guideline committee the searches will be re-run 6 weeks before final submission of the review and further studies retrieved for inclusion. The full search strategies will be published in the final review.
5.	Condition or domain being studied	Rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders.
6.	Population	Inclusion: Adults and children with rehabilitation needs due to the following chronic neurological disorders: • Acquired brain injury • Acquired spinal cord injury • Acquired peripheral nerve disorders • Progressive neurological diseases • Functional neurological disorders Exclusion: • Conditions which do not fit one of the 5 categories of chronic neurological disorder as defined in the guideline scope. These exclusions will be by exception and examined on a case-by-case basis rather than whole disorder groups. For example, this guideline will not cover autonomic neuropathy or the acute stabilisation of conditions such as encephalitis or hydrocephalus and will not cover degenerative disc disorder as spinal discs do not form part of the spinal cord. • Disorders for which interventions are primarily focused on altering body structure and functions, for example isolated peripheral nerve injuries i.e. single nerve or plexus injuries.

ID	Field	Content
		• Surgical management of conditions (for example brain tumours, orthopaedic complications). • Conditions for which NICE rehabilitation and rehabilitation related recommendations already exist, including stroke in people aged 16 years and over, dementia including Alzheimer's disease, cerebral palsy, myalgic encephalomyelitis (or encephalopathy)/chronic fatigue syndrome and post-COVID-19 syndrome. • Early rehabilitation after spinal cord injury as this will be covered in the NICE guideline on rehabilitation after traumatic injury
7.	Intervention	Interventions designed to support people to participate in physical activity, exercise or sport: • Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist • Group exercise programmes • Person intrinsic approaches, including behaviour change and coaching • Social prescribing, including green prescribing.

8.	Comparator	Interventions compared with each other or:
		• Placebo (placebo or sham)
		• Control (no intervention, waitlist, standard rehabilitation care alone, or 'usual care')
		• The same intervention (as listed under 'intervention') but varied in terms of:
		  ○ Frequency
		  ○ Intensity
		  ○ Timing
		  ○ Setting

9.	Types of study to be included	Include published full-text papers**: • Systematic reviews of RCTs • Experimental studies with random assignment to intervention and control groups. If insufficient* RCT evidence is located to support decision making about children and young people, then experimental studies with non-random assignment to intervention and control groups (quasi-randomised controlled trials, non-randomised controlled

ID	Field	Content
		trials and prospective and retrospective cohort studies) will also be considered, if a method of controlling for confounding variables is used. Systematic reviews of these studies will also be considered. *Sufficiency will be judged on issues such as the number and quality of the included studies; sample sizes, reported outcomes, and availability of data on subgroups of interest. **Studies must match or adjust for age and chronic neurological disorder. Other confounding factors are: • Sex • delivery setting, for instance whether community or inpatient.
10.	Other exclusion criteria	Inclusion: • Full text papers • Studies conducted in the UK, Australia, New Zealand and Canada and high-income European countries (according to the World Bank). Exclusion: • Conference abstracts/proceedings • Non-English language articles • Articles published before 2013 • Non-English language articles • Books, book chapters and theses. • Papers that do not include methodological details will not be included as they do not provide sufficient information to evaluate risk of bias/study quality.
11.	Context	Recommendations will apply to all inpatient (excluding critical care units), outpatient and community settings, including tertiary settings and care homes in which either fully or partially NHS-funded rehabilitation interventions for chronic neurological disorders are provided.

ID	Field	Content
12.	Primary outcomes (critical outcomes)	• Sustained participation in exercise or physical activity (measured using an objective or subjective count of minutes per week undertaking aerobic or physical activity, change over time or proportion of the group achieving target activity time) • Personal goal attainment (measured using validated tools such as the Goal Attainment Scale [GAS]) • Cardiorespiratory fitness (measured using VO2max)
13.	Secondary outcomes (important outcomes)	• Physical and mental health related quality of life and social care related quality of life (assessed using validated, global measures, such as EQ5D - 3L; EQ5D - 5L; NeuroQOL; PedsQL; QUOLIBRI; SF-36; WHOQOL-100; WHO-QOL Brief; ASCOT; ICECAP-A) • Anxiety (assessed using anxiety sub scales from global quality of life measures or global measures of anxiety such as HADS-A) • Depression (assessed using depression sub scales from global quality of life measures or global measures of depression such as the PHQ-9, BDI-II [Beck Depression Inventory-II] and HADS-D)
14.	Data extraction (selection and coding)	All references identified by the searches and from other sources will be uploaded into EPPI reviewer and de-duplicated. Titles and abstracts of the retrieved citations will be screened to identify studies that potentially meet the inclusion criteria outlined in the review protocol. Dual sifting will be performed on at least 10% of records (or 300 records, whichever is smaller); 90% agreement is required and disagreements will be resolved via discussion with the senior systematic reviewer. The full set of records will not be dual screened because the population, interventions and relevant study designs are relatively clear and should be readily identified from titles and abstracts. Full versions of the selected studies will be obtained for assessment. Studies that fail to meet the inclusion criteria once the full version has been checked will be excluded at this stage. Each study excluded after checking the full version will be listed, along with the reason for its exclusion. The included and excluded studies lists will be circulated to the Topic Group for their comments. Resolution of disputes will be by discussion between the senior reviewer, Topic Advisor and Chair. A standardised form will be used to extract the following data from included studies: study details (reference, country where study was carried out, type and dates), participant characteristics, inclusion and exclusion criteria, details of the interventions if

ID	Field	Content
		relevant, setting and follow-up, relevant outcome data and source of funding. This will be quality assessed by the senior reviewer.
15.	Risk of bias (quality) assessment	Quality assessment of individual studies will be performed according to Developing NICE guidelines: the manual, using the following checklists. • ROBIS tool for systematic reviews • Cochrane RoB tool v.2 for RCTs • Cochrane ROBINS-I for non-randomised controlled trials. The quality assessment will be performed by one reviewer and this will be quality assured by a senior reviewer.
16.	Strategy for data synthesis	Depending on the availability of the evidence, the findings will be summarised narratively or quantitatively. Where possible, pairwise meta-analyses will be conducted using Cochrane Review Manager software. A fixed effect meta-analysis will be conducted and data will be presented as odds ratios or risk ratios for dichotomous outcomes. Peto odds ratio will be used for outcomes with zero events. Mean differences or standardised mean differences will be calculated for continuous outcomes. Heterogeneity in the effect estimates of the individual studies will be assessed using the I2 statistic. Alongside visual inspection of the point estimates and confidence intervals, I2 values of greater than 50% and 80% will be considered as significant and very significant heterogeneity, respectively. Heterogeneity will be explored as appropriate using sensitivity analyses and pre-specified subgroup analyses. If heterogeneity cannot be explained through subgroup analysis then a random effects model will be used for meta-analysis, or the data will not be pooled. The confidence in the findings across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group: http://www.gradeworkinggroup.org/ Importance and imprecision of findings will be assessed against minimally important differences (MIDs). Default MIDs will be used for risk ratios and continuous outcomes only, unless the committee pre-specifies published or other MIDs for specific outcomes • For risk ratios: 0.8 and 1.25. • For continuous outcomes:

ID	Field	Content
		○ MID is calculated by ranking the studies in order of SD in the control arms. The MID is calculated as +/- 0.5 times median SD. ○ For studies that have been pooled using SMD (meta-analysed): +0.5 and -0.5 in the SMD scale are used as MID boundaries.
17.	Analysis of sub-groups	Evidence will be stratified by: • Age at time of intervention (children vs. adults). Children are classified as being aged 17 years or younger. • Functional neurological disorders as distinct from the 4 other categories of neurological disorder. Evidence will be subgrouped by the following only in the event that there is significant heterogeneity in outcomes: • The 4 disorder categories not separated out through a priori stratification (acquired brain injury, acquired spinal cord injury, acquired peripheral nerve disorders and progressive neurological diseases • Study design (RCT v. NRS) • Age (for the ≤17 years of age stratification only). Categories are <4 years, 4-11 years and >11 years Where evidence is stratified or sub grouped the committee will consider on a case-by-case basis if separate recommendations should be made for distinct groups. Separate recommendations may be made where there is evidence of a differential effect of interventions in distinct groups. If there is a lack of evidence in one group, the committee will consider, based on their experience, whether it is reasonable to extrapolate and assume the interventions will have similar effects in that group compared with others.
18.	Type and method of review	☒ Intervention
		☐ Diagnostic
		☐ Prognostic
		☐ Qualitative
		☐ Epidemiologic
		☐ Service Delivery
		☐ Other (please specify)

ID	Field	Content		
19.	Language	English		
20.	Country	England		
21.	Anticipated or actual start date	March 2024		
22.	Anticipated completion date	July 2024		
23.	Stage of review at time of this submission	Review stage	Started	Completed
		Preliminary searches	☑	☑
		Piloting of the study selection process	☑	☑
		Formal screening of search results against eligibility criteria	☑	☑
		Data extraction	☑	☑
		Risk of bias (quality) assessment	☑	☑
		Data analysis	☑	☑
24.	Named contact	5a. Named contact NICE 5b Named contact e-mail rehabforcnd@nice.org.uk 5e Organisational affiliation of the review National Institute for Health and Care Excellence (NICE)		
25.	Review team members	NICE Technical Team		

ID	Field	Content
26.	Funding sources/sponsor	This systematic review is being completed by NICE, which receives funding from the Department of Health and Social Care.
27.	Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.
28.	Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: https://www.nice.org.uk/guidance/indevelopment/gid-ng10181
29.	Other registration details	N/A
30.	Reference/URL for published protocol	https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42024531892
31.	Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: notifying registered stakeholders of publication publicising the guideline through NICE's newsletter and alerts issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.
32.	Keywords	Acquired brain injury; acquired spinal cord injury; access; sport; exercise; physical activity; neurological diseases; neurological disorders; peripheral nerve disorders; rehabilitation.
33.	Details of existing review of same topic by same authors	N/A

ID	Field	Content	
34.	Current review status	☐	Ongoing
		☐	Completed but not published
		☒	Completed and published
		☐	Completed, published and being updated
		☐	Discontinued
35..	Additional information	N/A	
36.	Details of final publication	www.nice.org.uk	

ASCOT: Adult Social Care Outcomes Toolkit; CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; CES-D: Center of Epidemiological Studies-Depression; DAS: Depression, Anxiety and Stress Scale; EQ 5D: EuroQoL five dimensions; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HADS-A: Hospital Anxiety and Depression Scale-Anxiety; HADS-D: Hospital Anxiety and Depression Scale-Depression; ICECAP-A: NeuroQOL: Quality of Life in Neurological Disorders; INAHTA: International Network of Agencies for Health Technology Assessment; MEDLINE: Medical Literature Analysis and Retrieval System Online; MID: minimally important difference; NICE: National Institute for Health and Care Excellence; NRS: non-randomised trials; PRESS: Peer Review of Electronic Search Strategies; PedsQL: Paediatric Quality of Life Inventory; PHQ-9: Patient Health Questionnaire; QUOLIBRI: Quality of Life after Brain Injury; RCT: randomised controlled trial; RoB: risk of bias; ROBINS-I: Risk Of Bias In Non-randomised Studies - of Interventions; ROBIS: risk of bias in systematic reviews; SCI: spinal cord injury; SF-36: 36-Item Short Form Survey; SD: standard deviation; SMD: standard mean difference; VO_2max: maximal oxygen consumption; WHOQOL-100: world health organisation quality of life assessment-100 item; WHOQOL-BREF: world health organisation quality of life assessment-brief version

Appendix B Literature search strategies

Literature search strategies for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Review question search strategies

Databases: Medline all

Date of last search: 18/06/2024

#	Searches
1	(CRANIOCEREBRAL TRAUMA/ or brain injuries/ or exp brain hemorrhage, traumatic/ or exp brain injuries, diffuse/ or exp brain injuries, traumatic/ or exp brain injury, chronic/ or Shaken Baby Syndrome/ or HYPOXIA, BRAIN/ or Brain Damage, Chronic/ or exp INTRACRANIAL HEMORRHAGE, TRAUMATIC/ or exp BRAIN NEOPLASMS/ or BRAIN DISEASES/ or BRAIN ABSCESS/ or BRAIN DISEASES, METABOLIC/ or CEREBELLAR DISEASES/ or cerebrovascular disorders/ or basal ganglia cerebrovascular disease/ or cerebrovascular trauma/ or intracranial arteriovenous malformations/ or "intracranial embolism and thrombosis"/ or intracranial hemorrhages/ or vascular headaches/ or exp ENCEPHALITIS/ or exp HYDROCEPHALUS/) not (exp STROKE/ or dementia/)
2	((brain* or cereb* or craniocereb* or cranial or intracrani* or neurocognit*) adj2 (injur* or trauma* or damage* or disease*1 or disorder* or infect* or h?emorrhag* or neoplasm* or cancer* or tumo?r* or insult* or impair* or ischemi* or ischaemi* or infarcti* or hypoxi* or drown*)).ti,ab.
3	(chronic* adj1 trauma* adj2 encephalopath*).ti,ab.
4	((infratentorial* or supratentorial* or hypothalam* or pituitar* or choroid plexus) adj2 (neoplasm* or cancer* or tumo?r* or carcinom* or adenocarcinom*)).ti,ab.
5	(brain* adj2 abscess*).ti,ab.
6	(carotid arter* adj2 (disease* or injur*)).ti,ab.
7	("basal ganglia disease*" or encephalitis or meningoencephalitis or hydrocephal* or "paraneoplastic cereb* degenerat*" or "shak* baby syndrome*").ti,ab.
8	exp STROKE/ and (ADOLESCENT/ or MINORS/ or exp CHILD/ or exp INFANT/ or exp PEDIATRICS/ or exp PUBERTY/)
9	(stroke? adj3 (p?ediatric* or child* or adolescen* or kid or kids or youth* or youngster* or minor or minors or underage* or under-age* or "under age*" or teen or teens or teenager* or juvenile* or boy or boys or boyhood or girl or girls or girlhood or schoolchild* or "school age*" or schoolage* or "under 16" or "under sixteen*")).ti,ab.
10	exp SPINAL CORD INJURIES/ or exp SPINAL CORD NEOPLASMS/ or EPIDURAL ABSCESS/ or SPINAL CORD DISEASES/ or exp SPINAL CORD VASCULAR DISEASES/ or SPINAL CORD COMPRESSION/ or MYELITIS, TRANSVERSE/
11	((spinal* or spine?) adj2 (injur* or trauma* or tumo?r* or neoplasm* or cancer* or infect* or insult* or disease? or disorder* or degenrat* or compress* or vascular* or ischemi* or ischaemi* or infarct* or h?emorrhag*)).ti,ab.
12	(Central cord syndrome* or transverse myelitis).ti,ab.
13	(epidural* adj2 (neoplasm* or cancer* or tumo?r* or abscess*)).ti,ab.
14	((spinal* or spine?) adj2 (viral* or virus* or polio* or acquired immunodeficiency syndrome or AIDS or HIV or bacterial* or neurosyphili* or neuro-syphili* or tubercul*)).ti,ab.
15	PERIPHERAL NERVE INJURIES/ or exp CRANIAL NERVE INJURIES/ or PERIPHERAL NERVOUS SYSTEM NEOPLASMS/ or exp CRANIAL NERVE NEOPLASMS/ or exp PERIPHERAL NERVOUS SYSTEM DISEASES/ or exp CRANIAL NERVE DISEASES/
16	((periph* or cranial*) adj1 (nerve? or nervous system) adj2 (injur* or trauma* or disorder* or disease* or damage* or neoplasm* or cancer* or tumo?r* or inflamm* or autoimmun* or paraneoplastic* or neuropath* or syndrome?)).ti,ab.

#	Searches
17	(Guillain* adj1 Barr*).ti,ab.
18	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 injur*).ti,ab.
19	(optic* adj1 nerve* adj2 (neoplasm* or cancer* or tumo?r*)).ti,ab.
20	(brachial plexus adj1 (neuropath* or neuritis)).ti,ab.
21	(complex regional pain syndrome* or causalgia or mononeuropath* or nerve compression syndrome*).ti,ab.
22	((femoral or median or peroneal or radial or sciatic or tibial or ulnar) adj1 neuropath*).ti,ab.
23	((carpal-tunnel or piriformis-muscle or tarsal-tunnel or thoracic-outlet) adj1 syndrome*).ti,ab.
24	(pudendal neuralgia or polyneuropath* or polyradiculoneuropath* or polyradiculopath* or radiculopath*).ti,ab.
25	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 disease*).ti,ab.
26	(periph* adj2 neuropath*).ti,ab.
27	(((periph* or cranial*) adj2 (nerve? or nervous system)) and lupus).ti,ab.
28	((multi-focal* or multifocal*) adj2 motor adj1 neuropath*).ti,ab.
29	(((periph* or cranial*) adj2 (nerve? or nervous system)) and alcohol*).ti,ab.
30	exp MOTOR NEURON DISEASE/ or POSTPOLIOMYELITIS SYNDROME/ or exp PARKINSONIAN DISORDERS/ or MUSCULAR DYSTROPHY, DUCHENNE/ or exp MULTIPLE SCLEROSIS/ or NEUROMUSCULAR DISEASES/ or SPASTIC PARAPLEGIA, HEREDITARY/ or FRIEDREICH ATAXIA/ or exp MULTIPLE SYSTEM ATROPHY/ or SUPRANUCLEAR PALSY, PROGRESSIVE/ or CORTICOBASAL DEGENERATION/ or LEUKODYSTROPHY, METACHROMATIC/ or exp MITOCHONDRIAL MYOPATHIES/ or exp MUCOPOLYSACCHARIDOSES/ or WILLIAMS SYNDROME/ or GENETIC DISEASES, INBORN/ or RETT SYNDROME/ or FETAL ALCOHOL SPECTRUM DISORDERS/ or DYSTONIC DISORDERS/ or "HEREDITARY SENSORY AND MOTOR NEUROPATHY"/ or SPINAL DYSRAPHISM/
31	(neurolog* adj1 (condition* or disease* or damage* or disorder* or impair*)).ti,ab.
32	((motor-neuron* or gehrig* or charcott* or kennedy*) adj1 disease*).ti,ab.
33	((amyotroph* or primary) adj1 lateral* adj1 sclero*).ti,ab.
34	(bulbar adj1 pals*).ti,ab.
35	((muscular or muscle* or bulbo) adj1 atroph* adj1 spin*).ti,ab.
36	(progressiv* adj1 (muscular or muscle*) adj1 atroph*).ti,ab.
37	((postpolio* or post-polio*) adj1 syndrome?).ti,ab.
38	(Parkinson* or duchenne* or multiple scleros?s* or aphasia or creutzfeldt-jakob or huntington* or kluver-bucy).ti,ab.
39	(muscular adj1 dystroph*).ti,ab.
40	(neuromusc* adj1 (disease* or disorder?)).ti,ab.
41	(heredit* adj1 spastic* adj1 parapleg*).ti,ab.
42	"friedreich* ataxia*".ti,ab.
43	((multiple system or olivopontocerebellar) adj1 atroph*).ti,ab.
44	(shy-drager syndrome* or striatonigral degenerat* or batten* disease?).ti,ab.
45	(progressive adj1 supranuclear adj1 pals*).ti,ab.
46	(richardson* adj1 (disease? or syndrome?)).ti,ab.
47	((corticobasal or cortico basal) adj1 degenerat*).ti,ab.
48	(white adj1 matter adj1 disorder?).ti,ab.
49	(metachromatic leukodystroph* or mitochondrial myopath* or mucopolysaccharidos*).ti,ab.
50	(lysosomal adj1 storage adj1 disorder?).ti,ab.
51	((genetic or William* or catch-22 or rett* or congenital or f?etal alcohol) adj1 (syndrome or disorder*)).ti,ab.
52	(perinatal illness* or perinatal hypoxia*).ti,ab.
53	(primary adj1 dystonia?).ti,ab.
54	(heredit* adj1 motor* adj1 sens* adj1 neuropath*).ti,ab.

#	Searches
55	(spina bifida? or spinal dysraphism?).ti,ab.
56	MOVEMENT DISORDERS/ or MOTOR DISORDERS/ or CONVERSION DISORDER/
57	((functional* or psychogenic* or dissociative*) adj1 neurologic* adj1 (disorder* or dysfunction* or difficult*)).ti,ab.
58	((movement* or motor* or convers*) adj1 (disorder* or dysfunct*)).ti,ab.
59	((psychogenic or dissociative or non-epilep* or nonepilep*) adj1 (seizure* or convulsion* or fit or fits or spasm* or attack*)).ti,ab.
60	(pseudo-seizure* or pseudoseizure*).ti,ab.
61	(medical* adj1 (unexplain* or un-explain*) adj1 symptom?).ti,ab.
62	or/1-61
63	((access* or participat* or tailor* or toolkit? or "tool kit?" or personali?ed or personali?ation or individuali?ed or individuali?ation or supervised or supervision or facilitated or facilitator? or guided or mediated or bespoke or custom* or condition specific or specialist? or therapist? or trainer? or instructor? or teacher?) adj3 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
64	(support* adj1 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
65	(group? adj2 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti.
66	(group? adj2 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ab. /freq=2
67	((intrinsic* or coach*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
68	(behavio?r* adj5 (chang* or modif* or intervention*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
69	((green or social) adj3 prescrib* adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
70	or/63-69
71	62 and 70
72	letter/
73	editorial/
74	news/
75	exp historical article/
76	Anecdotes as topic/
77	comment/
78	case reports/
79	(letter or comment*).ti.
80	or/72-79
81	randomized controlled trial/ or random*.ti,ab.
82	80 not 81
83	animals/ not humans/
84	exp Animals, Laboratory/
85	exp Animal Experimentation/
86	exp Models, Animal/
87	exp Rodentia/
88	(rat or rats or rodent* or mouse or mice).ti.
89	or/82-88
90	71 not 89
91	limit 90 to english language
92	limit 91 to yr="2013 -Current"
93	meta-analysis/
94	meta-analysis as topic/
95	(meta analy* or metanaly* or metaanaly*).ti,ab.
96	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
97	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.

#	Searches
98	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
99	(search* adj4 literature).ab.
100	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
101	cochrane.jw.
102	or/93-101
103	randomized controlled trial.pt.
104	controlled clinical trial.pt.
105	pragmatic clinical trial.pt.
106	randomi#ed.ab.
107	placebo.ab.
108	randomly.ab.
109	Clinical Trials as topic.sh.
110	trial.ti.
111	or/103-110
112	exp EPIDEMIOLOGIC STUDIES/ or exp CLINICAL TRIAL/ or COMPARATIVE STUDY/
113	(control and study).mp.
114	program.mp.
115	or/112-114
116	exp Infant/ or Infant Health/ or Infant Welfare/
117	(prematur* or pre-matur* or preterm* or pre-term* or infan* or newborn* or new-born* or perinat* or peri-nat* or neonat* or neo-nat* or baby* or babies or toddler*).ti,ab,in,jn.
118	exp Child/ or exp Child Behavior/ or Child Health/ or Child Welfare/
119	Minors/
120	(child* or minor or minors or boy* or girl* or kid or kids or young*).ti,ab,in,jn.
121	exp pediatrics/
122	(pediatric* or paediatric* or peadiatric*).ti,ab,in,jn.
123	Adolescent/ or Adolescent Behavior/ or Adolescent Health/
124	Puberty/
125	(adolescen* or pubescen* or prepubescen* or pre-pubescen* or pubert* or prepubert* or pre-pubert* or teen* or preteen* or pre-teen* or juvenil* or youth* or under*age*).ti,ab,in,jn.
126	Schools/
127	Child Day Care Centers/ or exp Nurseries/ or Schools, Nursery/
128	(pre-school* or preschool* or kindergar* or daycare or day-care or nurser* or school* or pupil* or student*).ti,ab,jn.
129	("under 18*" or "under eighteen*" or "under 25*" or "under twenty five*").ti,ab.
130	or/116-129
131	92 and (102 or 111)
132	92 and 115 and 130
133	or/131-132

Databases: Embase

Date of last search: 18/06/2024

#	Searches
1	(head injury/ or exp brain injury/ or chronic brain disease/ or brain hemorrhage/ or brain hypoxia/ or exp brain tumor/ or brain disease/ or brain abscess/ or metabolic encephalopathy/ or cerebellum disease/ or exp cerebrovascular disease/ or encephalitis/ or hydrocephalus/) not (exp cerebrovascular accident/ or dementia/)

#	Searches
2	((brain* or cereb* or craniocereb* or cranial or intracrani* or neurocognit*) adj2 (injur* or trauma* or damage* or disease*1 or disorder* or infect* or h?emorrhag* or neoplasm* or cancer* or tumo?r* or insult* or impair* or ischemi* or infarcti* or hypoxi* or drown*)).ti,ab.
3	(chronic* adj1 trauma* adj2 encephalopath*).ti,ab.
4	((infratentorial* or supratentorial* or hypothalam* or pituitar* or choroid plexus) adj2 (neoplasm* or cancer* or tumo?r* or carcinom* or adenocarcinom*)).ti,ab.
5	(brain* adj2 abscess*).ti,ab.
6	(carotid arter* adj2 (disease* or injur*)).ti,ab.
7	("basal ganglia disease*" or encephalitis or meningoencephalitis or hydrocephal* or "paraneoplastic cereb* degenerat*" or "shak* baby syndrome*").ti,ab.
8	exp cerebrovascular accident/ and (adolescent/ or "minor (person)"/ or exp child/ or exp infant/ or pediatrics/ or exp pediatrics/ or exp puberty/)
9	(stroke? adj3 (p?ediatric* or child* or adolescen* or kid or kids or youth* or youngster* or minor or minors or underage* or under-age* or "under age*" or teen or teens or teenager* or juvenile* or boy or boys or boyhood or girl or girls or girlhood or schoolchild* or "school age*" or schoolage* or "under 16" or "under sixteen*")).ti,ab.
10	exp spinal cord injury/ or exp spinal cord tumor/ or epidural abscess/ or spinal cord disease/ or exp spinal cord vascular disease/ or spinal cord compression/ or transverse myelitis/
11	((spinal* or spine?) adj2 (injur* or trauma* or tumo?r* or neoplasm* or cancer* or infect* or insult* or disease? or disorder* or degenrat* or compress* or vascular* or ischemi* or ischaemi* or infarct* or h?emorrhag*)).ti,ab.
12	(Central cord syndrome* or transverse myelitis).ti,ab.
13	(epidural* adj2 (neoplasm* or cancer* or tumo?r* or abscess*)).ti,ab.
14	((spinal* or spine?) adj2 (viral* or virus* or polio* or acquired immunodeficiency syndrome or AIDS or HIV or bacterial* or neurosyphili* or neuro-syphili* or tubercul*)).ti,ab.
15	peripheral nerve injury/ or exp cranial nerve injury/ or peripheral nerve tumor/ or exp cranial nerve tumor/ or exp peripheral neuropathy/ or exp cranial neuropathy/
16	((periph* or cranial*) adj1 (nerve? or nervous system) adj2 (injur* or trauma* or disorder* or disease* or damage* or neoplasm* or cancer* or tumo?r* or inflamm* or autoimmun* or paraneoplastic* or neuropath* or syndrome?)).ti,ab.
17	(Guillain* adj1 Barr*).ti,ab.
18	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 injur*).ti,ab.
19	(optic* adj1 nerve* adj2 (neoplasm* or cancer* or tumo?r*)).ti,ab.
20	(brachial plexus adj1 (neuropath* or neuritis)).ti,ab.
21	(complex regional pain syndrome* or causalgia or mononeuropath* or nerve compression syndrome*).ti,ab.
22	((femoral or median or peroneal or radial or sciatic or tibial or ulnar) adj1 neuropath*).ti,ab.
23	((carpal-tunnel or piriformis-muscle or tarsal-tunnel or thoracic-outlet) adj1 syndrome*).ti,ab.
24	(pudendal neuralgia or polyneuropath* or polyradiculoneuropath* or polyradiculopath* or radiculopath*).ti,ab.
25	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 disease*).ti,ab.
26	(periph* adj2 neuropath*).ti,ab.
27	(((periph* or cranial*) adj2 (nerve? or nervous system)) and lupus).ti,ab.
28	((multi-focal* or multifocal*) adj2 motor adj1 neuropath*).ti,ab.
29	(((periph* or cranial*) adj2 (nerve? or nervous system)) and alcohol*).ti,ab.
30	exp motor neuron disease/ or postpoliomyelitis syndrome/ or exp parkinsonism/ or Duchenne muscular dystrophy/ or exp multiple sclerosis/ or neuromuscular disease/ or hereditary motor sensory neuropathy/ or Friedreich ataxia/ or exp Shy Drager syndrome/ or progressive supranuclear palsy/ or corticobasal degeneration/ or metachromatic leukodystrophy/ or exp mitochondrial myopathy/ or exp mucopolysaccharidosis/ or Williams Beuren syndrome/ or genetic disorder/ or Rett syndrome/ or fetal alcohol syndrome/ or dystonic disorder/ or hereditary motor sensory neuropathy/ or spinal dysraphism/
31	(neurolog* adj1 (condition* or disease* or damage* or disorder* or impair*)).ti,ab.
32	((motor-neuron* or gehrig* or charcott* or kennedy*) adj1 disease*).ti,ab.

#	Searches
33	((amyotroph* or primary) adj1 lateral* adj1 sclero*).ti,ab.
34	(bulbar adj1 pals*).ti,ab.
35	((muscular or muscle* or bulbo) adj1 atroph* adj1 spin*).ti,ab.
36	(progressiv* adj1 (muscular or muscle*) adj1 atroph*).ti,ab.
37	((postpolio* or post-polio*) adj1 syndrome?).ti,ab.
38	(Parkinson* or duchenne* or multiple scleros?s* or aphasia or creutzfeldt-jakob or huntington* or kluver-bucy).ti,ab.
39	(muscular adj1 dystroph*).ti,ab.
40	(neuromusc* adj1 (disease* or disorder?)).ti,ab.
41	(heredit* adj1 spastic* adj1 parapleg*).ti,ab.
42	"friedreich* ataxia*".ti,ab.
43	((multiple system or olivopontocerebellar) adj1 atroph*).ti,ab.
44	(shy-drager syndrome* or striatonigral degenerat* or batten* disease?).ti,ab.
45	(progressive adj1 supranuclear adj1 pals*).ti,ab.
46	(richardson* adj1 (disease? or syndrome?)).ti,ab.
47	((corticobasal or cortico basal) adj1 degenerat*).ti,ab.
48	(white adj1 matter adj1 disorder?).ti,ab.
49	(metachromatic leukodystroph* or mitochondrial myopath* or mucopolysaccharidos*).ti,ab.
50	(lysosomal adj1 storage adj1 disorder?).ti,ab.
51	((genetic or William* or catch-22 or rett* or congenital or f?etal alcohol) adj1 (syndrome or disorder*)).ti,ab.
52	(perinatal illness* or perinatal hypoxia*).ti,ab.
53	(primary adj1 dystonia?).ti,ab.
54	(heredit* adj1 motor* adj1 sens* adj1 neuropath*).ti,ab.
55	(spina bifida? or spinal dysraphism?).ti,ab.
56	motor dysfunction/ or motor dysfunction/ or conversion disorder/
57	((functional* or psychogenic* or dissociative*) adj1 neurologic* adj1 (disorder* or dysfunction* or difficult*)).ti,ab.
58	((movement* or motor* or convers*) adj1 (disorder* or dysfunct*)).ti,ab.
59	((psychogenic or dissociative or non-epilep* or nonepilep*) adj1 (seizure* or convulsion* or fit or fits or spasm* or attack*)).ti,ab.
60	(pseudo-seizure* or pseudoseizure*).ti,ab.
61	(medical* adj1 (unexplain* or un-explain*) adj1 symptom?).ti,ab.
62	or/1-61
63	((access* or participat* or tailor* or toolkit? or "tool kit?" or personali?ed or personali?ation or individuali?ed or individuali?ation or supervised or supervision or facilitated or facilitator? or guided or mediated or bespoke or custom* or condition specific or specialist? or therapist? or trainer? or instructor? or teacher?) adj3 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
64	(support* adj1 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
65	(group? adj2 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti.
66	(group? adj2 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ab. /freq=2
67	((intrinsic* or coach*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
68	(behavio?r* adj5 (chang* or modif* or intervention*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
69	((green or social) adj3 prescrib* adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
70	or/63-69
71	62 and 70
72	letter.pt. or letter/
73	note.pt.

#	Searches
74	editorial.pt.
75	case report/ or case study/
76	(letter or comment*).ti.
77	or/72-76
78	randomized controlled trial/ or random*.ti,ab.
79	77 not 78
80	animal/ not human/
81	nonhuman/
82	exp Animal Experiment/
83	exp Experimental Animal/
84	animal model/
85	exp Rodent/
86	(rat or rats or rodent* or mouse or mice).ti.
87	or/79-86
88	71 not 87
89	limit 88 to english language
90	limit 89 to yr="2013 -Current"
91	systematic review/
92	meta-analysis/
93	(meta analy* or metanaly* or metaanaly*).ti,ab.
94	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
95	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
96	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
97	(search* adj4 literature).ab.
98	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
99	((pool* or combined) adj2 (data or trials or studies or results)).ab.
100	cochrane.jw.
101	or/91-100
102	random*.ti,ab.
103	factorial*.ti,ab.
104	(crossover* or cross over*).ti,ab.
105	((doubl* or singl*) adj blind*).ti,ab.
106	(assign* or allocat* or volunteer* or placebo*).ti,ab.
107	crossover procedure/
108	single blind procedure/
109	randomized controlled trial/
110	double blind procedure/
111	or/102-110
112	EPIDEMIOLOGY/ or CONTROLLED STUDY/ or exp CASE CONTROL STUDY/ or PROSPECTIVE STUDY/ or RETROSPECTIVE STUDY/ or COHORT ANALYSIS/ or FOLLOW UP/ or CROSS-SECTIONAL STUDY/ or exp CLINICAL TRIAL/ or COMPARATIVE STUDY/
113	(control and study).mp.
114	program.mp.
115	or/112-114
116	exp juvenile/ or Child Behavior/ or Child Welfare/ or Child Health/ or infant welfare/ or "minor (person)"/ or elementary student/
117	(prematur* or pre-matur* or preterm* or pre-term* or infan* or newborn* or new-born* or perinat* or peri-nat* or neonat* or neo-nat* or baby* or babies or toddler*).ti,ab,in,ad,jw.

#	Searches
118	(child* or minor or minors or boy* or girl* or kid or kids or young*).ti,ab,in,ad,jw.
119	exp pediatrics/
120	(pediatric* or paediatric* or peadiatric*).ti,ab,in,ad,jw.
121	exp adolescence/ or exp adolescent behavior/ or adolescent health/ or high school student/ or middle school student/
122	(adolescen* or pubescen* or prepubescen* or pre-pubescen* or pubert* or prepubert* or pre-pubert* or teen* or preteen* or pre-teen* or juvenil* or youth* or under*age*).ti,ab,in,ad,jw.
123	school/ or high school/ or kindergarten/ or middle school/ or primary school/ or nursery school/ or day care/
124	(pre-school* or preschool* or kindergar* or daycare or day-care or nurser* or school* or pupil* or student*).ti,ab,jw.
125	("under 18*" or "under eighteen*" or "under 25*" or "under twenty five*").ti,ab.
126	or/116-125
127	90 and (101 or 111)
128	90 and 115 and 126
129	or/127-128
130	(conference abstract* or conference review or conference paper or conference proceeding).db,pt,su.
131	129 not 130

Databases: Cochrane Central Register of Controlled Trials; and Cochrane Database of Systematic Reviews

Date of last search: 18/06/2024

#	Searches
#1	MeSH descriptor: [Craniocerebral Trauma] this term only
#2	MeSH descriptor: [Brain Injuries] this term only
#3	MeSH descriptor: [Brain Hemorrhage, Traumatic] explode all trees
#4	MeSH descriptor: [Brain Injuries, Diffuse] explode all trees
#5	MeSH descriptor: [Brain Injuries, Traumatic] explode all trees
#6	MeSH descriptor: [Brain Injury, Chronic] explode all trees
#7	MeSH descriptor: [Shaken Baby Syndrome] this term only
#8	MeSH descriptor: [Brain Damage, Chronic] this term only
#9	MeSH descriptor: [Hypoxia, Brain] this term only
#10	MeSH descriptor: [Intracranial Hemorrhage, Traumatic] explode all trees
#11	MeSH descriptor: [Brain Neoplasms] explode all trees
#12	MeSH descriptor: [Brain Diseases] this term only
#13	MeSH descriptor: [Brain Abscess] this term only
#14	MeSH descriptor: [Brain Diseases, Metabolic] this term only
#15	MeSH descriptor: [Cerebellar Diseases] this term only
#16	MeSH descriptor: [Cerebrovascular Disorders] this term only
#17	MeSH descriptor: [Basal Ganglia Cerebrovascular Disease] this term only
#18	MeSH descriptor: [Cerebrovascular Trauma] this term only
#19	MeSH descriptor: [Intracranial Arteriovenous Malformations] this term only
#20	MeSH descriptor: [Intracranial Embolism and Thrombosis] this term only
#21	MeSH descriptor: [Intracranial Hemorrhages] this term only
#22	MeSH descriptor: [Vascular Headaches] this term only
#23	MeSH descriptor: [Encephalitis] this term only
#24	MeSH descriptor: [Hydrocephalus] this term only

#	Searches
#25	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24
#26	MeSH descriptor: [Stroke] explode all trees
#27	MeSH descriptor: [Dementia] this term only
#28	#26 or #27
#29	#25 NOT #28
#30	((brain* or cereb* or craniocereb* or cranial or intracrani* or neurocognit*) NEAR/2 (injur* or trauma* or damage* or disease* or diseases* or disorder* or infect* or hemorrhag* or haemorrhag* or neoplasm* or cancer* or tumour* or tumor* or insult* or impair* or ischemi* or ischaemi* or infarcti* or hypoxi* or drown*)):ti,ab
#31	(chronic* NEAR/1 trauma* NEAR/2 encephalopath*):ti,ab
#32	((infratentorial* or supratentorial* or hypothalam* or pituitar* or "choroid plexus") NEAR/2 (neoplasm* or cancer* or tumour* or tumor* or carcinom* or adenocarcinom*)):ti,ab
#33	(brain* NEAR/2 abscess*):ti,ab
#34	(carotid arter* NEAR/2 (disease* or injur*)):ti,ab
#35	(("basal ganglia" next disease*) or encephalitis or meningoencephalitis or hydrocephal* or "paraneoplastic cerebellar" next degenerat* or "shaken baby" next syndrome* or "shaking baby" next syndrome*):ti,ab
#36	MeSH descriptor: [Stroke] explode all trees
#37	MeSH descriptor: [Adolescent] this term only
#38	MeSH descriptor: [Minors] this term only
#39	MeSH descriptor: [Child] explode all trees
#40	MeSH descriptor: [Infant] explode all trees
#41	MeSH descriptor: [Pediatrics] explode all trees
#42	MeSH descriptor: [Puberty] explode all trees
#43	#37 or #38 or #39 or #40 or #41 or #42
#44	#36 and #43
#45	((stroke or strokes) NEAR/3 (paediatric* or pediatric* or child* or adolescen* or kid or kids or youth* or youngster* or minor or minors or underage* or "under age" or "under ages" or "under aged" or teen or teens or teenager* or juvenile* or boy or boys or boyhood or girl or girls or girlhood or schoolchild* or "school ages" or "school age" or "school aged" or schoolage* or "under 16" or "under sixteen" or "under sixteens")):ti,ab
#46	MeSH descriptor: [Spinal Cord Injuries] explode all trees
#47	MeSH descriptor: [Spinal Cord Neoplasms] explode all trees
#48	MeSH descriptor: [Epidural Abscess] this term only
#49	MeSH descriptor: [Spinal Cord Diseases] this term only
#50	MeSH descriptor: [Spinal Cord Vascular Diseases] explode all trees
#51	MeSH descriptor: [Spinal Cord Compression] this term only
#52	MeSH descriptor: [Myelitis, Transverse] this term only
#53	((spinal* or spine or spines) NEAR/2 (injur* or trauma* or tumour* or tumor* or neoplasm* or cancer* or infect* or insult* or disease or diseases or disorder* or degenrat* or compress* or vascular* or ischemi* or ischaemi* or infarct* or hemorrhag* or haemorrhag*)):ti,ab
#54	("Central cord" next syndrome* or "transverse myelitis"):ti,ab
#55	(epidural* NEAR/2 (neoplasm* or cancer* or tumour* or tumor* or abscess*)):ti,ab
#56	((spinal* or spine or spines) NEAR/2 (viral* or virus* or polio* or "acquired immunodeficiency syndrome" or AIDS or HIV or bacterial* or neurosyphili* or neuro next syphili* or tubercul*)):ti,ab
#57	MeSH descriptor: [Peripheral Nerve Injuries] this term only
#58	MeSH descriptor: [Cranial Nerve Injuries] explode all trees
#59	MeSH descriptor: [Peripheral Nervous System Neoplasms] this term only
#60	MeSH descriptor: [Cranial Nerve Neoplasms] explode all trees
#61	MeSH descriptor: [Peripheral Nervous System Diseases] explode all trees
#62	MeSH descriptor: [Cranial Nerve Diseases] explode all trees

#	Searches
#63	((periph* or cranial*) NEAR/1 (nerve or nerves or "nervous system") NEAR/2 (injur* or trauma* or disorder* or disease* or damage* or neoplasm* or cancer* or tumour* or tumor* or inflamm* or autoimmun* or paraneoplastic* or neuropath* or syndrome*)):ti,ab
#64	(Guillain* NEAR/1 Barr*):ti,ab
#65	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or "ocular motility" or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) NEAR/1 nerve* NEAR/1 injur*):ti,ab
#66	(optic* NEAR/1 nerve* NEAR/2 (neoplasm* or cancer* or tumour* or tumor*)):ti,ab
#67	(brachial next plexus NEAR/1 (neuropath* or neuritis)):ti,ab
#68	("complex regional pain" next syndrome* or causalgia or mononeuropath* or "nerve compression" next syndrome*):ti,ab
#69	((femoral or median or peroneal or radial or sciatic or tibial or ulnar) NEAR/1 neuropath*):ti,ab
#70	((carpal next tunnel or piriformis next muscle or tarsal next tunnel or thoracic next outlet) NEAR/1 syndrome*):ti,ab
#71	((pudendal next neuralgia) or polyneuropath* or polyradiculoneuropath* or polyradiculopath* or radiculopath*):ti,ab
#72	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or "ocular motility" or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) NEAR/1 nerve* NEAR/1 disease*):ti,ab
#73	(periph* NEAR/2 neuropath*):ti,ab
#74	(((periph* or cranial*) NEAR/2 (nerve or nerves or "nervous system")) and lupus):ti,ab
#75	((multi next focal* or multifocal*) NEAR/2 motor NEAR/1 neuropath*):ti,ab
#76	(((periph* or cranial*) NEAR/2 (nerve or nerves or nervous system)) and alcohol*):ti,ab
#77	#29 or #30 or #31 or #32 or #33 or #34 or #35 or #44 or #45 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60 or #61 or #62 or #63 or #64 or #65 or #66 or #67 or #68 or #69 or #70 or #71 or #72 or #73 or #74 or #75 or #76
#78	MeSH descriptor: [Motor Neuron Disease] explode all trees
#79	MeSH descriptor: [Postpoliomyelitis Syndrome] this term only
#80	MeSH descriptor: [Parkinsonian Disorders] explode all trees
#81	MeSH descriptor: [Muscular Dystrophy, Duchenne] this term only
#82	MeSH descriptor: [Multiple Sclerosis] explode all trees
#83	MeSH descriptor: [Neuromuscular Diseases] this term only
#84	MeSH descriptor: [Spastic Paraplegia, Hereditary] this term only
#85	MeSH descriptor: [Friedreich Ataxia] this term only
#86	MeSH descriptor: [Multiple System Atrophy] explode all trees
#87	MeSH descriptor: [Supranuclear Palsy, Progressive] this term only
#88	MeSH descriptor: [Corticobasal Degeneration] explode all trees
#89	MeSH descriptor: [Leukodystrophy, Metachromatic] this term only
#90	MeSH descriptor: [Mitochondrial Myopathies] explode all trees
#91	MeSH descriptor: [Mucopolysaccharidoses] explode all trees
#92	MeSH descriptor: [Williams Syndrome] this term only
#93	MeSH descriptor: [Genetic Diseases, Inborn] this term only
#94	MeSH descriptor: [Rett Syndrome] this term only
#95	MeSH descriptor: [Fetal Alcohol Spectrum Disorders] this term only
#96	MeSH descriptor: [Dystonic Disorders] this term only
#97	MeSH descriptor: [Hereditary Sensory and Motor Neuropathy] this term only
#98	MeSH descriptor: [Spinal Dysraphism] this term only
#99	(neurolog* NEAR/1 (condition* or disease* or damage* or disorder* or impair*)):ti,ab
#100	((motor next neuron* or gehrig* or charcott* or kennedy*) NEAR/1 disease*):ti,ab
#101	((amyotroph* or primary) NEAR/1 lateral* NEAR/1 sclero*):ti,ab
#102	(bulbar NEAR/1 pals*):ti,ab
#103	((muscular or muscle* or bulbo) NEAR/1 atroph* NEAR/1 spin*):ti,ab

#	Searches
#104	(progressiv* NEAR/1 (muscular or muscle*) NEAR/1 atroph*):ti,ab
#105	((postpolio* or post next polio*) NEAR/1 (syndrome*)):ti,ab
#106	(Parkinson* or duchenne* or multiple next scleros* or sclerosos* or aphasia or creutzfeldt next jakob or huntington* or kluver next bucy):ti,ab
#107	(muscular NEAR/1 dystroph*):ti,ab
#108	((neurolog*) near/1 (condition* or disease* or damage* or disorder* or impair*)):ti,ab
#109	(heredit* NEAR/1 spastic* NEAR/1 parapleg*):ti,ab
#110	(friedreich* next ataxia*):ti,ab
#111	(("multiple system" or olivopontocerebellar) NEAR/1 atroph*):ti,ab
#112	((shy next drager next syndrome*) or striatonigral next degenerat* or batten next disease*):ti,ab
#113	(progressive NEAR/1 supranuclear NEAR/1 pals*):ti,ab
#114	(richardson* NEAR/1 (disease* or syndrome*)):ti,ab
#115	((corticobasal or "cortico basal") NEAR/1 degenerat*):ti,ab
#116	("white matter" NEAR/1 (disorder*)):ti,ab
#117	(metachromatic next leukodystroph* or mitochondrial next myopath* or mucopolysaccharidos*):ti,ab
#118	(lysosomal NEAR/1 storage NEAR/1 disorder*):ti,ab
#119	((genetic or William* or "catch-22" or rett* or congenital or fetal or "foetal alcohol") NEAR/1 (syndrome* or disorder*)):ti,ab
#120	(perinatal NEAR/1 (illness* or hypoxia*)):ti,ab
#121	(primary NEAR/1 (dystonia or dystonias)):ti,ab
#122	(heredit* NEAR/1 motor* NEAR/1 sens* NEAR/1 neuropath*):ti,ab
#123	(spina next (bifida or bifidas) or spinal next (dysraphism or dysraphisms)):ti,ab
#124	MeSH descriptor: [Movement Disorders] this term only
#125	MeSH descriptor: [Motor Disorders] this term only
#126	MeSH descriptor: [Conversion Disorder] this term only
#127	((functional* or psychogenic* or dissociative*) NEAR/1 neurologic* NEAR/1 (disorder* or dysfunction* or difficult*)):ti,ab
#128	((movement* or motor* or convers*) NEAR/1 (disorder* or dysfunct*)):ti,ab
#129	((psychogenic or dissociative or non-epilep* or nonepilep*) NEAR/1 (seizure* or convulsion* or fit or fits or spasm* or attack*)):ti,ab
#130	(pseudo next seizure or pseudoseizure):ti,ab
#131	(medical* NEAR/1 (unexplain* or un next explain*) NEAR/1 (symptom*)):ti,ab
#132	#77 or #78 or #79 or #80 or #81 or #82 or #83 or #84 or #85 or #86 or #87 or #88 or #89 or #90 or #91 or #92 or #93 or #94 or #95 or #96 or #97 or #98 or #99 or #100 or #101 or #102 or #103 or #104 or #105 or #106 or #107 or #108 or #109 or #110 or #111 or #112 or #113 or #114 or #115 or #116 or #117 or #118 or #119 or #120 or #121 or #122 or #123 or #124 or #125 or #126 or #127 or #128 or #129 or #130 or #131
#133	((access* or participat* or tailor* or toolkit* or (tool NEXT kit*) or personalised or personalized or personalisation or personalization or individualised or individualized or individualisation or individualization or supervised or supervision or facilitated or facilitator* or guided or mediated or bespoke or custom* or condition specific or specialist* or therapist* or trainer* or instructor* or teacher*) NEAR/3 ((physical NEXT activit*) or exercis* or sport* or fitness or (active NEXT lifestyle*))):ti,ab
#134	(support* NEAR/1 ((physical NEXT activit*) or exercis* or sport* or fitness or (active NEXT lifestyle*))):ti,ab
#135	((group or groups) NEAR/2 ((physical NEXT activit*) or exercis* or sport* or fitness or (active NEXT lifestyle*))):ti
#136	((group or groups) NEXT ((physical NEXT activit*) or exercis* or sport* or fitness or (active NEXT lifestyle*))):ab
#137	((intrinsic* or coach*) NEAR/5 ((physical NEXT activit*) or exercis* or sport* or fitness or (active NEXT lifestyle*))):ti,ab
#138	((behavior* or behaviour*) NEAR/5 (chang* or modif* or intervention*) NEAR/5 ((physical NEXT activit*) or exercis* or sport* or fitness or (active NEXT lifestyle*))):ti,ab

#	Searches
#139	((green or social) NEAR/3 prescrib* NEAR/5 ((physical NEXT activit*) or exercis* or sport* or fitness or (active NEXT lifestyle*))):ti,ab
#140	#133 or #134 or #135 or #136 or #137 or #138 or #139
#141	#132 and #140
#142	#132 and #140 with Cochrane Library publication date Between Jan 2013 and May 2024, in Cochrane Reviews
#143	((clinicaltrials or trialsearch* or trial-registry or trials-registry or clinicalstudies or trialsregister* or trialregister* or trial-number* or studyregister* or study-register* or controlled-trials-com or current-controlled-trial or AMCTR or ANZCTR or ChiCTR* or CRiS or CTIS or CTRI* or DRKS* or EU-CTR* or EUCTR* or EUDRACT* or ICTRP or IRCT* or JAPIC* or JMCTR* or JRCT or ISRCTN* or LBCTR* or NTR* or ReBec* or REPEC* or RPCEC* or SLCTR or TCTR* or UMIN*):so or (ctgov or ictrp)):an
#144	#141 not #143
#145	"conference":pt
#146	#144 not #145
#147	#144 not #145 with Publication Year from 2013 to 2024, in Trials

Databases: PsycInfo

Date of last search: 18/06/2024

#	Searches
1	(exp Brain Injuries/ or anoxia/ or exp brain disorders/ or exp cerebrovascular disorders/ or exp headache/) not (exp Dementia/ or Cerebrovascular Accidents/)
2	((brain* or cereb* or craniocereb* or cranial or intracrani* or neurocognit*) adj2 (injur* or trauma* or damage* or disease*1 or disorder* or infect* or h?emorrhag* or neoplasm* or cancer* or tumo?r* or insult* or impair* or ischemi* or ischaemi* or infarcti* or hypoxi* or drown*)).ti,ab.
3	(chronic* adj1 trauma* adj2 encephalopath*).ti,ab.
4	((infratentorial* or supratentorial* or hypothalam* or pituitar* or choroid plexus) adj2 (neoplasm* or cancer* or tumo?r* or carcinom* or adenocarcinom*)).ti,ab.
5	(brain* adj2 abscess*).ti,ab.
6	(carotid arter* adj2 (disease* or injur*)).ti,ab.
7	("basal ganglia disease*" or encephalitis or meningoencephalitis or hydrocephal* or "paraneoplastic cereb* degenerat*" or "shak* baby syndrome*").ti,ab.
8	Cerebrovascular Accidents/ and (exp childhood development/ or exp adolescent development/ or pediatrics/ or puberty/)
9	(stroke? adj3 (p?ediatric* or child* or adolescen* or kid or kids or youth* or youngster* or minor or minors or underage* or under-age* or "under age*" or teen or teens or teenager* or juvenile* or boy or boys or boyhood or girl or girls or girlhood or schoolchild* or "school age*" or schoolage* or "under 16" or "under sixteen*")).ti,ab.
10	spinal cord injuries/ or (Spinal Cord/ and neoplasms/) or (Cardiovascular Disorders/ and spinal cord/) or exp myelitis/
11	((spinal* or spine?) adj2 (injur* or trauma* or tumo?r* or neoplasm* or cancer* or infect* or insult* or disease? or disorder* or degenrat* or compress* or vascular* or ischemi* or ischaemi* or infarct* or h?emorrhag*)).ti,ab.
12	(Central cord syndrome* or transverse myelitis).ti,ab.
13	(epidural* adj2 (neoplasm* or cancer* or tumo?r* or abscess*)).ti,ab.
14	((spinal* or spine?) adj2 (viral* or virus* or polio* or acquired immunodeficiency syndrome or AIDS or HIV or bacterial* or neurosyphili* or neuro-syphili* or tubercul*)).ti,ab.
15	(exp Peripheral Nervous System/ and (Injuries/ or neoplasms/)) or nervous system disorders/
16	((periph* or cranial*) adj1 (nerve? or nervous system) adj2 (injur* or trauma* or disorder* or disease* or damage* or neoplasm* or cancer* or tumo?r* or inflamm* or autoimmun* or paraneoplastic* or neuropath* or syndrome?)).ti,ab.
17	(Guillain* adj1 Barr*).ti,ab.

#	Searches
18	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 injur*).ti,ab.
19	(optic* adj1 nerve* adj2 (neoplasm* or cancer* or tumo?r*)).ti,ab.
20	(brachial plexus adj1 (neuropath* or neuritis)).ti,ab.
21	(complex regional pain syndrome* or causalgia or mononeuropath* or nerve compression syndrome*).ti,ab.
22	((femoral or median or peroneal or radial or sciatic or tibial or ulnar) adj1 neuropath*).ti,ab.
23	((carpal-tunnel or piriformis-muscle or tarsal-tunnel or thoracic-outlet) adj1 syndrome*).ti,ab.
24	(pudendal neuralgia or polyneuropath* or polyradiculoneuropath* or polyradiculopath* or radiculopath*).ti,ab.
25	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 disease*).ti,ab.
26	(periph* adj2 neuropath*).ti,ab.
27	(((periph* or cranial*) adj2 (nerve? or nervous system)) and lupus).ti,ab.
28	((multi-focal* or multifocal*) adj2 motor adj1 neuropath*).ti,ab.
29	(((periph* or cranial*) adj2 (nerve? or nervous system)) and alcohol*).ti,ab.
30	motor neurons/ or exp muscular disorders/ or exp neuromuscular disorders/ or multiple sclerosis/ or neurodegenerative diseases/ or Progressive Supranuclear Palsy/ or corticobasal degeneration/ or Metabolism Disorders/ or Williams Syndrome/ or genetic disorders/ or rett syndrome/ or fetal alcohol syndrome/ or exp peripheral neuropathy/ or spina bifida/
31	(neurolog* adj1 (condition* or disease* or damage* or disorder* or impair*)).ti,ab.
32	((motor-neuron* or gehrig* or charcott* or kennedy*) adj1 disease*).ti,ab.
33	((amyotroph* or primary) adj1 lateral* adj1 sclero*).ti,ab.
34	(bulbar adj1 pals*).ti,ab.
35	((muscular or muscle* or bulbo) adj1 atroph* adj1 spin*).ti,ab.
36	(progressiv* adj1 (muscular or muscle*) adj1 atroph*).ti,ab.
37	((postpolio* or post-polio*) adj1 syndrome?).ti,ab.
38	(Parkinson* or duchenne* or multiple scleros?s* or aphasia or creutzfeldt-jakob or huntington* or kluver-bucy).ti,ab.
39	(muscular adj1 dystroph*).ti,ab.
40	(neuromusc* adj1 (disease* or disorder?)).ti,ab.
41	(heredit* adj1 spastic* adj1 parapleg*).ti,ab.
42	"friedreich* ataxia*".ti,ab.
43	((multiple system or olivopontocerebellar) adj1 atroph*).ti,ab.
44	(shy-drager syndrome* or striatonigral degenerat* or batten* disease?).ti,ab.
45	(progressive adj1 supranuclear adj1 pals*).ti,ab.
46	(richardson* adj1 (disease? or syndrome?)).ti,ab.
47	((corticobasal or cortico basal) adj1 degenerat*).ti,ab.
48	(white adj1 matter adj1 disorder?).ti,ab.
49	(metachromatic leukodystroph* or mitochondrial myopath* or mucopolysaccharidos*).ti,ab.
50	(lysosomal adj1 storage adj1 disorder?).ti,ab.
51	((genetic or William* or catch-22 or rett* or congenital or f?etal alcohol) adj1 (syndrome or disorder*)).ti,ab.
52	(perinatal illness* or perinatal hypoxia*).ti,ab.
53	(primary adj1 dystonia?).ti,ab.
54	(heredit* adj1 motor* adj1 sens* adj1 neuropath*).ti,ab.
55	(spina bifida? or spinal dysraphism?).ti,ab.
56	conversion disorder/
57	((functional* or psychogenic* or dissociative*) adj1 neurologic* adj1 (disorder* or dysfunction* or difficult*)).ti,ab.
58	((movement* or motor* or convers*) adj1 (disorder* or dysfunct*)).ti,ab.

#	Searches
59	((psychogenic or dissociative or non-epilep* or nonepilep*) adj1 (seizure* or convulsion* or fit or fits or spasm* or attack*)).ti,ab.
60	(pseudo-seizure* or pseudoseizure*).ti,ab.
61	(medical* adj1 (unexplain* or un-explain*) adj1 symptom?).ti,ab.
62	or/1-61
63	((access* or participat* or tailor* or toolkit? or "tool kit?" or personali?ed or personali?ation or individuali?ed or individuali?ation or supervised or supervision or facilitated or facilitator? or guided or mediated or bespoke or custom* or condition specific or specialist? or therapist? or trainer? or instructor? or teacher?) adj3 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
64	(support* adj1 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
65	(group? adj2 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti.
66	(group? adj2 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ab. /freq=2
67	((intrinsic* or coach*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
68	(behavio?r* adj5 (chang* or modif* or intervention*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
69	((green or social) adj3 prescrib* adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
70	or/63-69
71	62 and 70
72	(letter or editorial or comment reply).dt. or case report/
73	(letter or comment*).ti.
74	or/72-73
75	exp randomized controlled trial/
76	random*.ti,ab.
77	or/75-76
78	74 not 77
79	animal.po.
80	(rat or rats or rodent* or mouse or mice).ti.
81	or/78-80
82	71 not 81
83	limit 82 to english language
84	limit 83 to yr="2013 -Current"
85	(meta analysis or "systematic review").md.
86	META ANALYSIS/
87	SYSTEMATIC REVIEW/
88	(meta analy* or metanaly* or metaanaly*).ti,ab.
89	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
90	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
91	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
92	(search* adj4 literature).ab.
93	((pool* or combined) adj2 (data or trials or studies or results)).ab.
94	(medline or pubmed or cochrane or embase or psychlit or psyclit or cinahl or science citation index or bids or cancerlit).ab.
95	or/85-94
96	clinical trial.md.
97	Clinical trials/
98	Randomized controlled trials/
99	Randomized clinical trials/
100	assign*.ti,ab.
101	allocat*.ti,ab.

#	Searches
102	crossover*.ti,ab.
103	cross over*.ti,ab.
104	((doubl* or singl*) adj blind*).ti,ab.
105	factorial*.ti,ab.
106	placebo*.ti,ab.
107	random*.ti,ab.
108	volunteer*.ti,ab.
109	trial?.ti,ab.
110	or/96-109
111	EPIDEMIOLOGY/ or PROSPECTIVE STUDIES/ or RETROSPECTIVE STUDIES/ or COHORT ANALYSIS/ or FOLLOWUP STUDIES/ or exp CLINICAL TRIALS/
112	(control and study).mp.
113	program.mp.
114	or/111-113
115	(adolescence 13 17 yrs or childhood birth 12 yrs or infancy 2 23 mo or neonatal birth 1 mo or preschool age 2 5 yrs or school age 6 12 yrs).ag.
116	Pediatrics/ or Puberty/ or Adolescence/
117	(child* or adolescen* or baby or babies or boy? or girl? or infan* or juvenile? or kid? or kindergar* or minors or neonat* or newborn? or p?ediatric* or prepubert* or pre pubert* or prepubescen* or pre pubescen* or preschool* or pre school* or preteen* or pre teen* or pubert* or pubescen* or schoolchild* or school age? or teen* or toddler* or young or youth?).ti,ab.
118	(child* or adolescen* or baby or babies or infan* or juvenile? or kindergar* or neonat* or newborn? or p?ediatric* or prepubert* or pre pubert* or pubert* or schoolchild* or school age?).jw.
119	or/115-118
120	84 and (95 or 110)
121	84 and 114 and 119
122	or/120-121
123	limit 122 to ("0100 journal" or "0110 peer-reviewed journal")

Databases: Social policy and practice

Date of last search: 18/06/2024

#	Searches
1	((brain* or cereb* or craniocereb* or cranial or intracrani* or neurocognit*) adj2 (injur* or trauma* or damage* or disease*1 or disorder* or infect* or h?emorrhag* or neoplasm* or cancer* or tumo?r* or insult* or impair* or ischemi* or infarcti* or hypoxi* or drown*)).ti,ab.
2	((brain* or cereb* or craniocereb* or cranial or intracrani* or neurocognit*) and (injur* or trauma* or damage* or disease* or disorder* or infect* or h?emorrhag* or neoplasm* or cancer* or tumo?r* or insult* or impair* or ischemi* or infarcti* or hypoxi* or drown*)).hw.
3	(chronic* adj1 trauma* adj2 encephalopath*).ti,ab.
4	(chronic* and trauma* and encephalopath*).hw.
5	((infratentorial* or supratentorial* or hypothalam* or pituitar* or choroid plexus) adj2 (neoplasm* or cancer* or tumo?r* or carcinom* or adenocarcinom*)).ti,ab.
6	((infratentorial* or supratentorial* or hypothalam* or pituitar* or choroid plexus) and (neoplasm* or cancer* or tumo?r* or carcinom* or adenocarcinom*)).hw.
7	(brain* adj2 abscess*).ti,ab.
8	(brain* and abscess*).hw.
9	(carotid arter* adj2 (disease* or injur*)).ti,ab.
10	(carotid arter* and (disease* or injur*)).hw.

#	Searches
11	("basal ganglia disease*" or encephalitis or meningoencephalitis or hydrocephal* or "paraneoplastic cereb* degenerat*" or "shak* baby syndrome*").ti,ab.
12	("basal ganglia disease*" or encephalitis or meningoencephalitis or hydrocephal* or "paraneoplastic cereb* degenerat*" or "shak* baby syndrome*").hw.
13	(stroke? adj3 (p?ediatric* or child* or adolescen* or kid or kids or youth* or youngster* or minor or minors or underage* or under-age* or "under age*" or teen or teens or teenager* or juvenile* or boy or boys or boyhood or girl or girls or girlhood or schoolchild* or "school age*" or schoolage* or "under 16" or "under sixteen*")).ti,ab.
14	(stroke? and (p?ediatric* or child* or adolescen* or kid or kids or youth* or youngster* or minor or minors or underage* or under-age* or "under age*" or teen or teens or teenager* or juvenile* or boy or boys or boyhood or girl or girls or girlhood or schoolchild* or "school age*" or schoolage* or "under 16" or "under sixteen*")).hw.
15	((spinal* or spine?) adj2 (injur* or trauma* or tumo?r* or neoplasm* or cancer* or infect* or insult* or disease? or disorder* or degenrat* or compress* or vascular* or ischemi* or ischaemi* or infarct* or h?emorrhag*)).ti,ab.
16	((spinal* or spine?) and (injur* or trauma* or tumo?r* or neoplasm* or cancer* or infect* or insult* or disease? or disorder* or degenrat* or compress* or vascular* or ischemi* or ischaemi* or infarct* or h?emorrhag*)).hw.
17	(Central cord syndrome* or transverse myelitis).ti,ab.
18	(Central cord syndrome* or transverse myelitis).hw.
19	(epidural* adj2 (neoplasm* or cancer* or tumo?r* or abscess*)).ti,ab.
20	(epidural* and (neoplasm* or cancer* or tumo?r* or abscess*)).hw.
21	((spinal* or spine?) adj2 (viral* or virus* or polio* or acquired immunodeficiency syndrome or AIDS or HIV or bacterial* or neurosyphili* or neuro-syphili* or tubercul*)).ti,ab.
22	((spinal* or spine?) and (viral* or virus* or polio* or acquired immunodeficiency syndrome or bacterial* or neurosyphili* or neuro-syphili* or tubercul*)).hw.
23	((periph* or cranial*) adj1 (nerve? or nervous system) adj2 (injur* or trauma* or disorder* or disease* or damage* or neoplasm* or cancer* or tumo?r* or inflamm* or autoimmun* or paraneoplastic* or neuropath* or syndrome?)).ti,ab.
24	((periph* or cranial*) and (nerve? or nervous system) and (injur* or trauma* or disorder* or disease* or damage* or neoplasm* or cancer* or tumo?r* or inflamm* or autoimmun* or paraneoplastic* or neuropath* or syndrome?)).hw.
25	(Guillain* adj1 Barr*).ti,ab.
26	(Guillain* and Barr*).hw.
27	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 injur*).ti,ab.
28	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) and nerve* and injur*).hw.
29	(optic* adj1 nerve* adj2 (neoplasm* or cancer* or tumo?r*)).ti,ab.
30	(optic* and nerve* and (neoplasm* or cancer* or tumo?r*)).hw.
31	(brachial plexus adj1 (neuropath* or neuritis)).ti,ab.
32	(brachial plexus and (neuropath* or neuritis)).hw.
33	(complex regional pain syndrome* or causalgia or mononeuropath* or nerve compression syndrome*).ti,ab.
34	(complex regional pain syndrome* or causalgia or mononeuropath* or nerve compression syndrome*).hw.
35	((femoral or median or peroneal or radial or sciatic or tibial or ulnar) adj1 neuropath*).ti,ab.
36	((femoral or median or peroneal or radial or sciatic or tibial or ulnar) and neuropath*).hw.
37	((carpal-tunnel or piriformis-muscle or tarsal-tunnel or thoracic-outlet) adj1 syndrome*).ti,ab.
38	((carpal-tunnel or piriformis-muscle or tarsal-tunnel or thoracic-outlet) and syndrome*).hw.
39	(pudendal neuralgia or polyneuropath* or polyradiculoneuropath* or polyradiculopath* or radiculopath*).ti,ab.
40	(pudendal neuralgia or polyneuropath* or polyradiculoneuropath* or polyradiculopath* or radiculopath*).hw.

#	Searches
41	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) adj1 nerve* adj1 disease*).ti,ab.
42	((abducen* or accessory or facial or glossopharyngeal or hypoglossal or oculomotor or ocular motility or olfactory or optic* or trigeminal or trochlear or vestibulocochlear) and nerve* and disease*).hw.
43	(periph* adj2 neuropath*).ti,ab.
44	(periph* and neuropath*).hw.
45	(((periph* or cranial*) adj2 (nerve? or nervous system)) and lupus).ti,ab.
46	((periph* or cranial*) and (nerve? or nervous system) and lupus).hw.
47	((multi-focal* or multifocal*) adj2 motor adj1 neuropath*).ti,ab.
48	((multi-focal* or multifocal*) and motor and neuropath*).hw.
49	(((periph* or cranial*) adj2 (nerve? or nervous system)) and alcohol*).ti,ab.
50	((periph* or cranial*) and (nerve? or nervous system) and alcohol*).hw.
51	(neurolog* adj1 (condition* or disease* or damage* or disorder* or impair*)).ti,ab.
52	(neurolog* and (condition* or disease* or damage* or disorder* or impair*)).hw.
53	((motor-neuron* or gehrig* or charcott* or kennedy*) adj1 disease*).ti,ab.
54	((motor-neuron* or gehrig* or charcott* or kennedy*) and disease*).hw.
55	((amyotroph* or primary) adj1 lateral* adj1 sclero*).ti,ab.
56	((amyotroph* or primary) and lateral* and sclero*).hw.
57	(bulbar adj1 pals*).ti,ab.
58	(bulbar and pals*).hw.
59	((muscular or muscle* or bulbo) adj1 atroph* adj1 spin*).ti,ab.
60	((muscular or muscle* or bulbo) and atroph* and spin*).hw.
61	(progressiv* adj1 (muscular or muscle*) adj1 atroph*).ti,ab.
62	(progressiv* and (muscular or muscle*) and atroph*).hw.
63	((postpolio* or post-polio*) adj1 syndrome?).ti,ab.
64	((postpolio* or post-polio*) and syndrome?).hw.
65	(Parkinson* or duchenne* or multiple scleros?s* or aphasia or creutzfeldt-jakob or huntington* or kluver-bucy).ti,ab.
66	(Parkinson* or duchenne* or multiple scleros?s* or aphasia or creutzfeldt-jakob or huntington* or kluver-bucy).hw.
67	(muscular adj1 dystroph*).ti,ab.
68	(muscular and dystroph*).hw.
69	(neuromusc* adj1 (disease* or disorder?)).ti,ab.
70	(neuromusc* and (disease* or disorder?)).hw.
71	(heredit* adj1 spastic* adj1 parapleg*).ti,ab.
72	(heredit* and spastic* and parapleg*).hw.
73	"friedreich* ataxia*".ti,ab.
74	"friedreich* ataxia*".hw.
75	((multiple system or olivopontocerebellar) adj1 atroph*).ti,ab.
76	((multiple system or olivopontocerebellar) and atroph*).hw.
77	(shy-drager syndrome* or striatonigral degenerat* or batten* disease?).ti,ab.
78	(shy-drager syndrome* or striatonigral degenerat* or batten* disease?).hw.
79	(progressive adj1 supranuclear adj1 pals*).ti,ab.
80	(progressive and supranuclear and pals*).hw.
81	(richardson* adj1 (disease? or syndrome?)).ti,ab.
82	(richardson* and (disease? or syndrome?)).hw.
83	((corticobasal or cortico basal) adj1 degenerat*).ti,ab.
84	((corticobasal or cortico basal) and degenerat*).hw.
85	(white adj1 matter adj1 disorder?).ti,ab.

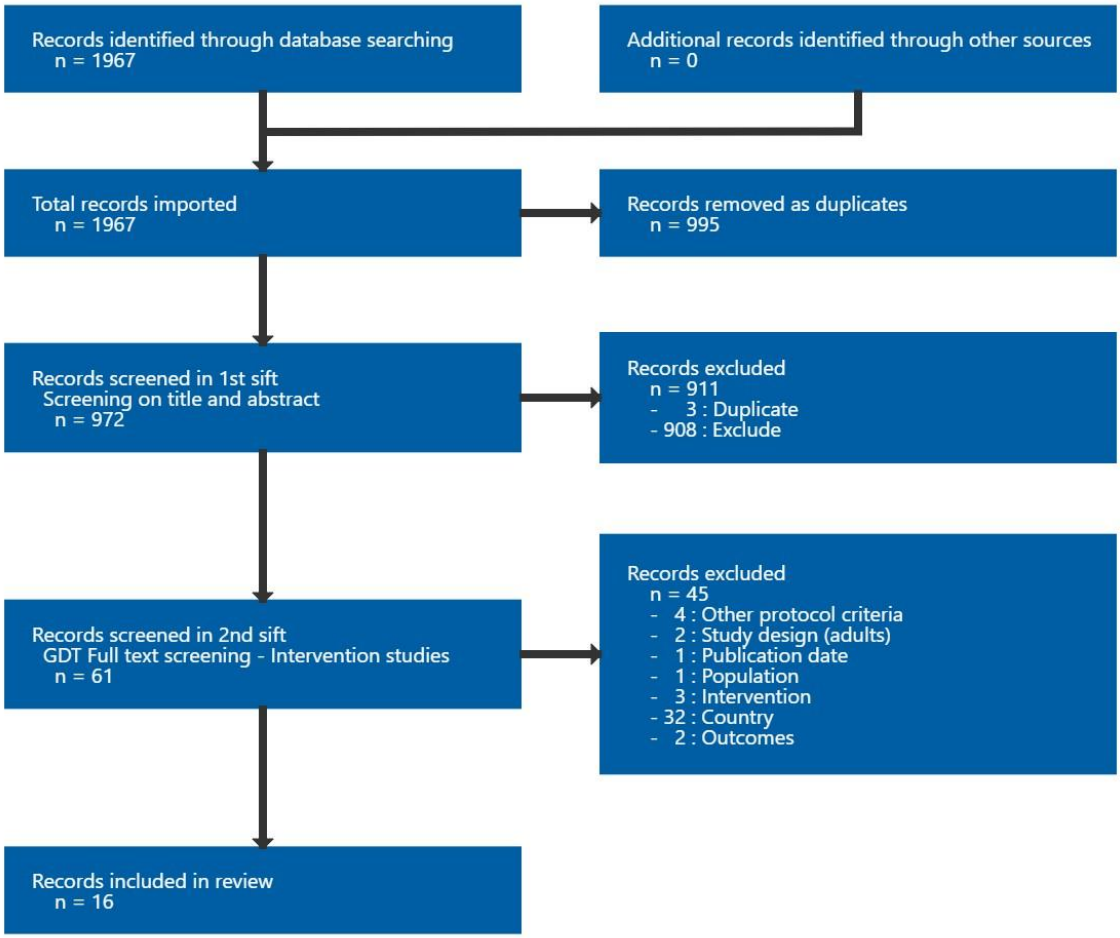
#	Searches
86	(white and matter and disorder?).hw.
87	(metachromatic leukodystroph* or mitochondrial myopath* or mucopolysaccharidos*).ti,ab.
88	(metachromatic leukodystroph* or mitochondrial myopath* or mucopolysaccharidos*).hw.
89	(lysosomal adj1 storage adj1 disorder?).ti,ab.
90	(lysosomal and storage and disorder?).hw.
91	((genetic or William* or catch-22 or rett* or congenital or f?etal alcohol) adj1 (syndrome or disorder*)).ti,ab.
92	((genetic or William* or catch-22 or rett* or congenital or f?etal alcohol) and (syndrome or disorder*)).hw.
93	(perinatal illness* or perinatal hypoxia*).ti,ab.
94	(perinatal illness* or perinatal hypoxia*).hw.
95	(primary adj1 dystonia?).ti,ab.
96	(primary and dystonia?).hw.
97	(heredit* adj1 motor* adj1 sens* adj1 neuropath*).ti,ab.
98	(heredit* and motor* and sens* and neuropath*).hw.
99	(spina bifida? or spinal dysraphism?).ti,ab.
100	(spina bifida? or spinal dysraphism?).hw.
101	((functional* or psychogenic* or dissociative*) adj1 neurologic* adj1 (disorder* or dysfunction* or difficult*)).ti,ab.
102	((functional* or psychogenic* or dissociative*) and neurologic* and (disorder* or dysfunction* or difficult*)).hw.
103	((movement* or motor* or convers*) adj1 (disorder* or dysfunct*)).ti,ab.
104	((movement* or motor* or convers*) and (disorder* or dysfunct*)).hw.
105	((psychogenic or dissociative or non-epilep* or nonepilep*) adj1 (seizure* or convulsion* or fit or fits or spasm* or attack*)).ti,ab.
106	((psychogenic or dissociative or non-epilep* or nonepilep*) and (seizure* or convulsion* or fit or fits or spasm* or attack*)).hw.
107	(pseudo-seizure* or pseudoseizure*).ti,ab.
108	(pseudo-seizure* or pseudoseizure*).hw.
109	(medical* adj1 (unexplain* or un-explain*) adj1 symptom?).ti,ab.
110	(medical* and (unexplain* or un-explain*) and symptom?).hw.
111	or/1-110
112	((access* or participat* or tailor* or toolkit? or "tool kit?" or personali?ed or personali?ation or individuali?ed or individuali?ation or supervised or supervision or facilitated or facilitator? or guided or mediated or bespoke or custom* or condition specific or specialist? or therapist? or trainer? or instructor? or teacher?) adj3 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
113	((access* or participat* or tailor* or toolkit? or "tool kit?" or personali?ed or personali?ation or individuali?ed or individuali?ation or supervised or supervision or facilitated or facilitator? or guided or mediated or bespoke or custom* or condition specific or specialist? or therapist? or trainer? or instructor? or teacher?) and (physical activit* or exercis* or sport? or fitness or active lifestyle?)).hw.
114	(support* adj1 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
115	(support* and (physical activit* or exercis* or sport? or fitness or active lifestyle?)).hw.
116	(group? adj2 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
117	(group? and (physical activit* or exercis* or sport? or fitness or active lifestyle?)).hw.
118	((intrinsic* or coach*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
119	((intrinsic* or coach*) and (physical activit* or exercis* or sport? or fitness or active lifestyle?)).hw.
120	(behavio?r* adj5 (chang* or modif* or intervention*) adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.
121	(behavio?r* and (chang* or modif* or intervention*) and (physical activit* or exercis* or sport? or fitness or active lifestyle?)).hw.
122	((green or social) adj3 prescrib* adj5 (physical activit* or exercis* or sport? or fitness or active lifestyle?)).ti,ab.

#	Searches
123	((green or social) and prescrib* and (physical activit* or exercis* or sport? or fitness or active lifestyle?)).hw.
124	or/112-123
125	111 and 124
126	limit 125 to yr="2013 -Current"

Appendix C Effectiveness evidence study selection

Study selection for: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Figure 1: Study selection flow chart



Appendix D Evidence tables

Evidence tables for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Table 5: Evidence tables

Busse, 2017

Bibliographic Reference	Busse, Monica; Quinn, Lori; Drew, Cheney; Kelson, Mark; Trubey, Rob; McEwan, Kirsten; Jones, Carys; Townson, Julia; Dawes, Helen; Tudor-Edwards, Rhiannon; Rosser, Anne; Hood, Kerenza; Physical Activity Self-Management and Coaching Compared to Social Interaction in Huntington Disease: Results From the ENGAGE-HD Randomized, Controlled Pilot Feasibility Trial.; Physical therapy; 2017; vol. 97 (no. 6); 625-639

Study details

Country/ies where study was carried out	UK
Study type	Randomised controlled trial (RCT)
Study dates	June 23, 2014, - August 21, 2015
Inclusion criteria	1) had a diagnosis of Huntington’s disease (HD), confirmed by genetic testing, 2) had self-reported or physician-reported difficulties with walking and/or balance (but were still able to walk with minimal assistance), 3) were over 18 years old, and 4) had a stable medication regime for 4 weeks prior and were anticipated to maintain a stable regime for the duration

Exclusion criteria	1) had any physical or psychiatric condition that would prohibit the participant from completing the intervention or assessments, 2) were unable to communicate in spoken English, or 3) were involved in (or were within 4 weeks of completing) any other interventional trial.
Patient characteristics	N=46 adults with Huntington's disease - Engage-HD: n=22 - Social control: n=24 Age in years [Mean (SD)]: - Engage-HD: 56.1 (10.3) - Social control: 53.7 (9.9) Sex (M/F): - Engage-HD : n=12/n=10 - Social control: n=13/n=11 Time since diagnosis in years: not reported Chronic neurological disorder category: Progressive Neurological Diseases
Intervention(s)/control	**Intervention**

	Name: Engage-HD Physical Activity Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching Delivery setting: Home and telephone Number/frequency of sessions: 6 home visits over 14 weeks (weeks 1, 2, 3, 6, 10, and 14) and 3 interim phone calls (weeks 4, 8, and 12) that served to provide encouragement Duration: 14 weeks Practitioner: Coaches were either a) healthcare professionals (for example, physical therapists, occupational therapists, or nurses) with experience of delivering exercise-related activities or with specific experience with HD; or b) exercise professionals. The Engage-HD Physical Activity intervention was grounded within the framework of self-determination theory, and consisted of three main elements: the participant/coach interaction, the Engage-HD Workbook, and an exercise DVD. In partnership with their coaches, participants developed up to three realistic physical activity goals and were assisted with individual physical activity progression through goal discussion. Goal achievement was assessed by the coach at the last home visit. Exercise diaries and pedometers were provided to record the amount and type of physical activity involvement (for example, walking or use of DVD and pedometers). Similarly, health and falls diaries facilitated documentation of falls, medication changes, or contact with health care services. All staff had to meet specific health competencies. **Control** Name: Social control

	Protocol description: Control Delivery setting: Home and telephone Number/ frequency of sessions: Home visits were conducted at weeks 1, 2, 3, 6, 10, and 14, and supportive phone calls at weeks 4, 8, and 12 Duration: Not applicable Practitioner(s): Coaches were either a) healthcare professionals (physical therapists, occupational therapists, or nurses) with experience of delivering exercise-related activities or with specific experience with HD; or b) exercise professionals. The social control provided conversational interaction. The social control could help both control for contact time and account for the potential influence of the interpersonal skills of the coach on any treatment effect while not focusing particularly on the goal-setting processes integral to a physical activity self-management intervention. This approach to facilitating the understanding of individual components of interventions is in line with the UK Medical Research Council (MRC) framework for development and evaluation of complex interventions. At each visit, the social activity coach engaged the participant in a talking and communication interaction. Conversation cards representing a wide range of topics stimulated discussions. Health and falls diaries were completed.
Duration of follow-up	16-weeks from baseline for primary outcomes
Sources of funding	Not industry funded.
Sample size	N=46 - Engage-HD: n=22 - Social control: n=24

HD: huntington's disease; N/n: number of participants; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (16 weeks from baseline)

Physical activity intervention versus social control: Sustained participation in exercise or physical activity; Physical and mental health related quality of life and social care related quality of life
Sustained participation in exercise or physical activity as measured by International Physical Activity Questionnaire (IPAQ) - Polarity - Higher values are better
Physical and mental health related quality of life and social care related quality of life as measured by EQ-5D - Polarity - Higher values are better

Outcome	Physical activity intervention, post-intervention, IPAQ N=15; EQ-5D N=17	Social control, post-intervention, IPAQ N=21; EQ-5D N=23
IPAQ change score from baseline Mean (SD)	1.2 (4.36)	0.1 (3.25)
EQ-5D change score from baseline Mean (SD)	0 (0.14)	-0.3 (0.52)

*EQ-5D: EuroQol 5-dimensions; IPAQ: International Physical Activity Questionnaire**;** N/n: number of participants; SD: standard deviation*

Critical appraisal – Cochrane RoB 2

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Randomization [ratio of 1:1] and automatic allocation was accomplished using a purpose developed web-based system. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	High *(37% and 8% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up unbalanced between groups so missingness may likely depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: International Physical Activity Questionnaire, EQ-5D. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High

Section	Question	Answer
Overall bias and Directness	Overall Directness	Directly applicable

EQ-5D: EuroQol 5-dimensions; ITT: intention to treat

Carter, 2013

Bibliographic Reference	Carter, Anouska M; Daley, Amanda J; Kesterton, Sue W; Woodroofe, Nicola M; Saxton, John M; Sharrack, Basil; Pragmatic exercise intervention in people with mild to moderate multiple sclerosis: a randomised controlled feasibility study.; Contemporary clinical trials; 2013; vol. 35 (no. 2); 40-7

Study details

Country/ies where study was carried out	UK
Study type	Randomised controlled trial (RCT)
Study dates	Not reported
Inclusion criteria	- Aged 18–65 years, - Fulfilled the modified McDonald diagnostic criteria for multiple sclerosis (MS), - Expanded Disability Status Score ≤5.5 and were stable on disease modifying treatment for ≥3 months prior to recruitment.

Exclusion criteria	Participants who experienced relapses within the preceding 3 months, had other illnesses substantially affecting their ability to exercise (confirmed by consultant physician) or who were physically active (≥2× per week, ≥30 min per session, during the previous 3 months) were excluded
Patient characteristics	N=30 adults with multiple sclerosis - Pragmatic exercise therapy intervention: n=16 - Usual care: n=14 Age in years [Mean (SD)]: - Pragmatic exercise therapy intervention: 39.5 (6.5) - Usual care: 40.9 (8.7) Sex (M/F): - Pragmatic exercise therapy intervention: n=2/n=14 - Usual care: n=2/n=12 Time since diagnosis in years: not reported Chronic neurological disorder category: Progressive Neurological Diseases
Intervention(s)/control	**Intervention** Name: Pragmatic exercise therapy intervention

	Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist plus person intrinsic approaches, including behaviour change and coaching Delivery setting: university exercise research facility and home Number/frequency of sessions: 2 supervised 1-hour sessions and weekly 1-hour home sessions Duration: 10 weeks Practitioner: Exercise researcher, qualified up to postgraduate level in sport and exercise science, with applied accreditation in exercise delivery. The exercise programme was progressive and tailored towards individual capabilities and preferences. Participants were encouraged to try all appropriate exercise options, but were given a choice over the exact modality, duration and intensity of the sessions. Sessions were then designed and progressed on the basis of individual preferences. A variety of cognitive behavioural techniques (for example consciousness raising, goal setting and finding social support for exercise) were also used during sessions to promote motivation and confidence for exercise. Behavioural techniques were integrated into the exercise sessions and the instructor used strategies appropriate to the conversation, the stage of change participants were at, and difficulties/questions participants raised during sessions. Home session content comprised both aerobic exercise and body conditioning activities, and was agreed with the participant after taking into account their needs, preferences, goals and exercise opportunities in their community. The duration and intensity of the home exercise sessions mirrored the level and progression achieved in the supervised sessions. Home sessions were included to promote independent exercise participation following the intervention. Participants completed a physical activity diary to log compliance and diaries were checked and confirmed weekly, with participants being made aware of the importance of recording accurate data. **Control**

	Name: Usual care Protocol description: Control (usual care) Delivery setting: not applicable Number/ frequency of sessions: Participants in the usual care group were offered three exercise sessions at the university exercise research facility and individual exercise advice after the study Duration: not applicable Practitioner(s): not applicable
Duration of follow-up	3-months post-intervention
Sources of funding	Not industry funded
Sample size	N=30 - Pragmatic exercise therapy intervention: n=16 - Usual care: n=14

MS: multiple sclerosis; PwMS: people with multiple sclerosis; N/n: number of participants; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (10 weeks from baseline)

- 3 months post intervention

Pragmatic exercise therapy intervention versus usual care: Sustained participation in exercise or physical activity; Physical and mental health related quality of life and social care related quality of life
Sustained participation in exercise or physical activity as measured by Godin Leisure-Time Exercise Questionnaire - Polarity - Higher values are better
Physical and mental health related quality of life and social care related quality of life as measured by MSQOL 54 - Polarity - Higher values are better

Outcome	Pragmatic exercise therapy intervention, post-intervention, N=14	Pragmatic exercise therapy intervention, 3-months post-intervention, N=12	Usual care, post-intervention, N=12	Usual care, 3-months post-intervention, N=12
Godin Leisure-Time Exercise Questionnaire change score from baseline Mean (SD)	0 (10.37)	3.1 (9.95)	0.1 (7.53)	1.2 (7.3)
MSQOL 54 change score from baseline Mean (SD)	-0.3 (16.32)	-3 (16.27)	-1.1 (12.62)	1.2 (12.62)

MSQOL 54: multiple sclerosis quality of life 54; N/n: number of participants; SD: standard deviation

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Computer generated randomisation and concealed allocation. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	High *(8% and 20% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up unbalanced between groups so missingness likely to depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: Godin Leisure-Time Exercise Questionnaire, MSQOL 54. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat; MSQOL-54: multiple sclerosis quality of life 54

Carter, 2014

Bibliographic Reference	Carter, A; Daley, A; Humphreys, L; Snowdon, N; Woodroofe, N; Petty, J; Roalfe, A; Tosh, J; Sharrack, B; Saxton, J M; Pragmatic intervention for increasing self-directed exercise behaviour and improving important health outcomes in people with multiple sclerosis: a randomised controlled trial.; Multiple sclerosis (Houndmills, Basingstoke, England); 2014; vol. 20 (no. 8); 1112-22

Study details

Country/ies where study was carried out	UK
Study type	Randomised controlled trial (RCT)
Study dates	March 2009 - August 2012
Inclusion criteria	-Clinical diagnosis of multiple sclerosis (MS), as defined by the modified McDonald criteria, with an Expanded Disability Status Scale score of 1.0–6.5, and able to walk a 10-metre distance; - Aged 18–65 years; - Clinically stable for at least four weeks prior to entering the study; - Physically able to participate in exercise three times per week; - Able to provide written informed consent. - Participants on disease-modifying therapy (interferon beta, glatiramer acetate and natalizumab) had been stable on this treatment for at least three months.

Exclusion criteria	- Comorbid conditions impairing the ability to be physically active three times per week; - Unwilling to be randomised; - Living more than 20 miles from the trial centre; - Already engaged in structured exercise or brisk walking ≥ 3 times per week for ≥30 minutes per session for at least six months
Patient characteristics	N=120 adults with multiple sclerosis - EXercise Intervention for people with MS (EXIMS) programme: n=60 - Usual care: n=60 Age in years [Mean (SD)]: - EXIMS intervention: 45.7 (9.1) - Usual care: 46.0 (8.4) Sex (M/F): - EXIMS intervention: n=17/n=43 - Usual care: n=17/n=43 Time since diagnosis in years [Mean (SD)]:

	- EXIMS intervention: 8.4 (7.4) - Usual care: 9.2 (7.9) Chronic neurological disorder category: Progressive Neurological Diseases
Intervention(s)/control	**Intervention** Name: EXercise Intervention for people with MS (EXIMS) programme Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist + person intrinsic approaches, including behaviour change and coaching Delivery setting: university exercise research facility and home Number/frequency of sessions: Weeks 1-6: 2 supervised sessions up to 1 hour in duration at the centre and 1 self-directed exercise session at home every week. Weeks 7-12: 1 supervised session at the centre and 2 self-directed exercise sessions at home every week Duration: 12 weeks Practitioner: Physiotherapist and an exercise physiologist The supervised exercise sessions incorporated cognitive-behavioural techniques (e.g. goal setting, finding social support, understanding the costs/benefits of exercise, etc.) to promote long-term participation in physical activity. The cognitive-behavioural elements were integrated into the exercise sessions using strategies appropriate to the conversation, stage of change and concerns/questions raised by participants. **Control**

	Name: Usual care Protocol description: Control (usual care) Delivery setting: not reported Number/ frequency of sessions: Participants in the usual care group were offered three exercise sessions at the university exercise research facility and individual exercise advice after the study Duration: not applicable Practitioner(s): not applicable
Duration of follow-up	6-months post-intervention
Sources of funding	Not industry funded
Sample size	N=120 - EXIMS plus usual care: n=60 - Usual care: n=60
Other information	Accelerometry step counts reported graphically without figures to ascertain confidence intervals, thus not extracted

EXIMS: EXercise Intervention for people with MS; N/n: number of participants; SD: standard deviation

Outcomes

Study timepoints

- Baseline

- Post intervention (12 weeks from baseline)
- 6 months post intervention

EXIMS versus usual care: Sustained participation in exercise or physical activity; Physical and mental health related quality of life and social care related quality of life
Sustained participation in exercise or physical activity as measured by Godin Leisure Time Exercise Questionnaire - Polarity - Higher values are better
Physical and mental health related quality of life and social care related quality of life as measured by MSQOL 54 - Polarity - Higher values are better

Outcome	EXIMS, post-intervention N=54, 6-months post-intervention N=49	Usual care, post-intervention N=53, 6-months post-intervention N=50
GLTEQ **Post-intervention**	Mean difference between groups (no confidence intervals reported)=9.6; p-value=0.01	
GLTEQ **6-months post-intervention**	Mean difference between groups (no confidence intervals reported)=6.9; p-value=0.08	
MSQOL 54 **Post-intervention** change score from baseline	9.8 (14.95)	-1.8 (12.54)

Outcome	EXIMS, post-intervention N=54, 6-months post-intervention N=49	Usual care, post-intervention N=53, 6-months post-intervention N=50
Mean (SD)		
MSQOL 54 **6-months post-intervention** change score from baseline Mean (SD)	7.6 (14.9)	-2 (13.11)

EXIMS: EXercise Intervention for people with MS; GLTEQ: godin leisure time exercise questionnaire; MSQOL 54: multiple sclerosis quality of life 54; N/n: number of participants; SD: standard deviation

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Treatment allocation was concealed from the study researchers by using a distant randomisation service at the University of York, UK. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*

Section	Question	Answer
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(9% and 8% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up balanced between groups so missingness does not depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: Godin Leisure Time Exercise Questionnaire, MSQOL 54. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat; MSQOL-54: multiple sclerosis quality of life 54

Chemtob 2019

Bibliographic Reference	Chemtob, K.; Rocchi, M.; Arbour-Nicitopoulos, K.; Kairy, D.; Fillion, B.; Sweet, S.; Using tele-health to enhance motivation, leisure time physical activity, and quality of life in adults with spinal cord injury: A self-determination theory-based pilot randomized control trial[white star].; Psychol Sport Exerc; 2019; vol. 43; 243-252

Study details

Country/ies where study was carried out	Canada
Study type	Randomised controlled trial (RCT)
Study dates	August 2016 - July 2017
Inclusion criteria	- Over the age of 18, - Have paraplegia, have sustained a spinal cord injury (SCI) at least one-year prior, were minimally active (engaging in less than two bouts of LTPA per week in the last two months), and - Were able to speak and understand English or French
Exclusion criteria	- Receiving in-patient rehabilitation services, - Diagnosed with memory impairments, severe communication impairments or severe visual impairments, - Did not require a mobility device, or - Answered yes to one of the questions on the SCI-inclusive physical activity readiness questionnaire
Patient characteristics	N=14 adults with spinal cord injury - Telehealth physical activity intervention n=7 - Usual care n=7 Age in years [Mean (SD)]:

	- overall (no individual arm information): 52.15 (13.25) Sex (M/F): - overall (no individual arm information): n=11/n=2 Time since injury in days [Mean (SD)]: - overall (no individual arm information): 13.85 (10.35) Chronic neurological disorder category: acquired spinal cord injury
Intervention(s)/control	**Intervention** Name: Telehealth physical activity intervention Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching Delivery setting: Home or community based Number/frequency of sessions: Weekly physical activity counselling session Duration: 8 weeks Practitioner: Kinesiologist Participants in the intervention group were given instructions on how to download the Remote Education, Augmented Communication, Training and Supervision (REACTS) online video-based software. A 30-minute training session on the REACTS software was set-up within 2 weeks of baseline measures. Once the training session was completed, the LTPA counsellor set up one brief introductory session with each

	participant to allow for introductions, and troubleshoot any remaining problems associated with familiarization to the software before the start of the intervention. The goal of the intervention was to motivate the participants to engage in LTPA in their home or within their community. The intervention was based in SDT. Behaviour change techniques were included in the intervention. Strategies such as action planning, self-monitoring and goal setting were implemented to further increase satisfaction of the basic psychological needs, autonomous motivation, and LTPA behaviour. **Control** Name: Usual care Protocol description: Control (Usual care) Delivery setting: Home or community Number/ frequency of sessions: 1 x 1-hour physical activity counselling session at end of the study Duration: Not applicable Practitioner(s): Kinesiologist The control group was asked to continue with their regular routine and told that the LTPA counsellor would contact them at the end of the study. At the end of the study, each participant who was randomized to the control group was contacted by email or by telephone, to schedule one session with the LTPA counsellor. Each participant from the control group received one, 1-hour physical activity counselling session.
Duration of follow-up	Post-intervention
Sources of funding	Not industry funded.

Sample size	N=14 - Telehealth physical activity intervention; n=7 - Control; n=7

LTPA: leisure time physical activity; N/n: number of participants; REACTS: Remote Education, Augmented Communication, Training and Supervision; SCI: spinal cord injury; SD: standard deviation; SDT: self-determination theory

Outcomes

Study timepoints

- Baseline
- Post intervention (8 weeks from baseline)

Telehealth physical activity intervention versus control: Sustained participation in exercise or physical activity
Sustained participation in exercise or physical activity as measured by Leisure-Time Physical Activity Questionnaire - Polarity - Higher values are better

Outcome	Telehealth physical activity intervention, post-intervention, N=6	Control, post-intervention, N=7
Leisure-Time Physical Activity Questionnaire (min/week aerobic + strength training) change score from baseline Mean (SD)	480.83 (202.1)	114.29 (179.7)

SD: standard deviation

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(The random allocation was determined by an online allocation tool. An offsite member of the research team created and sealed the envelopes. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Low *(All participants who received intervention or control analysed.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: Godin Leisure-Time Exercise Questionnaire. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	Some concerns
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Coote, 2017

Bibliographic Reference	Coote, Susan, Uszynski, Marcin, Herring, Matthew P et al. (2017) Effect of exercising at minimum recommendations of the multiple sclerosis exercise guideline combined with structured education or attention control education - secondary results of the step it up randomised controlled trial. BMC neurology 17(1): 119

Study details

Country/ies where study was carried out	Ireland
Study type	Randomised controlled trial (RCT)
Study dates	September 2013 - May 2014
Inclusion criteria	- Physician-confirmed formal diagnosis of multiple sclerosis (MS), - Aged 18 years or more, - Patient Determined Disease Steps Scale score of 0–3, - A sedentary lifestyle (<30min of moderate to strenuous exercise 1day or more per week over the last 6months) and - Willing to give written informed consent.
Exclusion criteria	- Pregnancy, - MS relapse in the previous 12 weeks and - Changes to MS medication or steroid treatment in the previous 12 weeks.
Patient characteristics	N=65 adults with multiple sclerosis

	- Social cognitive theory (SCT) + exercise: n=33 - Exercise + contact control education intervention: n=32 Age in years [Mean (SD)]: - SCT + exercise: 43.3 (9.9) - Exercise + contact control education intervention: 41.9 (9.3) Sex (M/F): - SCT + exercise: n=4/n=29 - Exercise + contact control education intervention: n=6/n=26 Time since diagnosis in years [Mean (SD)]: - SCT + exercise: 6.7 (5.7) - Exercise + contact control education intervention: 7.0 (6.1) Chronic neurological disorder category: Progressive Neurological Diseases
Intervention(s)/control	**Intervention** Name: Social cognitive theory (SCT) + exercise Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching

	Delivery setting: Community-delivered programme Number/frequency of sessions: Group exercise class on six occasions, supplemented with a telephone coaching call in the weeks without classes (intervention weeks 4, 6, 7 and 9) + SCT-based education sessions will be delivered after each exercise class session Duration: 10 weeks Practitioner: Physiotherapist The exercise plus SCT-based intervention group received the same exercise intervention as the control group (as described below). This group also received a similar duration of education based on the principles of SCT for health behaviour change, namely: self-efficacy, outcome expectations, goal-setting, barriers and benefits. The SCT intervention was designed to enable continued exercise behaviour and after the 10-week intervention the participants in both groups received structured phone calls from the intervention physiotherapists at weeks 16, 20 and 36. These telephone calls consisted of direct questions about the frequency, intensity, type and duration of exercise participants had completed and whether they had experienced any adverse events or relapses. Additionally, the SCT group was coached using the principles of that educational component. **Control** Name: Exercise + contact control education intervention Protocol description: Control Delivery setting: Community-delivered programme. Number/ frequency of sessions: Group exercise class on six occasions, supplemented with a telephone coaching call in the weeks without classes (intervention weeks 4, 6, 7 and 9)

	Duration: 10 weeks Practitioner(s): Physiotherapist The aerobic activity consisted of walking, the intensity of which monitored using step rate measured using the Yamax digiwalker pedometer (which will be provided to all participants) and an exercise log to document duration of walking exercise and number of steps taken. The target walking exercise intensity was a rate of 100 steps/minute. Participants began with 10 minutes of walking twice weekly at a rate of 100 steps/minute and increase incrementally in 5-minute intervals over 5 weeks until they reach the guideline of 30 minutes twice weekly. The strengthening programme consists of ten exercises targeting major muscle groups for the upper and lower extremities using elastic resistance band. The intensity and duration of the strengthening component of the intervention progresses by increasing the number of repetitions and sets and changing the resistance of the elastic resistance band used for each strengthening exercise. Participants begin with one set of 10–15 repetitions and gradually increase the number of sets, repetitions and level of resistance until they meet the target of two sets of each exercise twice weekly. After each of the group exercise classes the control group receive an education session about topics unrelated to PA behaviour, e.g. diet, vitamin D, sleep, temperature and hydration, and immunisations and vaccinations.
Duration of follow-up	Post-intervention
Sources of funding	Not industry funded.
Sample size	N= 65 - SCT + exercise; n=33 - Exercise + contact control education intervention; n=32

N/n: number of participants; PA: physical activity; SCT: social cognitive theory; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (10 weeks from baseline)
- 6 months post intervention

SCRT + exercise versus exercise + contact control education intervention: Sustained participation in exercise or physical activity; cardiorespiratory fitness; Anxiety; Depression
Sustained participation in exercise or physical activity as measured by Godin Leisure-Time Exercise Questionnaire - Polarity - Higher values are better
Sustained participation in exercise or physical activity as measured by daily step count - Polarity - Higher values are better
Cardiorespiratory fitness as measured by Modified Canadian Aerobic Fitness Test - Polarity - Higher values are better
Anxiety as measured by HADS-A - Polarity - Lower values are better
Depression as measured by HADS-D - Polarity - Lower values are better

Outcome	SCT + exercise, post-intervention, N =26	SCT + exercise, 6-months post-intervention, N=21	Exercise + contact control education intervention, post-intervention, N=28	Exercise + contact control education intervention, 6-months post-intervention, N=22
Godin Leisure-Time Exercise Questionnaire change score from baseline Mean (95% CI)	9.85 (5.46 to 14.23)	10.65 (4.18 to 17.12)	12.92 (4.69 to 20.89)	11.67 (5.67 to 17.67)
Daily step count change score from baseline Mean (95% CI)	118.67 (-1002.54 to 1239.87)	756.92 (-440.88 to 954.73)	30.38 (-1116.58 to 1177.34)	86.28 (-849.85 to 1022.42)

Outcome	SCT + exercise, post-intervention, N =26	SCT + exercise, 6-months post-intervention, N=21	Exercise + contact control education intervention, post-intervention, N=28	Exercise + contact control education intervention, 6-months post-intervention, N=22
Cardiorespiratory fitness (**Modified Canadian Aerobic Fitness Test)** change score from baseline Mean (95% CI)	8.56 (-6.86 to 23.98)	2.87 (-7.18 to 13.54)	10.54 (-6.29 to 27.37)	-11.54 (-27.67 to 4.59)
HADS-A change score from baseline Mean (95% CI)	-1.6 (-2.5 to 0.3)	-1.99 (-3.28 to -0.71)	-0.35 (-1.61 to 0.9)	-1.26 (-2.67 to 0.15)
HADS-D change score from baseline Mean (95% CI)	-0.76 (-1.54 to 0.33)	-1.02 (-2.05 to 0.01)	-0.61 (-1.54 to 0.33)	-0.37 (-1.35 to 0.61)

CI: confidence interval; HADS-A; hospital anxiety and depression scale-anxiety; HADS-D: hospital anxiety and depression scale-depression; N/n: number of participants; SCT: social cognitive theory

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Some concerns *(No details on randomisation methods other than randomised, treatment*

Section	Question	Answer
		allocation was concealed from the study researchers by using. Baseline characteristics balanced at baseline.)
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(35% and 34% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up balanced between groups so missingness does not depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: Godin Leisure-Time Exercise Questionnaire, Modified Canadian Aerobic Fitness Test. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Gehring, 2018

Bibliographic Reference	Gehring, Karin; Kloek, Corelien Jj; Aaronson, Neil K; Janssen, Kasper W; Jones, Lee W; Sitskoorn, Margriet M; Stuiver, Martijn M; Feasibility of a home-based exercise intervention with remote guidance for patients with stable grade II and III gliomas: a pilot randomized controlled trial.; Clinical rehabilitation; 2018; vol. 32 (no. 3); 352-366

Study details

Country/ies where study was carried out	The Netherlands
Study type	Randomised controlled trial (RCT)
Study dates	September 2013 - December 2014.
Inclusion criteria	- histologically proven or presumed (on the basis of clinical and MRI data) diffuse, low grade (i.e., WHO grade II) glioma, or anaplastic glioma (WHO grade III); - clinically stable for a minimum of 6 months prior to study entry as determined by MRI; - current self-reported inactivity or only a moderate level of physical activity (i.e., <20 minutes of vigorous exercise on at least 3 days of the week) as assessed with the Physician-based Assessment and Counselling for Exercise; - access to the internet; basic fluency in the Dutch language; - interest in undergoing the physical exercise program under investigation; and - a VO2 peak, as assessed with maximal cardiopulmonary exercise test, within the range of sedentary or recreationally active reference groups, allowing room for further improvement of fitness.
Exclusion criteria	- anti-tumour treatment (i.e., surgery, radiotherapy, chemotherapy, corticosteroids) within 6 months prior to study entry;

	- use of beta-blockers; - psychiatric or severe cognitive problems that would preclude program participation; - serious orthopaedic conditions, motor deficits, cardiovascular, cardiopulmonary or neurological condition; or - contra-indications for exercise without face-to face supervision as assessed with the Physical Activity Readiness Questionnaire, or as judged by the sports physician based on the cardiopulmonary exercise test; and - no room for cognitive improvement, as assessed with the neuropsychological testing.
Patient characteristics	N=34 adults with stable grade II and III gliomas - Home-based exercise intervention with remote guidance: n=23 - Waitlist control: n=11 Age in years [Mean (SD)]: - Home-based exercise intervention with remote guidance: 48.0 (9.4) - Waitlist control: 48.0 (11.9) Sex (M/F): - Home-based exercise intervention with remote guidance: n=10/n=13 - Waitlist control: n=5/n=6

	Time since diagnosis in years [Mean (SD)]: - Home-based exercise intervention with remote guidance: 7.6 (4.9) - Waitlist control: 8.5 (8.6) Chronic neurological disorder category: acquired brain injury
Intervention(s)/control	**Intervention** Name: Home-based exercise intervention with remote guidance Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist Delivery setting: Home-based Number/frequency of sessions: 3 home-based aerobic training sessions per week Duration: 6 months Practitioner: Physiotherapist At the start of the intervention, a physiotherapist visited participants at home. Patients received an individualized exercise prescription, based on their level of aerobic fitness, to exercise at 60–85% of their maximum heart rate. Patients kept a log of their training experiences. The physiotherapist monitored the training data on the platform on a weekly basis and provided additional personal feedback by e-mail. In case of motivational problems, fatigue, injury or technical problems, more frequent e-mail or phone contact was allowed. After the final exercise test, participants were called a last

	time to discuss the program and exercise test results, and to discuss continuation of physical exercise after the study period. **Control** Name: Waitlist control Protocol description: Control (waitlist control) Delivery setting: not applicable Number/ frequency of sessions: bimonthly phone calls Duration: not applicable Practitioner(s): not applicable Patients in the waiting list control group were advised to maintain an active lifestyle, in accordance with Dutch public health guidelines, which were described in two motivational brochures. Patients in this group also received bimonthly phone calls from the research-assistant during which general questions about their health were asked. These calls were intended to provide some control for potential effects due to the attention that was given to the exercise group. After all assessments had been completed, participants in the control group were offered a training watch and a general exercise prescription
Duration of follow-up	Post-intervention
Sources of funding	Not industry funded.
Sample size	N=34 Home-based exercise intervention with remote guidance; n=23

	Waitlist control; n=11

MRI; magnetic resonance imaging; N/n: number of participants; SD: standard deviation; VO_2max: maximal oxygen consumption; WHO: world health organisation

Outcomes

Study timepoints

- Baseline
- Post intervention (6 months from baseline)

Home-based exercise intervention with remote guidance versus waitlist control: Sustained participation in exercise or physical activity; cardiorespiratory fitness

Sustained participation in exercise or physical activity as measured by self-reported physical activity (metabolic equivalent of task min/week) - Polarity - Higher values are better

Cardiorespiratory fitness as measured by VO2 peak (relative, ml/kg/min) - Polarity - Higher values are better

Outcome	Exercise intervention, post-intervention, N=19	Waitlist control, post-intervention, N=9
Self-reported physical activity (metabolic equivalent of task min/week)	Median between group difference (95% CI)	=1489 [−2219.5; 5814.0], p=0.40
VO2 peak (relative, ml/kg/min) Change score from baseline Mean (95% CI)	1.9 (0.4 to 3.4)	-0.1 (-1.6 to 1.4)

CI: confidence interval; N/n: number of participants; VO_2max: maximal oxygen consumption

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Randomisation and allocation concealment was ensured by using an online computer software program. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(8% of participants in the intervention and control groups were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up balanced between groups so missingness does not depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: Self-reported physical activity (metabolic equivalent of task min/week), VO2 peak. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*

Section	Question	Answer
Overall bias and Directness	Risk of bias judgement	Some concerns
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat; VO_2max: maximal oxygen consumption

Kooijmans, 2017

Bibliographic Reference	Kooijmans, Hedwig; Post, Marcel W M; Stam, Henk J; van der Woude, Lucas H V; Spijkerman, Dorien C M; Snoek, Govert J; Bongers-Janssen, Helma M H; van Koppenhagen, C F; Twisk, Jos W; Bussmann, Johannes B J; Effectiveness of a Self-Management Intervention to Promote an Active Lifestyle in Persons With Long-Term Spinal Cord Injury: The HABITS Randomized Clinical Trial.; Neurorehabilitation and neural repair; 2017; vol. 31 (no. 12); 991-1004

Study details

Country/ies where study was carried out	The Netherlands
Study type	Randomised controlled trial (RCT)
Study dates	January 2012 - October 2014
Inclusion criteria	- Spinal cord injury (SCI) at ≥18 years old; - Time since injury at least 10 years; - Current age between 28 and 65 years;

	- Able to use a hand-rim wheelchair; and - Physically inactive as defined by a Physical Activity Scale for Individuals With Physical Disabilities (PASIPD) score lower than the 75th percentile of a Dutch SCI population
Exclusion criteria	- No intention to change their exercise behavior in the next 6 months; - A progressive disease or severe comorbidities; - Psychiatric problems that could interfere with the study; and - Insufficient knowledge of the Dutch language to understand the purpose of the study and the testing methods
Patient characteristics	N=64 adults with spinal cord injury - HABITS: n=33 - Information about active lifestyle: n=31 Age in years [Mean (SD)]: - HABITS: 48 (10) - Information about active lifestyle: 49 (11) Sex (M/F): - HABITS: n=21/n=12

	- Information about active lifestyle: n=24/n=7 Time since injury in years [Mean (SD)]: - HABITS: 21 (8) - Information about active lifestyle: 23 (10) Chronic neurological disorder category: Acquired spinal cord injury
Intervention(s)/control	**Intervention** Name: HABITS (self-management intervention) Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching Delivery setting: Rehabilitation centre Number/frequency of sessions: 1 home visit, 5 individual and 5 group sessions Duration: 16 weeks Practitioner: Counsellor, for example, physical therapist, and were trained in motivational interviewing The HABITS intervention specifically targeted on 2 conditions for behaviour change: optimizing intentions toward a healthier lifestyle and improving perceived behavioural control. Perceived behavioural control included self-efficacy and proactive coping. The HABITS intervention contained various elements that should facilitate an active lifestyle and the development of self-management skills: guidance of the HABITS counsellor, peer support and mastery

	experiences, discussions on various themes related to an healthy active lifestyle, action and proactive coping planning, problem solving, activity monitoring, a self-help workbook, and a booklet, “How to Stay Fit With SCI.” **Control** Name: Information about active lifestyle Protocol description: Control (usual care) Delivery setting: not applicable Number/ frequency of sessions: no applicable Duration: not applicable Practitioner(s): not applicable The control group received information about active lifestyle in SCI including one information group meeting in the first week of the study. In addition, they received the same self-health booklet as the intervention group, “How to Stay Fit with SCI. This book was published at the same time as the start of the study and resonated with the information needed for the control group.
Duration of follow-up	26-weeks post-intervention
Sources of funding	Not industry funded.
Sample size	N=64 - HABITS; n=33 - Information about active lifestyle; n=31

HABITS: Healthy Active Behavioral Intervention in Spinal cord injury; N/n: number of participants; SCI: spinal cord injury; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (16 weeks from baseline)
- 26 weeks post intervention

HABITS versus information about active lifestyle: Sustained participation in exercise or physical activity; cardiorespiratory fitness; Physical and mental health related quality of life and social care related quality of life

Sustained participation in exercise or physical activity as measured by Physical Activity Scale for Individuals with Physical Disabilities (metabolic equivalent task hour/ week) - Polarity - Higher values are better
Sustained participation in exercise or physical activity as measured by minutes of active wheelchair driving (min/day) - Polarity - Higher values are better
Cardiorespiratory fitness as measured by VO2 peak (L/min) - Polarity - Higher values are better
Physical and mental health related quality of life and social care related quality of life as measured by World Health Organization Quality of Life Assessment - Polarity - Higher values are better

Outcome	HABITS, post-intervention, physical activity scale n=25; wheelchair driving n=10; cardiorespiratory fitness n=18; quality of life n=21	HABITS, 26-weeks post-intervention, physical activity scale n=21; wheelchair driving n=9; cardiorespiratory fitness n=15; quality of life n=17	Information about active lifestyle, post-intervention, physical activity scale n=20; wheelchair driving n=17; cardiorespiratory fitness n=18; quality of life n=21	Information about active lifestyle, 26-weeks post-intervention, physical activity scale n=16; wheelchair driving n=15; cardiorespiratory fitness n=15; quality of life n=14
Physical Activity Scale for Individuals with Physical Disabilities (metabolic equivalent of task hour/ week) change score from baseline Mean (SD)	2.4 (14.58)	2.5 (8.75)	-0.2 (7.99)	-1.9 (7.54)
Minutes of active wheelchair driving (min/day) change score from baseline Mean (SD)	-4.5 (32.33)	13.38 (58.67)	-5.1 (61.34)	-2.7 (44.2)
Cardiorespiratory fitness (VO2 peak [L/min]) change score from baseline Mean (SD)	-1.2 (3.77)	-0.5 (3.96)	-1.9 (62.82)	-1.1 (3.73)

Outcome	HABITS, post-intervention, physical activity scale n=25; wheelchair driving n=10; cardiorespiratory fitness n=18; quality of life n=21	HABITS, 26-weeks post-intervention, physical activity scale n=21; wheelchair driving n=9; cardiorespiratory fitness n=15; quality of life n=17	Information about active lifestyle, post-intervention, physical activity scale n=20; wheelchair driving n=17; cardiorespiratory fitness n=18; quality of life n=21	Information about active lifestyle, 26-weeks post-intervention, physical activity scale n=16; wheelchair driving n=15; cardiorespiratory fitness n=15; quality of life n=14
World Health Organization Quality of Life Assessment change score from baseline Mean (SD)	1 (2.09)	2.3 (2.2)	0.4 (2.74)	2.3 (2.2)

HABITS: Healthy Active Behavioral Intervention in Spinal cord injury; N/n: number of participants; SD: standard deviation; VO_2max: maximal oxygen consumption

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Block randomisation process and concealed allocation. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Some concerns *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. No information whether ITT analyses were used.)*

Section	Question	Answer
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	High *(16% and 26% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up unbalanced between groups so missingness likely to depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: Physical Activity Scale for Individuals with Physical Disabilities, World Health Organization Quality of Life Assessment. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Ma, 2019

Bibliographic Reference	Ma, Jasmin K; West, Christopher R; Martin Ginis, Kathleen A; The Effects of a Patient and Provider Co-Developed, Behavioral Physical Activity Intervention on Physical Activity, Psychosocial Predictors, and Fitness in Individuals with Spinal Cord Injury: A Randomized Controlled Trial.; Sports medicine (Auckland, N.Z.); 2019; vol. 49 (no. 7); 1117-1131

Study details

Country/ies where study was carried out	New Zealand
Study type	Randomised controlled trial (RCT)
Study dates	May to July 2017
Inclusion criteria	- Aged 18–65 years, - Chronic (>1 year) spinal cord injury (SCI), - Physician clearance to exercise, and - Currently performing <150 min of moderate to vigorous PA/week (the Canadian PA guidelines)
Exclusion criteria	- Trauma or surgery within the past 3 months, - An active stage 3 or 4 pressure ulcer, - Lack of proficiency in the English language that would prevent ability to follow instructions, and - Any unstable medical/psychiatric condition that would likely affect the ability to complete the study
Patient characteristics	N=32 adults with spinal cord injury - ProACTIVE SCI: n=17 - Waitlist control: n=15 Age in years [Mean (SD)]:

	- ProACTIVE SCI: 45.79 (13.63) - Waitlist control: 45.57 (10.49) Sex (M/F): - ProACTIVE SCI: n=10/n=5 - Waitlist control: n=8/n=6 Time since injury in years [Mean (SD)]: - ProACTIVE SCI: 14.71 (13.94) - Waitlist control: 18.14 (10.85) Chronic neurological disorder category: Acquired spinal cord injury
Intervention(s)/control	**Intervention** Name: ProACTIVE SCI Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist plus Person intrinsic approaches, including behaviour change and coaching Delivery setting: In-person at research facility or via Skype (or if Skype not possible over the phone) Number/frequency of sessions: 1-h introductory session followed by eight once-weekly 10- to 15-min behavioural PA coaching sessions for a total time commitment of 140–180 min over 8 weeks

	Duration: 8 weeks Practitioner: Personal trainer with 7 years of experience working with people with SCI Tailoring and the individual's behaviour change theory stage was used throughout the intervention to match BCT strategies to participant needs and preferences. The only materials distributed in the study were an exercise band, which was given to both intervention and control group participants at baseline, and a tailored exercise program given to intervention group participants. **Control** Name: Waitlist control Protocol description: Control (waitlist control) Delivery setting: not applicable Number/ frequency of sessions: no applicable Duration: not applicable Practitioner(s): not applicable Participants randomized to the waitlist control condition were scheduled to begin their weekly coaching sessions after completion of post-intervention measures 9 weeks later. Continued to receive any concomitant care they were already receiving, with no additional treatment.
Duration of follow-up	Post-intervention
Sources of funding	Not industry funded.

Sample size	N=32 - ProACTIVE SCI: n=17 - waitlist control: n=15

BCT: behaviour change theory; N/n: number of participants; PA: physical activity; SCI: spinal cord injury; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (8 weeks from baseline)

ProACTIVE SCI versus waitlist control: Sustained participation in exercise or physical activity; cardiorespiratory fitness
Sustained participation in exercise or physical activity as measured by Leisure Time Physical Activity Questionnaire (min/week) - Polarity - Higher values are better
Sustained participation in exercise or physical activity as measured by accelerometer total counts (vector magnitude counts) - Polarity - Higher values are better
Cardiorespiratory fitness as measured by VO2 peak (ml/kg/min) - Polarity - Higher values are better

Outcome	ProACTIVE SCI, post-intervention, N=14	Waitlist control, post-intervention, N=14
Leisure Time Physical Activity Questionnaire (min/week) change score from baseline Mean (SD)	193 (253.08)	-127 (201.16)
Accelerometer total counts (vector magnitude counts) change score from baseline Mean (SD)	1.4 (1.77)	-2.5 (5.33)
Cardiorespiratory fitness (VO2 peak [ml/kg/min]) change score from baseline Mean (SD)	1.89 (3.3)	-1.06 (3.98)

N/n: number of participants; SD: standard deviation; VO_2max: maximal oxygen consumption

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Some concerns *(Random numbers generator, but no details on allocation concealment. Baseline characteristics balanced at baseline, however intervention group included five individuals with tetraplegia, whereas the control group included eight.)*

Section	Question	Answer
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	High *(18% and 9% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up unbalanced between groups so missingness likely to depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	High *(The questionnaires used were all validated and widely used tools: Leisure Time Physical Activity Questionnaire. Standardised and validated measurement tools implemented by researchers unblinded to allocation and outcomes subjective.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Mayo, 2020

Bibliographic Reference	Mayo, Nancy E; Mate, Kedar Kv; Reid, Ryan; Duquette, Pierre; Lapierre, Yves; Barclay, Ruth; Bayley, Mark; Bartlett, Susan; Andersen, Ross; Participation in and outcomes from a 12-month tailored exercise programme for people with multiple sclerosis (MSTEP©): a randomized trial.; Clinical rehabilitation; 2020; vol. 34 (no. 7); 927-937

Study details

Country/ies where study was carried out	Canada
Study type	Randomised controlled trial (RCT)
Study dates	March 2013 - March 2016
Inclusion criteria	Community dwelling individuals aged 19 to 65 who have been diagnosed after 1994 with multiple sclerosis (MS). Specific inclusion criteria were: - ambulatory (can walk 100m, be capable of walking 100metres without a walking aid corresponding to a classification of ⩽5.5 on the Expanded Disability Status Scale, even if they do use an aid for daily activities; and - self-reported to be sedentary or irregularly active at time of study entry (i.e. do not exercise 30minutes or more twice per week of moderate to vigorous activity). This latter criterion was subsequently confirmed using activity monitoring for 7 days post-enrolment.
Exclusion criteria	- unable to speak and read English or French; - unable to respond to simple questions on orientation and memory; - have an additional illness that restricts their function; and/or - experienced a relapse during the past 30 days as this may affect physical activity/exercise participation

Patient characteristics	N=137* adults with multiple sclerosis - MSTEP: n=66 - Guideline group: n=71 Age in years [Mean (SD)]: - MSTEP: 47.4 (9.7) - Guideline group: 47.1 (9.7) Sex (M/F): - MSTEP: n=8/n=26 - Guideline group: n=9/n=28 Time since diagnosis in years [Mean (SD)]: not reported Chronic neurological disorder category: Progressive Neurological Diseases *Baseline data only available for n=34 and n=37 in the MSTEP group and guideline group, respectively.
Intervention(s)/control	**Intervention** Name: MSTEP

	Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist Delivery setting: Outpatient clinics Number/frequency of sessions: Cardio-intensive x2 times a week using the concept of interval training + 2 private sessions Duration: 12 months Practitioner: Physical therapist or exercise therapist MSTEP, a personally adapted exercise regimen including a variety of exercises targeting endurance, muscular, and core strength, balance, flexibility, muscular power, and speed of movement. The goal of the MSTEP programme is to promote regular bouts of activity most days per week, encouraging a balance between rest and activity, and taking into consideration the physical and emotional status and capacity of the person. A unique feature of MSTEP was to specifically target cardio-aerobic capacity through cardio-intensive exercise prescribed two times per week (Push Days) using the concept of interval training. On Push Days, participants were instructed to do short bursts of moderate-high intensity exercise to their own tolerance (e.g. for 1–3minutes) and then reduce to a more comfortable pace for 5–7 minutes and repeat as they are possible. Private training sessions with the physical therapist or exercise therapist. For the MSTEP group, the sessions were used to assess individual needs and design an individualized programme. **Control** Name: Guideline group Protocol description: Control (usual care)

	Delivery setting: outpatient clinics Number/ frequency of sessions: 30 minutes of moderate intensity aerobic and strength training for large muscle groups two times per week aiming for two sets of 10 to 15 repetitions of each exercise Duration: 12 months Practitioner(s): Physical therapist or exercise therapist The Guideline group received instructions based on the 2013 exercise guidelines for adults with multiple sclerosis from the Canadian Society for Exercise Physiology. The Guideline recommends 30 minutes of moderate intensity aerobic and strength training for large muscle groups two times per week aiming for two sets of 10 to 15 repetitions of each exercise Private training sessions with the physical therapist or exercise therapist. For the Guideline group, the sessions were used to instruct on the guidelines and learn how to apply principles of safe and effective exercise. All were provided with a portfolio of exercise instructions
Duration of follow-up	Post-intervention
Sources of funding	Not industry funded.
Sample size	N=137 - MSTEP: n=66 - Guideline group: n=71

N/n: number of participants; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (12 months from baseline)

MSTEP versus guideline group: Cardiorespiratory fitness

Cardiorespiratory fitness as measured by VO2 peak (ml/kg/min) - Polarity - Higher values are better

Outcome	MSTEP, post-intervention, N=34	Guideline group, post-intervention, N=37
Cardiorespiratory fitness (VO2 peak [ml/kg/min]) change score from baseline Mean (SD)	-0.3 (5.51)	-0.5 (7.61)

N/n: number of participants; SD: standard deviation; VO_2max: maximal oxygen consumption

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(The randomization was done using a web-based programme and allocation was concealed. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(49% and 48% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all*

Section	Question	Answer
		results were biased by missing data; loss to follow-up balanced between groups so missingness does not depend on true value.)
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Low *(The outcome used was validated and a widely used tools: VO2 peak. Standardised and validated measurement tools implemented by researchers blinded to allocation and outcome objective.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	Some concerns
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat; VO_2max: maximal oxygen consumption

Nooijen, 2016

Bibliographic Reference	Nooijen, Carla Fj; Stam, Henk J; Bergen, Michael P; Bongers-Janssen, Helma Mh; Valent, Linda; van Langeveld, Sacha; Twisk, Jos; van den Berg-Emons, Rita Jg; A behavioural intervention increases physical activity in people with subacute spinal cord injury: a randomised trial.; Journal of physiotherapy; 2016; vol. 62 (no. 1); 35-41

Study details

Country/ies where study was carried out	The Netherlands
Study type	Randomised controlled trial (RCT)

Study dates	January 2011 - August 2013
Inclusion criteria	- Diagnosed with spinal cord injury (SCI), - Initial inpatient rehabilitation, - Dependent on a manual wheelchair, - Able to handcycle, and - Aged between 18 and 65 years old.
Exclusion criteria	- Insufficient comprehension of the Dutch language to understand the purpose of the study and its testing methods, and - Progressive disease or a psychiatric condition that could interfere with participation
Patient characteristics	N=45* adults with subacute spinal cord injury - Behavioural intervention + usual care: n=23 - Usual care: n=22 Age in years [Mean (SD)]: - Behavioural intervention + usual care: 44 (15) - Usual care: 44 (15) Sex (M/F):

	- Behavioural intervention + usual care: n=17/n=3 - Usual care: n=16/n=3 Time since injury in days [Mean (SD)]: - Behavioural intervention + usual care: 139 (67) - Usual care: 161 (81) Chronic neurological disorder category: Acquired spinal cord injury *Baseline data only available for n=20 and n=19 in the behavioural intervention group and usual care group, respectively.
Intervention(s)/control	**Intervention** Name: Behavioural intervention + usual care Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching Delivery setting: Inpatient rehabilitation centre Number/frequency of sessions: 13 x1-hour individual face-to-face sessions with a coach and handcycle training x3 times a week Duration: Began 2 months before and ended 6 months after discharge from inpatient rehabilitation Practitioner: Physiotherapist or occupational therapist trained in motivational interviewing

	This intervention aimed to increase the amount of everyday physical activity after discharge from inpatient rehabilitation. For practical reasons, some sessions after discharge were conducted by telephone. Each session began with the participant proposing the topics of conversation for that session. The behavioural intervention had four main components. The first component was feedback on daily wheelchair activity using bicycle odometers. The second component was formulation of action plans on how and when to be physically active and formulation of coping strategies for dealing with barriers that could hinder the actual performance of an action plan. The third component was a home visit by the coach in the first month after discharge, during which the coach helped to optimise the home and the environment of the participant for an active lifestyle. The last component was the provision of additional information at the request of the participant on relevant topics related to physical activity, such as possible health benefits. **Control** Name: Usual care Protocol description: Control (usual care) Delivery setting: Inpatient rehabilitation centre Number/ frequency of sessions: Handcycle training x3 times a week Duration: 8 weeks Practitioner(s): Physiotherapist or occupational therapist All participants in both groups received usual care, which included a handcycle training program and advice on physical activity after discharge. The structured handcycle training program was performed during the last 8 weeks of inpatient rehabilitation. This handcycle training consisted of an interval training protocol on an add-on handcycle. The advice

	about physical activity after discharge was unstructured and focused mainly on sports and not on daily activities. After inpatient rehabilitation, all participants continued rehabilitation as outpatients.
Duration of follow-up	6-months post-intervention
Sources of funding	Not industry funded.
Sample size	N=45 - Behavioural intervention + usual care: n=23 - usual care: n=22

N/n: number of participants; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (8 months from baseline)
- 6 months post intervention

Behavioural intervention + usual care versus usual care: Sustained participation in exercise or physical activity
Sustained participation in exercise or physical health as measured by Physical Activity Scale for Individuals with Physical Disabilities (metabolic equivalent task hour/day) - Polarity - Higher values are better
Sustained participation in exercise or physical health as measured by wheeled physical activity (min/day) - Polarity - Higher values are better

Outcome	Behavioural intervention + usual care, post-intervention, N=13	Behavioural intervention + usual care, 6-months post-intervention, N=10	Usual care, post-intervention, N=14	Usual care, 6-months post-intervention, N=10
Physical Activity Scale for Individuals with Physical Disabilities (metabolic equivalent task hour/day) Mean difference between groups at timepoint Mean (SD)	32 (34)	26 (11)	10 (8)	11 (12)
Wheeled physical activity (min/day) Mean difference between groups at timepoint Mean (SD)	3 (20.35)	8 (26.63)	-40 (20.63)	-30 (26.43)

N/n: number of participants; SD: standard deviation

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Some concerns *(No information on randomisation process or allocation concealment. Baseline characteristics balanced at baseline.)*

Section	Question	Answer
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. Participants analysed in groups randomised to.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(52% of participants in the intervention and control groups were lost to follow-up at the final assessment time-point; all results biased by missing data; loss to follow-up balanced between groups so missingness probably not dependent on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Low *(The questionnaires used were all validated and widely used tools: Physical Activity Scale for Individuals with Physical Disabilities. Research assistants performing measurements blinded.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available. All analyses reported in the study.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Nooijen, 2017

Bibliographic Reference	Nooijen, Carla Fj; Stam, Henk J; Sluis, Tebbe; Valent, Linda; Twisk, Jos; van den Berg-Emons, Rita Jg; A behavioral intervention promoting physical activity in people with subacute spinal cord injury: secondary effects on health, social participation and quality of life.; Clinical rehabilitation; 2017; vol. 31 (no. 6); 772-780

Study details

Country/ies where study was carried out	See Nooijen 2016
Study type	Randomised controlled trial (RCT)
Study dates	See Nooijen 2016
Inclusion criteria	See Nooijen 2016
Exclusion criteria	See Nooijen 2016
Patient characteristics	See Nooijen 2016
Intervention(s)/control	See Nooijen 2016
Duration of follow-up	See Nooijen 2016
Sources of funding	See Nooijen 2016
Sample size	See Nooijen 2016
Other information	Quality of life data not extracted as no overall score only sub-domains

Outcomes

Study timepoints

- Baseline
- Post intervention (8 months from baseline)

- 3 months post intervention

Behavioural intervention + usual care versus usual care: Cardiorespiratory fitness
Cardiorespiratory fitness as measured by VO2 peak (L/min) - Polarity - Higher values are better

Outcome	Behavioural intervention + usual care, post-intervention, N=13	Behavioural intervention + usual care, 3-months post-intervention, N=10	Usual care, post-intervention, N=14	Usual care, 3-months post-intervention, N=10
Cardiorespiratory fitness (VO2 peak [L/min]) Mean difference between groups at timepoint Mean (SD)	0.28 (0.43)	0.17 (0.34)	0.32 (0.4)	0.29 (0.42)

N/n: number of participants; SD: standard deviation; VO_2max: maximal oxygen consumption

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Some concerns *(No information on randomisation process or allocation concealment. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. Participants analysed in groups randomised to.)*

Section	Question	Answer
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(52% of participants in the intervention and control groups were lost to follow-up at the final assessment time-point; no evidence results not biased by missing data; loss to follow-up balanced between groups so missingness probably not dependent on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Low *(The outcomes measure was validated and a widely used tool: Peak oxygen uptake in L/min. Research assistants performing measurements blinded.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available. All analyses reported in the study.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Paul, 2019

Bibliographic Reference	Paul, Lorna; Renfrew, Linda; Freeman, Jennifer; Murray, Heather; Weller, Belinda; Mattison, Paul; McConnachie, Alex; Heggie, Robert; Wu, Olivia; Coulter, Elaine H; Web-based physiotherapy for people affected by multiple sclerosis: a single blind, randomized controlled feasibility study.; Clinical rehabilitation; 2019; vol. 33 (no. 3); 473-484

Study details

Country/ies where study was carried out	UK

Study type	Randomised controlled trial (RCT)
Study dates	June 2015-December 2015
Inclusion criteria	- Confirmed diagnosis of Multiple Sclerosis (MS) - Expanded Disability Status Scale of 4.0-6.5, and - Access to a personal computer/tablet with an email address and internet connection
Exclusion criteria	- Currently taking part in regular exercise (≥two times/week) and/or regular physiotherapy programme, - Poor cognitive function (Mini Mental State Examination Score <24), - Any significant change in medication or a relapse within the last three months, - Other significant co-morbidities for which exercise would be contra-indicated, - Currently participating in another clinical trial.
Patient characteristics	N=90 adults with multiple sclerosis - Web-based physiotherapy: n=45 - Printed sheet of exercises: n=45 Age in years [Mean (SD)]: - Web-based Physiotherapy: 55.6 (10.2) - Printed sheet of exercises: 56.5 (9.1)

	Sex (M/F): - Web-based Physiotherapy: n=13/n=32 - Printed sheet of exercises: n=8/n=37 Time since diagnosis in years [Mean (SD) not reported] [Median (IQR)]: - Web-based Physiotherapy: 10 (6-18) - Printed sheet of exercises: 15 (10-23) Chronic neurological disorder category: Progressive neurological diseases
Intervention(s)/control	**Intervention** Name: Web-based physiotherapy Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist Delivery setting: Multiple Sclerosis out-patient centres Number/frequency of sessions: Tailored according to exercise diaries every 2 weeks Duration: 6 months Practitioner: Physiotherapist

	Participants randomised to the web-based physiotherapy intervention received an individualised exercise programme delivered via a website. Programmes could consist of cardiovascular, strengthening and balance exercises, as well as warm up, cool down and stretching exercises, at different levels of difficulty and a prescribed number of sets/repetitions individualised to meet the participants' needs. The website contained exercises and disease-specific advice and education. During the intervention period the physiotherapist reviewed electronic exercise diaries every two weeks and remotely altered programmes in response to a participant's comments. Alterations could include changing exercises, difficulty level or number of repetitions or sets. Participants were informed of any changes by email. **Control** Name: Printed sheet of exercises Protocol description: Control (usual care) Delivery setting: Multiple Sclerosis out-patient centres Number/ frequency of sessions: Not applicable Duration: Not applicable Practitioner(s): Not applicable Participants randomised to the active comparator intervention received a printed sheet of exercises. Programmes consisted of similar exercises as intervention group. Participants completed a paper-based exercise diary that was posted to the research team every three months.
Duration of follow-up	3-months post-intervention
Sources of funding	Not industry funded.
Sample size	N=90

	- Web-based physiotherapy; n=45 - Printed sheet of exercises; n=45

N/n: number of participants; IQR: interquartile range; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (6 months from baseline)
- 3 months post intervention

Web-based physiotherapy versus printed sheet of exercises: Sustained participation in exercise or physical activity; Physical and mental health related quality of life and social care related quality of life; Anxiety; Depression
Sustained participation in exercise or physical activity as measured by steps/day - Polarity - Higher values are better
Physical and mental health related quality of life and social care related quality of life as measured by EQ-5D - Polarity - Higher values are better
Anxiety as measured by HADS-A - Polarity - Lower values are better
Depression as measured by HADS-D - Polarity - Lower values are better

Outcome	Web-based physiotherapy, post-intervention, Steps/day N=33, EQ-5D/HADS-A/HADS-D N=38	Web-based physiotherapy, 3-months post-intervention, Steps/day N=29, EQ-5D/HADS-A/HADS-D N=36	Printed sheet of exercises, post-intervention, Steps/day N= 35, EQ-5D/HADS-A/HADS-D N=39	Printed sheet of exercises, 3-months post-intervention, Steps/day N=33, EQ-5D/HADS-A/HADS-D N=36
Steps/day change score from baseline Mean (SD)	-454 (911)	-570 (1177)	-54 (1830)	-166 (1777)
EQ -5D change score from baseline Mean (SD)	0.03 (0.13)	-0.01 (0.1)	-0.06 (0.21)	0.01 (0.14)
HADS-A change score from baseline Mean (SD)	-0.34 (3.18)	-0.62 (3.63)	-0.05 (3.15)	-0.45 (3.06)
HADS-D change score from baseline Mean (SD)	-0.32 (2.74)	-0.03 (3.3)	0.23 (3.32)	-0.29 (2.98)

EQ-5D: EuroQol 5 dimensions; HADS-A: hospital anxiety and depression scale-anxiety; HADS-D: hospital anxiety and depression scale-depression; N/n: number of participants; SD: standard deviation

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Some concerns *(Remote, telephone automated randomisation system within the Glasgow Clinical Trials Unit. No details on allocation concealment provided. Baseline characteristics balanced at baseline.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(23% and 20% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up balanced between groups so missingness does not depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: EQ-5D, HADS-A, HADS-D. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High

Section	Question	Answer
Overall bias and Directness	Overall Directness	Directly applicable

EQ-5D: EuroQol 5-dimensions; HADS-A: hospital anxiety and depression scale-anxiety; HADS-D: hospital anxiety and depression scale-depression; ITT: intention to treat

Ryan, 2020

Bibliographic Reference	Ryan, Jennifer M; Fortune, Jennifer; Stennett, Andrea; Kilbride, Cherry; Lavelle, Grace; Hendrie, Wendy; DeSouza, Lorraine; Abdul, Mohammed; Brewin, Debbie; David, Lee; Anokye, Nana; Victor, Christina; Norris, Meriel; Safety, feasibility, acceptability and effects of a behaviour-change intervention to change physical activity behaviour among people with multiple sclerosis: Results from the iStep-MS randomised controlled trial.; Multiple sclerosis (Houndmills, Basingstoke, England); 2020; vol. 26 (no. 14); 1907-1918

Study details

Country/ies where study was carried out	UK
Study type	Randomised controlled trial (RCT)
Study dates	April-September 2017
Inclusion criteria	1. They have a self-reported diagnosis of multiple sclerosis (MS); this method of identifying a diagnosis of MS is consistent with the method used in the MS Therapy Centre, which is the site for this trial. 2. They are relapse free for the past 3 months; a relapse will be defined as ‘the appearance of new symptoms, or the return of old symptoms, for a period of 24hours or more, in the absence of a change in core body temperature or infection’.

	3. They are independently ambulatory at a minimum within their home with or without a walking aid. 4. They are free of unstable medical conditions, for example, unstable angina. 5. They are able to travel to the Berkshire MS Therapy Centre for the intervention. 6. They are fluent in English to a standard sufficient for completion of the trial assessment and intervention. 7. They have an ability to comprehend and follow all instructions relating to participation in the study including providing informed consent, completing the outcome measures or participating in the intervention.
Exclusion criteria	Exclusion criteria were pregnancy and ongoing participation in other trials.
Patient characteristics	N=60 adults with multiple sclerosis - i-Step MS + usual care: n=30 - Usual care: n=30 Age in years [Mean (SD)]: - i-Step + usual care: 56.9 (9.0) - Usual care: 56.7 (9.2) Sex (M/F): - i-Step + usual care: n=13/n=17 - Usual care: n=6/n=24

	Time since diagnosis in years [Mean (SD)]: - i-Step + usual care: 16.1 (10.5) - Usual care: 13.7 (9.4) Chronic neurological disorder category: Progressive neurological diseases
Intervention(s)/control	**Intervention** Name: i-Step + usual care Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching Delivery setting: NHS therapy centre Number/frequency of sessions: Four physical activity sessions with behaviour change techniques (session 1+3: 45-minutes; sessions 2+4: 30-minutes) Duration: 12 weeks Practitioner: Physiotherapist The handbook was developed to guide physiotherapists and participants through the four physical activity sessions. The handbook consists of seven sections: an introduction, a section dedicated to each of the four sessions and additional resources. The format of the sections dedicated to each session is: overview, pre-session reading and reflection, content specific to that session (eg, barriers and facilitators to physical activity), goal setting, and a diary to record and monitor goals. Key behaviour change techniques were incorporated into each session: ‘goal setting

	(behaviour)', 'action planning', 'barrier identification/ problem solving', 'set graded tasks', 'prompt review of behavioural goals', 'prompt self-monitoring of behaviour' and 'provide information on where and when to perform behaviour'. Participants in the intervention arm were provided with a Yamax SW-200 digiwalker pedometer at session. Participants will be asked to wear the pedometer on their trousers or skirt at the right hip for all waking hours, except for swimming and bathing, for at least 7 days between each session. **Control** Name: Usual care Protocol description: Control (usual care) Delivery setting: not applicable Number/ frequency of sessions: no applicable Duration: not applicable Practitioner(s): not applicable Participants allocated to the control group received ongoing usual care that could range from intensive physiotherapy to no treatment.
Duration of follow-up	6-months post-intervention
Sources of funding	Not industry funded.
Sample size	N=60 - i-Step + usual care; n=30

	- usual care; n=30

N/n: number of participants; MS: multiple sclerosis; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (8 weeks from baseline)
- 6 months post intervention

iStep-MS versus usual care: Sustained participation in exercise or physical activity
Sustained participation in exercise or physical activity as measured by daily step count - Polarity - Higher values are better

Outcome	i+Step MS, post-intervention, N=30	i+Step MS, 6-months post-intervention, N=30	Usual care, post-intervention, N=30	Usual care, 6-months post-intervention, N=30
Daily step count change score from baseline Mean (SD)	225.4 (2177.38)	436.5 (1982.08)	142.9 (1621.87)	305 (1843.77)

SD: standard deviation

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Computer-generated random schedule in random permuted blocks of 2 or 4. The allocation sequence was placed in sequentially numbered, opaque, sealed envelopes. Baseline characteristics look sufficiently similar, although no statistical analysis done to ascertain this.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Low *(All participants randomised were analysed.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	High *(The questionnaires used were all validated and widely used tools: accelerometer. Standardised and validated measurement tools implemented by researchers aware of allocation. Outcomes self-reported by unblinded participants.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Tallner, 2016

Bibliographic Reference	Tallner, Alexander; Streber, Rene; Hentschke, Christian; Morgott, Marc; Geidl, Wolfgang; Maurer, Mathias; Pfeifer, Klaus; Internet-Supported Physical Exercise Training for Persons with Multiple Sclerosis-A Randomised, Controlled Study.; International journal of molecular sciences; 2016; vol. 17 (no. 10)

Study details

Country/ies where study was carried out	Germany
Study type	Randomised controlled trial (RCT)
Study dates	Not reported
Inclusion criteria	- Diagnosed multiple sclerosis (MS) - Expanded Disability Status Scale score of less than or equal to 4.0 - Not less than four weeks of clinical stability prior to inclusion in the study - Access to the internet
Exclusion criteria	- Primary progressive multiple sclerosis and clinically-relevant cardiological, internal, or orthopaedic contraindications to exercise, which were assessed by the patients' attending physicians
Patient characteristics	N=126 adults with multiple sclerosis - Internet-Supported Physical Exercise Training n=59 - Waitlist control n=67

	Age in years [Mean (SD)]: - Internet-Supported Physical Exercise Training: 40.9 (10.4) - Waitlist control: 40.7 (9.5) Sex (M/F): - Internet-Supported Physical Exercise Training: n=15/n=44 - Waitlist control: n=17/n=50 Time since diagnosis in years [Mean (SD)]: - Internet-Supported Physical Exercise Training: 9.8 (9.2) - Waitlist control: 9.2 (7.2) Chronic neurological disorder category: Progressive neurological diseases
Intervention(s)/control	**Intervention** Name: Internet-Supported Physical Exercise Training Protocol intervention group: Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist Delivery setting: Home-based and supervised by the internet

	Number/frequency of sessions: Strength training twice weekly and endurance training once weekly Duration: 12 weeks Practitioner: Exercise therapists and/or physical therapists The e-training intervention began with a two-day, on-site training seminar on the content and procedures of the e-training. Afterwards, prescription and supervision of exercises and incorporation of participants' feedback was organized online with one-to-one support for each participant. For strength training, the number of sets and repetitions to be completed for each exercise were prescribed individually for each participant and training session, and were dependent on fitness levels. To ensure training overload and progression, a standardized progression scheme ranging from at least two times, six repetitions up to a maximum of three times, 20 repetitions. For endurance training, recommendations regarding the intensity of jogging, walking, cycling, and swimming were made. The form of activity for the endurance training was freely selected, duration (between 10–60 min) was adjusted to individual fitness levels. In contrast to the strength training, the endurance training was, however, not systematically progressed after the initial recommendation of training parameters. **Control** Name: Waitlist control Protocol description: Control (waitlist control) Delivery setting: not applicable Number/ frequency of sessions: no applicable

	Duration: not applicable Practitioner(s): not applicable After the initial assessment on entry, those assigned to the control group were instructed to maintain their previous physical activity behaviour. After waiting three months, they received the same e-training intervention as the intervention group had received from the start.
Duration of follow-up	3-months post-intervention
Sources of funding	Not industry funded.
Sample size	N=126 - Internet-Supported Physical Exercise Training; n=59 - Waitlist control; n=67

MS: multiple sclerosis; N/n: number of participants; PwMS: people with MS; SD: standard deviation

Outcomes

Study timepoints

- Baseline
- Post intervention (12 weeks from baseline)
- 3 months post intervention

Internet-Supported Physical Exercise Training versus waitlist control: Cardiorespiratory fitness; Physical and mental health related quality of life and social care quality of life
Cardiorespiratory fitness as measured by VO2 peak - Polarity - Higher values are better

Physical and mental health related quality of life and social care quality of life as measured by Hamburg Quality of Life Questionnaire for Multiple Sclerosis - Polarity - Higher values are better

Outcome	Internet-Supported Physical Exercise Training, post-intervention, N=49	Internet-Supported Physical Exercise Training, 3-months post-intervention, N=36	Waitlist control, post-intervention, N=59	Waitlist control, 3-months post-intervention, N=41
Cardiorespiratory fitness (VO2 peak) change score from baseline Mean (95% CI)	0.13 (-0.83 to 1.08)	-0.34 (-1.46 to 0.78)	-0.33 (-1.19 to 0.54)	0.71 (-0.28 to 1.71)
Hamburg Quality of Life Questionnaire for Multiple Sclerosis change score from baseline Mean (95% CI)	0.02 (-0.06 to 0.11)	0.04 (-0.06 to 0.13)	0.03 (-0.04 to 0.11)	-0.05 (-0.14 to 0.03)

CI: confidence interval; N/n: number of participants; VO_2max: maximal oxygen consumption

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Random allocation was email-based and administered by the study statistician. Randomisation was carried out in a one-to-one ratio and the sequence was produced using a computer-based random sequence generator. Baseline characteristics balanced at baseline.)*

Section	Question	Answer
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Some concerns *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. No information if ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(14% and 0% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up unbalanced between groups so missingness does likely to depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: Hamburg Quality of Life Questionnaire for Multiple Sclerosis. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

ITT: intention to treat

Thomas, 2017

Bibliographic Reference	Thomas, Sarah; Fazakarley, Louise; Thomas, Peter W; Collyer, Sarah; Brenton, Sarah; Perring, Steve; Scott, Rebecca; Thomas, Fern; Thomas, Charlotte; Jones, Kelly; Hickson, Jo; Hillier, Charles; Mii-vitaliSe: a pilot randomised controlled trial of a home gaming system (Nintendo Wii) to increase activity levels, vitality and well-being in people with multiple sclerosis.; BMJ open; 2017; vol. 7 (no. 9); e016966

Study details

Country/ies where study was carried out	UK
Study type	Randomised controlled trial (RCT)
Study dates	February 2013 - July 2013
Inclusion criteria	(i) a clinically definite diagnosis of multiple sclerosis (MS); (ii) aged 18 years or above; (iii) satisfied a risk assessment (see below); (iv) relatively physically inactive (active for a period of 30min or more on fewer than 5 days per week; (vi) having a suitable television at home.
Exclusion criteria	(i) Adapted Patient Determined Disease Steps Scale score of 1 or ≥6 (equivalent to an Expanded Disability Status Scale score of 1 or ≥6; (ii) a relapse within the past 3 months that required treatment with corticosteroids and/or a hospital admission; (iii) already participating in exercise or rehabilitation research;

	(iv) a medical condition placing an individual at risk from exercise participation; (vi) owns a Wii and is currently using it on a weekly basis or more; (vii) unwilling or unable to comply with the protocol (eg, long vacation planned)
Patient characteristics	N=30 adults with MS - Mii-vitaliSe + usual care: n=15 - Waitlist control: n=15 Age in years [Mean (SD)]: - Mii-vitaliSe + usual care: 50.9 (8.08) - Waitlist control: 47.6 (9.26) Sex (M/F): - Mii-vitaliSe + usual care: n=1/n=14 - Waitlist control: n=2/n=13 Time since diagnosis <1; 1-5; 6-10; 11-15; >16 years (n): - Mii-vitaliSe + usual care: 1;7;3;2;2 - Waitlist control: 2;4;4;1;4

	Chronic neurological disorder category: Progressive neurological diseases
Intervention(s)/control	**Intervention** Name: Mii-vitaliSe + usual care Protocol intervention group: Person intrinsic approaches, including behaviour change and coaching Delivery setting: Outpatients, home, virtual, and telephone Number/frequency of sessions: Weekly modules (Week 1 and 2: Orientation to Wii; Week 3: Installation of equipment and commencement of individual programme at home; Week 5: Follow-up; Week 7: Review visit; Week 12: Follow-up; Week 16: Review visit; Week 20 and thereafter: Ongoing support) Duration: 20 weeks Practitioner: Senior physiotherapists The rationale of Mii-vitaliSe is to support people with MS to increase activity levels in their own homes using the Nintendo Wii. Mii-vitaliSe encourages the internalisation of goals, and aims to provide individuals with skills, strategies and support to identify solutions to overcome barriers they encounter. The intervention draws on relevant psychological frameworks and theories (motivational interviewing, social cognitive, cognitive behavioural and self-determination theory) and incorporates behaviour change techniques. The intervention was personalised and this was achieved by the provision of regular one-to-one support from a physiotherapist (face-to-face and telephone) and a personal activity workbook (36 pages) that facilitated individualised goal setting, feedback, action and coping planning and monitoring of progress. **Control**

	Name: Waitlist control Protocol description: Control (waitlist control) Delivery setting: not applicable Number/ frequency of sessions: not applicable Duration: not applicable Practitioner(s): not applicable The Dorset MS Service provides multidisciplinary support. Patients are reviewed annually by the team at an outpatient clinic or home visit appointment. On completion of the review and necessary assessments, medical and therapy treatments are delivered as required. If patients experience a deterioration of their symptoms before the next review they can self-refer to the service. Education, support and advice regarding disease modifying therapies, management of symptoms and carer support is available from the specialist nurse. The team operates a helpline service Monday to Friday and messages can be left on an answerphone outside the scheduled helpline hours.
Duration of follow-up	6 months
Sources of funding	Not industry funded
Sample size	N=30 - Mii-vitaliSe + usual care: n=15 - Waitlist control: n=15

MS: multiple sclerosis; N/n: number of participants; SD: standard deviation

Outcomes

Study timepoints

- 6 months post intervention

Mii-vitaliSe + usual care versus waitlist control: Sustained participation in exercise or physical activity; Physical and mental health related quality of life and social care related quality of life; Anxiety; Depression
Sustained participation in exercise or physical activity as measured by Godin Leisure-Time Exercise Questionnaire - Polarity - Higher values are better
Physical and mental health related quality of life and social care related quality of life as measured by EQ-5D - Polarity - Higher values are better
Anxiety as measured by HADS-A - Polarity - Lower values are better
Depression as measured by HADS-D - Polarity - Lower values are better

Outcome	Mii-vitaliSe + usual care versus waitlist control, 6 months post-intervention, N=14 vs 15
Godin Leisure-Time Exercise Questionnaire Change in score from baseline Mean difference between groups (95% CI)	8.32 (−2.01 to 18.65)
EuroQol-5 Dimensions-5 Levels Change in score from baseline Mean difference between groups (95% CI)	−0.04 (-0.11 to 0.02)
HADS-Anxiety Change in score from baseline	−0.41 (-2.39 to 1.58)

Outcome	Mii-vitaliSe + usual care versus waitlist control, 6 months post-intervention, N=14 vs 15
Mean difference between groups (95% CI)	
HADS - Depression Change in score from baseline Mean difference between groups (95% CI)	−0.67 (-2.23 to 0.88)

CI: confidence interval; HADS: hospital anxiety and depression scale; N/n: number of participants

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Randomisation was carried out in a one-to-one ratio and the sequence was produced using a computer-based random sequence generator. To ensure good allocation concealment, random allocation was email-based and administered by the study statistician. Baseline characteristics of both groups look sufficiently similar, although no p-values to reinforce this.)*
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Some concerns *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. No information if ITT performed.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(5% and 0% of participants in the intervention and control groups, respectively*

Section	Question	Answer
		were lost to follow-up at the final assessment time-point; no evidence results biased by missing data.)
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	High *(The questionnaires used were all validated and widely used tools: Godin Leisure-Time Exercise Questionnaire; EQ-5D. Standardised and validated measurement tools implemented by researchers aware of allocation. Outcomes self-reported by unblinded participants via post.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

EQ-5D: EuroQol 5-dimensions; ITT: intention to treat

van Nimwegen, 2013

Bibliographic Reference	van Nimwegen, Marlies; Speelman, Arlene D; Overeem, Sebastiaan; van de Warrenburg, Bart P; Smulders, Katrijn; Dontje, Manon L; Borm, George F; Backx, Frank J G; Bloem, Bastiaan R; Munneke, Marten; Promotion of physical activity and fitness in sedentary patients with Parkinson's disease: randomised controlled trial.; BMJ (Clinical research ed.); 2013; vol. 346; f576

Study details

Country/ies where study was carried out	The Netherlands
Study type	Randomised controlled trial (RCT)

Study dates	September 2008 - January 2010
Inclusion criteria	- Parkinson’s disease according to UK Brain Bank criteria; - age 40-75 years; - sedentary lifestyle, defined as participation in physical activity of vigorous intensity less than three times a week and for less than 60 minutes in total per week or participation in moderate intensity physical activity less than three times a week and for less than 150 minutes in total per week; and - Hoehn and Yahr stage 3 or lower.
Exclusion criteria	- Mini-mental state examination score less than 24/30, - inability to complete Dutch questionnaires, - co-morbidity that interfered with daily functioning, - daily institutionalised care, and - previous deep brain surgery.
Patient characteristics	N=700* adults with Parkinson’s disease - ParkFit programme: n=350 - General physiotherapy programme: n=350 Age in years [Mean (SD)]:

	- ParkFit programme: 65.1 (7.9) - General physiotherapy programme: 65.9 (7.2) Sex (M/F): - ParkFit programme: n=194/n=105 - General physiotherapy programme: n=188/n=99 Time since diagnosis in years [Mean (SD)]: - ParkFit programme: 5.0 (4.5) - General physiotherapy programme: 5.5 (4.6) Chronic neurological disorder category: Progressive neurological diseases *Baseline data only available for n=299 and n=287 in the ParkFit programme and general physiotherapy programme, respectively
Intervention(s)/control	**Intervention** Name: ParkFit programme Protocol description: Person intrinsic approaches, including behaviour change and coaching Delivery setting: Community hospital

	Number/frequency of sessions: Year 1: Max 19 physical therapy sessions; 16 coaching sessions. Year 2: Max 23 physical therapy sessions; 12 coaching sessions Duration: 2 years Practitioner: Experienced therapists who participate in the Dutch Parkinson Net 1) Brochure ParkFit Patients receive a brochure covering specific strategies to promote a behavioural change. These strategies include: Education about the benefits of physical activity, advice about suitable activities, identifying and overcoming any perceived barriers to engage in physical activity, setting goals, and recruiting social support. Part of the educational workbook is a health contract: a written agreement signed by the patient and physiotherapist to support them in initiating and maintaining physical activities. A logbook monitors the specific goals. 2) Personal Activity Coach Physical therapists serve as personal activity coaches who guide patients towards a more active lifestyle, during specific coaching sessions. Their task is to educate patients about the beneficial effects of physical activity. Patients are additionally stimulated to participate in group exercise to experience the beneficial effects of physical activity and to receive social support from fellow patients. For safety reasons, all patients are encouraged to receive a preventive sports medical screening. 3) Goal setting Patient and coach create activity goals in order to obtain the 6-month-goals (as formulated in the health contract). Goals have to be realistic, concrete and individualized and have to be formulated in a systematic way, based on behavioural change theories.

	4) Ambulatory Activity Monitor with visual feedback Patients receive a personal ambulatory monitor with automated visual feedback showing the amount of actually delivered daily physical activity, recorded by a triaxial accelerometer. Additionally, a personalized website shows the activity history. Previous work showed that feedback from pedometers increases physical activity levels in COPD patients, sedentary workers and patients with diabetes mellitus. **Control** Name: General physiotherapy programme Protocol description: Control (usual care) Delivery setting: Community hospital Number/ frequency of sessions: Year 1: Max 35 physical therapy sessions. Year 2: Max 35 physical therapy sessions Duration: 2 years Practitioner(s): Experienced therapists who participate in the Dutch Parkinson Net 1) Brochure ParkSafe Patients receive a brochure with information about the benefits of physical therapy. Specific emphasis is given to the importance of safety when performing daily activities. 2) Physical therapy Patients receive an individualized physical therapy program. We maximized the total number of sessions at 35/year, to avoid large differences in number of treatment sessions between the two arms (patients in the ParkFit arm also receive

	35 annual sessions: 19 physiotherapy plus 16 coach sessions). 35 sessions is considered sufficient for patients in Hoehn and Yahr stage ≤ 3. Physical therapist and patient jointly formulate the aims of the projected treatment plan, based on individual problems and disabilities. The aims of the physical therapy sessions in both treatment arms are derived from the guideline for physical therapy in PD.
Duration of follow-up	Post-intervention
Sources of funding	Not industry funded.
Sample size	N=700 ParkFit programme; n=350 General physiotherapy programme; n=350

N/n: number of participants; SD: standard deviation

Outcomes

Study timepoints

- Post intervention (2 years from baseline)

ParkFit programme versus general physiotherapy programme: Sustained participation in exercise or physical activity; Physical and mental health related quality of life and social care related quality of life
Sustained participation in exercise or physical activity as measured by LASA physical activity questionnaire - Polarity - Higher values are better
Sustained participation in exercise or physical activity as measured by Activity monitor (accelerometer kcal/day) - Polarity - Higher values are better
Physical and mental health related quality of life and social care related quality of life as measured by PDQ-39 - Polarity - Lower values are better

Outcome	ParkFit programme versus general physiotherapy programme, post-intervention, LASA N=273 vs 267; Activity monitor N=254 vs 258; PDQ-39 N=278 vs 276
LASA physical activity questionnaire Estimated relative difference between groups, based on mixed model analysis (95% CI)	7% (−3% to 17%); p-value 0.19
Activity monitor (accelerometer kcal/day) Estimated relative difference between groups, based on mixed model analysis (95% CI)	12% (7% to 16%); p-value <0.001
PDQ-39 post-intervention Estimated (relative) mean difference, based on analysis of covariance (95% CI)	-0.9 (−2.1 to 0.3)

CI: confidence interval; LASA: longitudinal aging study Amsterdam; N/n: number of participants; PDQ-39: parkinson's disease questionnaire 39

Critical appraisal

Section	Question	Answer
Domain 1: Bias arising from the randomisation process	Risk of bias judgement for the randomisation process	Low *(Minimization algorithm is used to randomize patients and allocation concealed. Baseline characteristics balanced at baseline, although ParkFit patients tended to be less active than controls in daily life.)*

Section	Question	Answer
Domain 2a: Risk of bias due to deviations from the intended interventions (effect of assignment to intervention)	Risk of bias for deviations from the intended interventions (effect of assignment to intervention)	Low *(Although participants and personnel were aware of interventions allocated, there were no deviations from intended interventions. ITT analyses were used.)*
Domain 3. Bias due to missing outcome data	Risk-of-bias judgement for missing outcome data	Some concerns *(9% and 7% of participants in the intervention and control groups, respectively were lost to follow-up at the final assessment time-point; all results were biased by missing data; loss to follow-up balanced between groups so missingness does not depend on true value.)*
Domain 4. Bias in measurement of the outcome	Risk-of-bias judgement for measurement of the outcome	Some concerns *(The questionnaires used were all validated and widely used tools: LASA physical activity questionnaire, PDQ-39. Standardised and validated measurement tools implemented by researchers blinded to allocation, however outcomes subjective and participants aware of allocation.)*
Domain 5. Bias in selection of the reported result	Risk-of-bias judgement for selection of the reported result	Low *(Published protocol available.)*
Overall bias and Directness	Risk of bias judgement	High
Overall bias and Directness	Overall Directness	Directly applicable

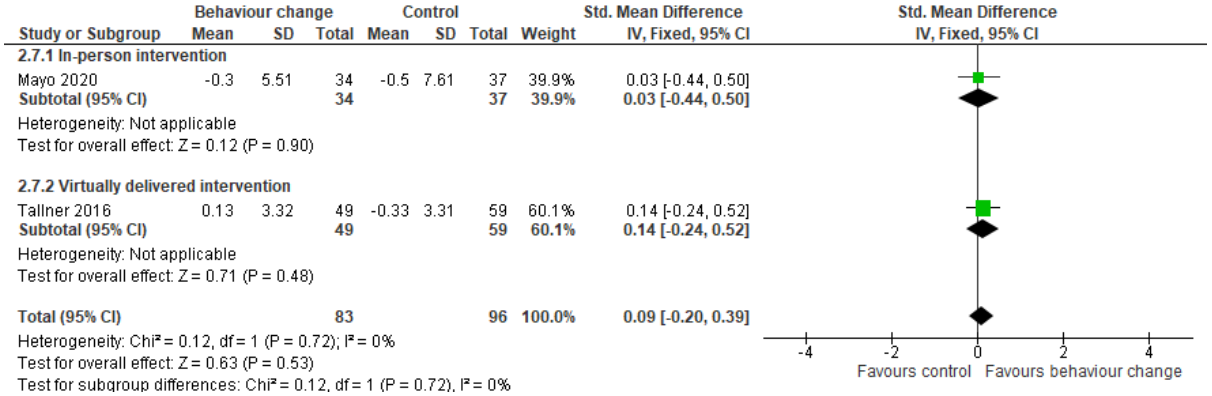
ITT: intention to treat; LASA: longitudinal aging study Amsterdam; PDQ-39: Parkinson's disease questionnaire-39

Appendix E Forest plots

Forest plots for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Evidence profile for comparison between tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist and control in adults with multiple sclerosis

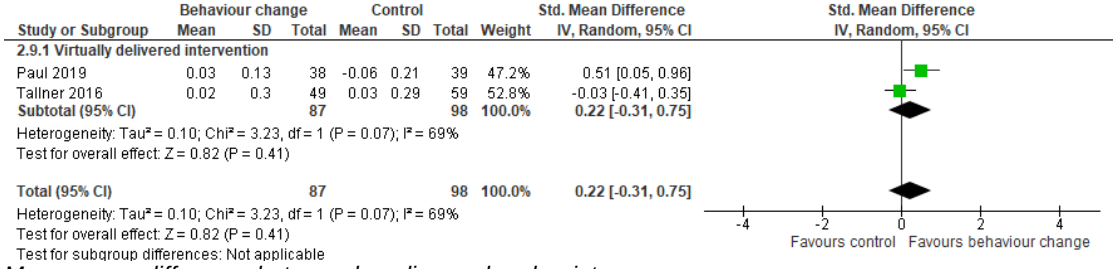
Figure 2: Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention



Mean: mean difference between baseline and end-point

CI: confidence interval; IV: inverse variance

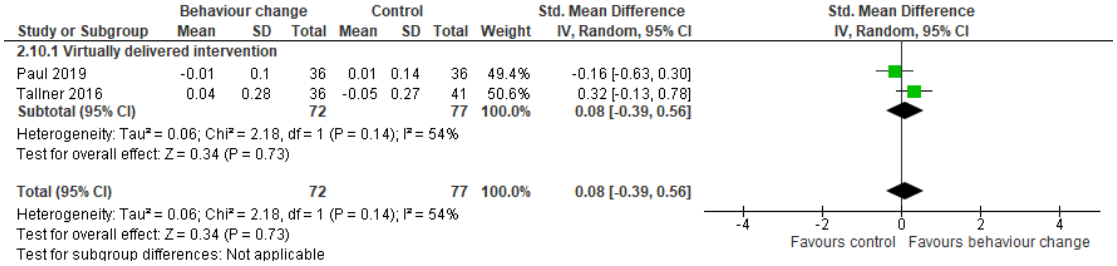
Figure 3: Physical and mental health related quality of life as measured by a validated scale at post-intervention - Virtually delivered intervention



Mean: mean difference between baseline and end-point

CI: confidence interval; IV: inverse variance

Figure 4: Physical and mental health related quality of life as measured by a validated scale at 3-months post-intervention - Virtually delivered intervention

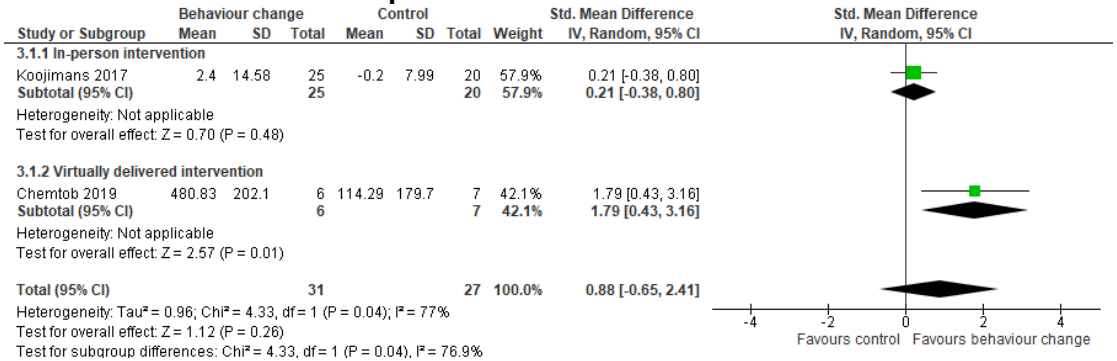


Mean: mean difference between baseline and end-point

CI: confidence interval; IV: inverse variance

Evidence profile for comparison between person intrinsic approaches, including behaviour change and coaching and control in adults with acquired spinal cord injury

Figure 5: Subjective participation in exercise or physical activity as measured by a validated scale at post-intervention

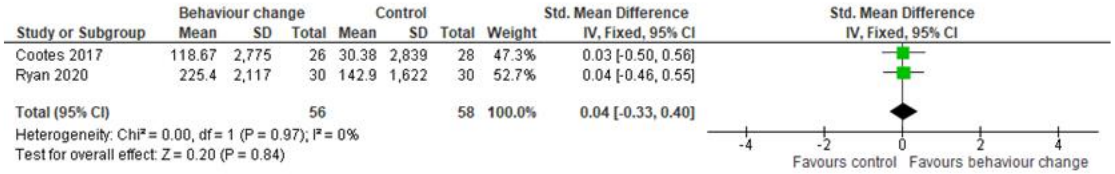


Mean: mean difference between baseline and end-point

CI: confidence interval; IV: inverse variance

Evidence profile for comparison between person intrinsic approaches, including behaviour change and coaching and control in adults with multiple sclerosis

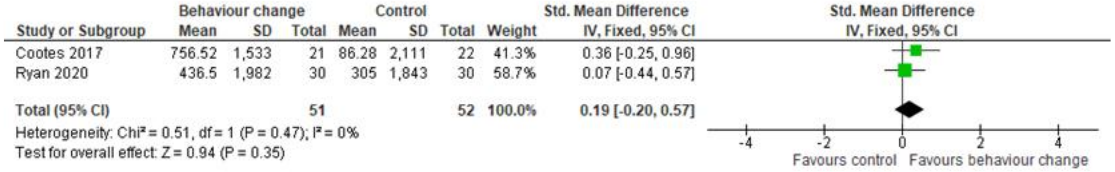
Figure 6: Objective participation in exercise or physical activity as measured by daily step count at post-intervention - In-person intervention



Mean: mean difference between baseline and end-point

CI: confidence interval; IV: inverse variance

Figure 7: Objective participation in exercise or physical activity as measured by daily step count at 6-months post-intervention - In-person intervention



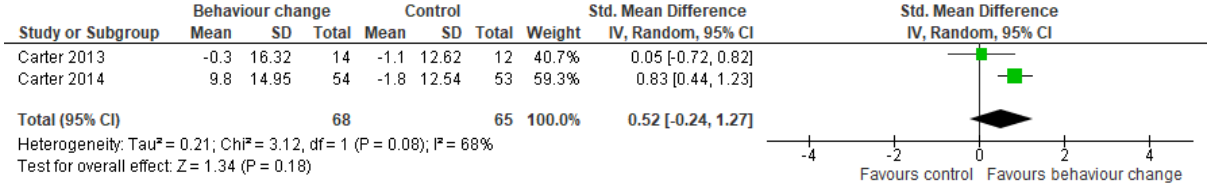
Mean: mean difference between baseline and end-point

CI: confidence interval; IV: inverse variance

Evidence profile for comparison between tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist + person

intrinsic approaches, including behaviour change and coaching and control in adults with multiple sclerosis

Figure 8: Physical and mental health related quality of life as measured by a validated scale at post-intervention - In-person intervention



Mean: mean difference between baseline and end-point

CI: confidence interval; IV: inverse variance

Appendix F GRADE tables

GRADE tables for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Table 6: Evidence profile for comparison between tailored, including condition specific, exercise programmes, delivered by a specialist health or exercise therapist and control in adults with acquired brain injury

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist	Control	Relative (95% CI)	Absolute		
Subjective participation in exercise or physical activity as measured by self-reported physical activity (MET min/week) at post-intervention – Virtually delivered intervention (Better indicated by higher values)												
1 (Gehring 2018)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	19	9	-	SMD 0.69 higher (0.12 lower to 1.51 higher)	LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention - Virtually delivered intervention (Better indicated by higher values)												
1 (Gehring 2018)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	19	9	-	Median difference 1489 higher (2219 lower to 5814 higher)[4]	VERY LOW	CRITICAL

CI: confidence interval; MET: metabolic equivalent task; SMD: standardised mean difference; VO2 peak: highest amount of oxygen consumed at peak exercise
[1] Serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[2] 95% CI crosses 1 MID (for SMD +/-0.5)
[3] Very serious imprecision due to sample size <200
[4] Differences between groups judged to be non-statistically significant according to author analysis

Table 7: Evidence profile for comparison between tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist and control in adults with multiple sclerosis

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist	Control	Relative (95% CI)	Absolute		
Objective participation in exercise or physical activity as measured by daily step count at post-intervention - Virtually delivered intervention (Better indicated by higher values)												
1 (Paul 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	33	35	-	SMD 0.27 lower (0.75 lower to 0.21 higher)	VERY LOW	CRITICAL
Objective participation in exercise or physical activity as measured by daily step count at 3-months follow-up - Virtually delivered intervention (Better indicated by higher values)												
1 (Paul 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	29	33	-	SMD 0.26 lower (0.76 lower to 0.24 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention (Better indicated by higher values)												
2*	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	83	96	-	SMD 0.09 higher (0.20 lower to 0.39 higher)	LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention - In-person intervention (Better indicated by higher values)												
1 (Mayo 2020)	randomised trials	serious[3]	no serious inconsistency	no serious indirectness	serious[2]	none	34	37	-	SMD 0.03 higher (0.44 lower to 0.50 higher)	LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention - Virtually delivered intervention (Better indicated by higher values)												

1 (Tallner 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	49	59	-	SMD 0.14 higher (0.24 lower to 0.52 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at 3-months follow-up - Virtually delivered intervention (Better indicated by higher values)												
1 (Tallner 2016)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	36	41	-	SMD 0.32 lower (0.77 lower to 0.13 higher)	VERY LOW	CRITICAL
Physical and mental health related quality of life as measured by a validated scale at post-intervention - Virtually delivered intervention (Better indicated by higher values)												
2*	randomised trials	very serious[1]	serious[4]	no serious indirectness	serious[2]	none	87	98	-	SMD 0.22 higher (0.31 lower to 0.75 higher)	VERY LOW	IMPORTANT
Physical and mental health related quality of life as measured by a validated scale at 3-months follow-up - Virtually delivered intervention (Better indicated by higher values)												
2*	randomised trials	very serious[1]	serious[4]	no serious indirectness	serious[2]	none	72	77	-	SMD 0.08 higher (0.39 lower to 0.56 higher)	VERY LOW	IMPORTANT
Anxiety symptoms as measured by HADS-A at post-intervention - Virtually delivered intervention (Better indicated by lower values)												
1 (Paul 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	38	39	-	SMD 0.09 lower (0.54 lower to 0.36 higher)	VERY LOW	IMPORTANT
Anxiety symptoms as measured by HADS-A at 3-months follow-up - Virtually delivered intervention (Better indicated by lower values)												
1 (Paul 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	36	36	-	SMD 0.05 lower (0.51 lower to 0.41 higher)	VERY LOW	IMPORTANT
Depressive symptoms as measured by HADS-D at post-intervention - Virtually delivered intervention (Better indicated by lower values)												
1 (Paul 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	38	39	-	SMD 0.18 lower (0.63 lower to 0.27 higher)	VERY LOW	IMPORTANT

Depressive symptoms as measured by HADS-D at 3-months follow-up - Virtually delivered intervention (Better indicated by lower values)												
1 (Paul 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	36	36	-	SMD 0.08 higher (0.38 lower to 0.54 higher)	VERY LOW	IMPORTANT

CI: confidence interval; HADS-A: Hospital Anxiety and Depression Scale-Anxiety; HADS-D: Hospital Anxiety and Depression Scale-Depression; MS: multiple sclerosis; SMD: standardised mean difference; VO2 peak: highest amount of oxygen consumed at peak exercise
**See corresponding forest plot*
[1] Very serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[2] 95% CI crosses 1 MID (for SMD +/-0.5)
[3] Serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[4] Serious heterogeneity (I^2 >50%)

Table 8: Evidence profile for comparison between person intrinsic approaches, including behaviour change and coaching and control in adults with acquired spinal cord injury

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Person intrinsic approaches, including behaviour change and coaching**	**Control**	**Relative (95% CI)**	**Absolute**		
Subjective participation in exercise or physical activity as measured by a validated scale at post-intervention (Better indicated by higher values)												
2*	randomised trials	very serious[1]	serious[2]	no serious indirectness	very serious[3]	none	31	27	-	SMD 0.88 higher (0.65 lower to 2.41 higher)	VERY LOW	CRITICAL
Subjective participation in exercise or physical activity as measured by Physical Activity Scale for Individuals with Physical Disabilities (MET hr/ week) at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	25	20	-	SMD 0.21 higher (0.38 lower to 0.80 higher)	VERY LOW	CRITICAL

Subjective participation in exercise or physical activity as measured by Leisure-Time Physical Activity Questionnaire (min/week aerobic + strength training) at post-intervention – Virtual delivered intervention (Better indicated by higher values)												
1 (Chemtob 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	6	7	-	SMD 1.79 higher (0.43 to 3.16 higher)	VERY LOW	CRITICAL
Subjective participation in exercise or physical activity as measured by physical activity scale for individuals with physical disabilities (MET hr/day) at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Nooijen 2016)**	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	13	14	-	SMD 0.88 higher (0.08 to 1.68 higher)	VERY LOW	CRITICAL
Subjective participation in exercise or physical activity as measured by physical activity scale for individuals with physical disabilities (MET hr/ week) at 26-weeks follow-up – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	21	16	-	SMD 0.52 higher (0.14 lower to 1.18 higher)	VERY LOW	CRITICAL
Subjective participation in exercise or physical activity as measured by physical activity scale for individuals with physical disabilities (MET hr/day) at 6-months follow-up – In-person intervention (Better indicated by higher values)												
1 (Nooijen 2016)**	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	10	10	-	SMD 1.25 higher (0.27 to 2.23 higher)	VERY LOW	CRITICAL
Objective participation in exercise or physical activity as measured by minutes of active wheelchair driving (min/day) at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	10	17	-	SMD 0.01 higher (0.77 lower to 0.79 higher)	VERY LOW	CRITICAL
Objective participation in exercise or physical activity as measured by minutes of wheeled physical activity (min/day) at post-intervention – In-person intervention (Better indicated by higher values)												

1 (Nooijen 2016)**	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	13	14	-	SMD 2.03 higher (1.08 to 2.99 higher)	LOW	CRITICAL
Objective participation in exercise or physical activity as measured by minutes of active wheelchair driving (min/day) at 26-weeks follow-up – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	9	15	-	SMD 0.31 higher (0.52 lower to 1.14 higher)	VERY LOW	CRITICAL
Objective participation in exercise or physical activity as measured by minutes of wheeled physical activity (min/day) at 6-months follow-up – In-person intervention (Better indicated by higher values)												
1 (Nooijen 2016)**	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	10	10	-	SMD 1.37 higher (0.38 to 2.37 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	18	18	-	SMD 0.02 higher (0.64 lower to 0.67 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Nooijen 2017)**	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	13	14	-	SMD 0.09 lower (0.85 lower to 0.66 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at 26-weeks follow-up – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	15	15	-	SMD 0.15 higher (0.57 lower to 0.87 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at 3-months follow-up – In-person intervention (Better indicated by higher values)												

1 (Nooijen 2017)**	randomised trials	very serious	no serious inconsistency	no serious indirectness	very serious[3]	none	10	10	-	SMD 0.3 lower (1.18 lower to 0.58 higher)	VERY LOW	CRITICAL
Physical and mental health related quality of life as measured by World Health Organization Quality of Life Assessment at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	21	21	-	SMD 0.24 higher (0.37 lower to 0.85 higher)	VERY LOW	IMPORTANT
Physical and mental health related quality of life as measured by World Health Organization Quality of Life Assessment at 26-weeks follow-up – In-person intervention (Better indicated by higher values)												
1 (Kooijmans 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[4]	none	17	14	-	SMD 0.87 higher (0.13 to 1.62 higher)	VERY LOW	IMPORTANT

CI: confidence interval; MET: metabolic equivalent task; SMD: standardised mean difference; SCI: spinal cord injury; VO2 peak: highest amount of oxygen consumed at peak exercise
**See corresponding forest plot*
***Nooijen 2016/2017 reported the overall results as SMD without changes in mean score and variance from baseline so unable to meta-analyse alongside the other studies.*
[1] Very serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[2] Serious heterogeneity (I^2 >50%)
[3] 95% CI crosses 2 MIDs (for SMD +/-0.5)
[4] 95% CI crosses 1 MID (for SMD +/-0.5)

Table 9: Evidence profile for comparison between person intrinsic approaches, including behaviour change and coaching and control in adults with Huntington's disease

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Person intrinsic approaches, including behaviour change and coaching**	**Control**	**Relative (95% CI)**	**Absolute**		
Subjective participation in exercise or physical activity as measured by International Physical Activity Questionnaire at post-intervention – In-person intervention (Better indicated by higher values)												

1 (Busse 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	21	-	SMD 0.29 higher (0.38 lower to 0.95 higher)	VERY LOW	CRITICAL
Physical and mental health related quality of life as measured by EQ-5D at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Busse 2017)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	17	23	-	SMD 0.72 higher (0.08 to 1.37 higher)	VERY LOW	IMPORTANT

CI: confidence interval; EQ-5D: EuroQol; SMD: standardised mean difference
[1] Very serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[2] 95% CI crosses 1 MID (for SMD +/-0.5)

Table 10: Evidence profile for comparison between person intrinsic approaches, including behaviour change and coaching and control in adults with Parkinson's disease

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Person intrinsic approaches, including behaviour change and coaching**	**Control**	**Relative (95% CI)**	**Absolute**		
Subjective participation in exercise or physical activity as measured by LASA physical activity questionnaire at post-intervention – In-person intervention (Better indicated by higher values)												
1 (van Nimwegen 2013)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	273	267	-	Estimated relative difference between groups, based on mixed model analysis (95% CI) = 7% (−3% to 17%); p-value 0.19[2]	LOW	CRITICAL
Objective participation in exercise or physical activity as measured by accelerometer (kcal/day) at post-intervention – In-person intervention (Better indicated by higher values)												
1 (van Nimwegen 2013)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	254	258	-	Estimated relative difference between groups, based on analysis of covariance (95% CI)	LOW	CRITICAL

										= 12% (7% to 16%) p-value <0.001[3]		
Physical and mental health related quality of life as measured by PDQ-39 at post-intervention – In-person intervention (Better indicated by lower values)												
1 (van Nimwegen 2013)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	278	276	-	MD* 0.9 lower (2.1 lower to 0.3 higher)	LOW	IMPORTANT

CI: confidence interval; LASA: longitudinal aging study Amsterdam; MD: mean difference; PDQ-39; Parkinson's Disease Questionnaire – 39
**van Nimwegen 2013 reported results as MD between groups at endpoint, unable to convert to SMD in RevMan therefore reported as MD*
[1] Very serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[2] Differences between groups judged to be non-statistically significant according to author analysis
[3] Differences between groups judged to be statistically significant according to author analysis, favouring person intrinsic approaches. Clinical significance could not be determined.

Table 11: Evidence profile for comparison between person intrinsic approaches, including behaviour change and coaching and control in adults with multiple sclerosis

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Person intrinsic approaches, including behaviour change and coaching versus control in MS**	**Control**	**Relative (95% CI)**	**Absolute**		
Subjective participation in exercise or physical activity as measured by a validated scale at post-intervention - In-person intervention (Better indicated by higher values)												
1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	26	28	-	SMD 0.18 lower (0.71 lower to 0.36 higher)	LOW	CRITICAL
Subjective participation in exercise or physical activity as measured by a validated scale at 6-months follow-up - In-person intervention (Better indicated by higher values)												
1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	21	22	-	SMD 0.07 lower (0.67 lower to 0.53 higher)	VERY LOW	CRITICAL

Subjective participation in exercise or physical activity as measured by Godin Leisure Time Exercise Questionnaire at 6-months follow-up - Virtual delivered intervention (Better indicated by higher values)												
1 (Thomas 2017)	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[5]	none	14	15	-	MD** 8.32 higher (2.01 lower to 18.65 higher)	VERY LOW	CRITICAL
Objective participation in exercise or physical activity as measured by daily step count at post-intervention - In-person intervention (Better indicated by higher values)												
2*	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	no serious imprecision	none	56	58	-	SMD 0.04 higher (0.33 lower to 0.4 higher)	LOW	CRITICAL
Objective participation in exercise or physical activity as measured by daily step count at 6-months follow-up - In-person intervention (Better indicated by lower values)												
2*	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[2]	none	51	52	-	SMD 0.19 higher (0.2 lower to 0.57 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention - In-person intervention (Better indicated by higher values)												
1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	26	28	-	SMD 0.05 lower (0.58 lower to 0.49 higher)	LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at 6-months follow-up - In-person intervention (Better indicated by higher values)												
1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	21	22	-	SMD 0.46 higher (0.14 lower to 1.07 higher)	LOW	CRITICAL
Physical and mental health related quality of life as measured by a EuroQol-5 at 6-months follow-up - Virtual delivered intervention (Better indicated by higher values)												
1 (Thomas 2017)	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[5]	none	14	15	-	MD** 0.04 lower (0.11 lower to 0.02 higher)	VERY LOW	IMPORTANT
Anxiety symptoms as measured by HADS-A at post-intervention - In-person intervention (Better indicated by lower values)												

1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	26	28	-	SMD 0.37 lower (0.91 lower to 0.17 higher)	LOW	IMPORTANT
Anxiety symptoms as measured by HADS-A at 6-months follow-up - In-person intervention (Better indicated by lower values)												
1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	21	22	-	SMD 0.24 lower (0.84 lower to 0.36 higher)	LOW	IMPORTANT
Anxiety symptoms as measured by HADS-A at 6-months follow-up - Virtual delivered intervention (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[5]	none	14	15	-	MD** 0.41 lower (2.39 lower to 1.58 higher)	LOW	IMPORTANT
Depressive symptoms as measured by HADS-D at post-intervention - In-person intervention (Better indicated by lower values)												
1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	26	28	-	SMD 0.06 lower (0.60 lower to 0.47 higher)	LOW	IMPORTANT
Depressive symptoms as measured by HADS-D at 6-months follow-up - In-person intervention (Better indicated by lower values)												
1 (Coote 2017)	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	21	22	-	SMD 0.29 lower (0.89 lower to 0.32 higher)	LOW	IMPORTANT
Depressive symptoms as measured by HADS-D at 6-months follow-up - Virtual delivered intervention (Better indicated by lower values)												
1 (Thomas 2017)	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[5]	none	14	15	-	MD** 0.67 lower (2.23 lower to 0.88 higher)	VERY LOW	IMPORTANT

CI: confidence interval; HADS-A: Hospital Anxiety and Depression Scale-Anxiety; HADS-D: Hospital Anxiety and Depression Scale-Depression; MD: mean difference; SMD: standardised mean difference; VO2 peak: highest amount of oxygen consumed at peak exercise

**See corresponding forest plot*

***Thomas 2017 reported results as MD between groups at endpoint, unable to convert to SMD in RevMan therefore reported as MD*

[1] Serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2

[2] 95% CI crosses 1 MID (for SMD +/-0.5)

[3] 95% CI crosses 2 MIDs (for SMD +/-0.5)

[4] Very serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[5] 95% CI crosses 1 MID (0.5x control group SD for: subjective participation in exercise or physical activity at 6-months follow-up – virtual = +/-6; EuroQOL at 6-months follow-up – virtual = +/-0.045; HADS-A at 6-months follow-up – virtual = +/-1.64; HADS-D at 6-months follow-up – virtual = +/-1.42)

Table 12: Evidence profile for comparison between tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist + person intrinsic approaches, including behaviour change and coaching and control in adults with acquired spinal cord injury

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist + person intrinsic approaches, including behaviour change and coaching	Control	Relative (95% CI)	Absolute		
Subjective participation in exercise or physical activity as measured by Leisure Time Physical Activity Questionnaire at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Ma 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	14	14	-	SMD 1.36 higher (0.53 to 2.19 higher)	VERY LOW	CRITICAL
Objective participation in exercise or physical activity as measured by minutes of wheeled physical activity (min/day) at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Ma 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	14	14	-	SMD 0.71 higher (0.06 lower to 1.48 higher)	VERY LOW	CRITICAL
Objective cardiorespiratory fitness as measured by VO2 peak at post-intervention – In-person intervention (Better indicated by higher values)												
1 (Ma 2019)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	14	14	-	SMD 0.78 higher (0.01 to 1.56 higher)	VERY LOW	CRITICAL

CI: confidence interval; SMD: standardised mean difference; VO2 peak: highest amount of oxygen consumed at peak exercise
[1] Very serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[2] 95% CI crosses 1 MID (for SMD +/-0.5)

Table 13: Evidence profile for comparison between tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist + person intrinsic approaches, including behaviour change and coaching and control in adults with multiple sclerosis

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Tailored, including condition specific exercise programmes, delivered by a specialist health or exercise therapist + person intrinsic approaches, including behaviour change and coaching	Control	Relative (95% CI)	Absolute		
Subjective participation in exercise or physical activity as measured by Godin Leisure Time Exercise Questionnaire at post-intervention - In-person intervention (Better indicated by higher values)												
1 (Carter 2013)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	14	12	-	SMD 0.01 lower (0.78 lower to 0.76 higher)	VERY LOW	CRITICAL
Subjective participation in exercise or physical activity as measured by Godin Leisure Time Exercise Questionnaire at post-intervention - In-person intervention (Better indicated by higher values)												
1 (Carter 2014)**	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	54	53	-	SMD 0.51 higher (0.12 to 0.90 higher)	VERY LOW	CRITICAL
Subjective participation in exercise or physical activity as measured by Godin Leisure Time Exercise Questionnaire at 3-months post-intervention - In-person intervention (Better indicated by higher values)												
1 (Carter 2013)	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	12	12	-	SMD 0.21 higher (0.59 lower to 1.01 higher)	VERY LOW	CRITICAL

Subjective participation in exercise or physical activity as measured by Godin Leisure Time Exercise Questionnaire at 6-months post-intervention - In-person intervention (Better indicated by higher values)												
1 (Carter 2014)**	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	49	50	-	SMD 0.36 higher (0.03 lower to 0.75 higher)	VERY LOW	IMPORTANT
Physical and mental health related quality of life as measured by a MSQOL-54 scale at post-intervention - In-person intervention (Better indicated by higher values)												
2*	randomised trials	very serious[1]	serious[4]	no serious indirectness	serious[3]	none	68	65	-	SMD 0.52 higher (0.24 lower to 1.27 higher)	VERY LOW	IMPORTANT
Physical and mental health related quality of life as measured by a MSQOL-54 scale at 3-months post-intervention - In-person intervention (Better indicated by higher values)												
1 (Carter 2013)***	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	12	12	-	SMD 0.28 lower (1.08 lower to 0.53 higher)	VERY LOW	IMPORTANT
Physical and mental health related quality of life as measured by a MSQOL-54 scale at 6-months post-intervention- In-person intervention (Better indicated by higher values)												
1 (Carter 2014)***	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	49	50	-	SMD 0.68 higher (0.27 to 1.08 higher)	VERY LOW	IMPORTANT

CI: confidence interval; MD: mean difference; MSQOL 54: multiple sclerosis quality of life-54; SMD: standardised mean difference
**See corresponding forest plot*
***For subjective participation in exercise or physical activity, Carter 2014 reported the overall results as MD without changes in mean score and variance from baseline and therefore unable to meta-analyse with Carter 2013*
****For physical and mental health related quality of life at 6-months, Carter 2013 and Carter 2014 were not meta-analysed as there was very serious heterogeneity (I^2>80%)*
[1] Very serious risk of bias in the evidence contributing to the outcomes as per Cochrane RoB2
[2] 95% CI crosses 2 MIDs (for SMD +/-0.5)
[3] 95% CI crosses 1 MID (for SMD +/-0.5)
[4] Serious heterogeneity (I^2 >50%)

Appendix G Economic evidence study selection

Study selection for: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Please see Supplement 2 for details on search that was undertaken and study selection.

Appendix H Economic evidence tables

Economic evidence tables for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Table 14: Economic evidence table for exercise intervention (EXIMS) in adults with multiple sclerosis

Study country and type	Intervention and comparator	Study population, design and data sources	Costs and outcomes (descriptions and values)	Results	Comments
Tosh 2014 UK Cost-utility analysis Source of funding: Multiple Sclerosis Society in the UK	The pragmatic exercise intervention (EXIMS) plus usual care group - 12-week exercise programme which included supervised sessions at an exercise facility near the hospital as well as self-directed exercise sessions at home, -Cognitive-behavioural techniques such as goal setting, finding social support, and understanding the costs and benefits of exercise were incorporated to encourage long-term participation in physical activity.	People with multiple sclerosis (MS), the majority with relapsing-remitting type Mean age (years) -Intervention: 45.7 (SD: 9.1) - Usual care: 46.0 (SD: 8.4) Economic evaluation alongside an RCT (Carter 2013 and 2014) Source of baseline data: RCT (N=120) Source of effectiveness data: RCT (N=72)	Costs: - Intervention (staff, equipment, overheads), - Primary care (GP, NHS community health visit), - Secondary care (neurology outpatient visits, neurology inpatient visits, hospitalisation, accident and emergency visits), - Social care (social care visits). Mean cost per participant over 9 months: Intervention: £1,398 (SD: £337)	ICER: £10,137 per QALY gained Probability of being cost-effective: 0.75 at £20k/QALY Subgroup analysis: Stratified by EDSS score at baseline - EDSS < 4.0 (less severe disease) - intervention was dominated, probability cost-effective 0.18 at £20k/QALY - EDSS ≥ 4.0 (more severe disease) - ICER £5,092/QALY, probability cost-effective 0.80 at £20k/QALY	Perspective: NHS and PSS Currency: UK£ Cost year: 2011 Time horizon: 9 months Discounting: NA Applicability: Directly Limitations: Minor

Study country and type	Intervention and comparator	Study population, design and data sources	Costs and outcomes (descriptions and values)	Results	Comments
	Comparator: Usual care only which was not defined	Source of resource use data: RCT study participants (N=82) Source of unit cost data: National sources (PSSRU, NHS Reference Costs)	Control: £932 (SD: £225) Difference: £466 (95% CI: –£273 to £1,310) Primary measure of outcome: QALYs (EQ-5D-3L) Mean QALYs per participant over 9 months: Intervention: 0.538 (SD: 0.021) Control: 0.492 (SD: 0.028) Difference: 0.046 (95% CI: –0.022 to 0.115)	Stratified by GLTEQ score at baseline - GLTEQ ≥ 14 (more physically active) - £9,558/QALY, probability cost-effective 0.65 at £20k/QALY - GLTEQ < 14 (less physical active) - £11,470/QALY, probability cost-effective 0.63 at £20k/QALY Sensitivity analysis: - Private provision of intervention at £495 per patient per programme, (base case = £375): ICER £11,938/QALY, probability cost-effective 0.67 at £20k/QALY - The use of SF-6D utility scores: ICER £19,783/QALY, probability cost-effective 0.50 at £20k/QALY	

Abbreviations: EDSS: Expanded Disability Status Scale, EQ-5D-3L: EuroQol 5 Dimensions 3 Level, GP: General Practitioner, GLTEQ: Godin Leisure-Time Exercise Questionnaire, ICER: Incremental Cost-Effectiveness Ratio, k: thousand, MS: Multiple Sclerosis, N: Number of people, NA: Not Applicable, NHS: National Health Service, PSS: Person Social Services, PSSRU: Personal Social Services Research Unit, QALY: Quality-Adjusted Life Year, RCT: Randomised Controlled Trial, SD: Standard Deviation, UK: United Kingdom

Appendix I Economic model

Economic model for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

No economic analysis was conducted for this review question.

Appendix J Excluded studies

Excluded studies for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

Excluded effectiveness studies

Table 15: Excluded studies and reasons for their exclusion –

Study	Reason for exclusion
Adamson, Brynn C, Learmonth, Yvonne C, Kinnett-Hopkins, Dominique et al. (2016) Feasibility study design and methods for Project GEMS: Guidelines for Exercise in Multiple Sclerosis. Contemporary clinical trials 47: 32-9	- Country Study conducted in the US.
Ahern, Leanne, Timmons, Suzanne, Lamb, Sarah E et al. (2024) A systematic review of Behaviour Change Interventions to improve exercise self-efficacy and adherence in people with Parkinson's disease using the Theoretical Domains Framework. Journal of frailty, sarcopenia and falls 9(1): 66-68	- Study design (adults) Systematic review with 4/11 randomised controlled trials, 2/11 non-randomised controlled trials (in adults), and 5/11 single arm studies. Randomised controlled trials were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.
Arbour-Nicitopoulos, Kelly P, Sweet, Shane N, Lamontagne, Marie-Eve et al. (2017) A randomized controlled trial to test the efficacy of the SCI Get Fit Toolkit on leisure-time physical activity behaviour and social-cognitive processes in adults with spinal cord injury. Spinal cord series and cases 3: 17044	- Intervention Education intervention, not tailored, condition specific exercise programmes, delivered by a specialist health or exercise therapist (e.g. group exercise programme, person intrinsic approaches, or social prescribing) for promoting physical activity as outlined in the protocol.
Brauer, Sandra G; Lamont, Robyn M; O'Sullivan, John D (2024) A physiotherapy group exercise and self-management approach to improve physical activity in people with mild-moderate Parkinson's disease: a randomized controlled trial. Trials 25(1): 76	- Other protocol criteria Published protocol.
Butzer, John F, Kozlowski, Allan J, Hern, Rachel et al. (2023) Randomized Trial of Two Exercise Programs to Increase Physical Activity and Health-Related Quality of Life for Persons With Spinal Cord Injury. Topics in spinal cord injury rehabilitation 29(4): 51-60	- Country Study conducted in the US.
Casey, Blathin, Coote, Susan, Hayes, Sara et al. (2018) Changing Physical Activity Behavior in People With Multiple Sclerosis: A Systematic Review and Meta-Analysis. Archives of physical medicine and rehabilitation 99(10): 2059-2075	- Country Systematic review with 11/14 of the included studies conducted in the US, 2/14 in the UK, and 1/14 in Ireland. British and Irish studies were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.

Study	Reason for exclusion
Edwards, Thomas, Michelsen, Anne Sophie, Fakolade, Afolasade O et al. (2022) Exercise training improves participation in persons with multiple sclerosis: A systematic review and meta-analysis. Journal of sport and health science 11(3): 393-402	- Publication date Systematic review with 10/23 studies published pre-2013. Studies published 2013 onwards were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.
Ellis, Terry D, Cavanaugh, James T, DeAngelis, Tamara et al. (2019) Comparative Effectiveness of mHealth-Supported Exercise Compared With Exercise Alone for People With Parkinson Disease: Randomized Controlled Pilot Study. Physical therapy 99(2): 203-216	- Country Study conducted in the US.
Froehlich-Grobe, Katherine, Lee, Jaehoon, Aaronson, Lauren et al. (2014) Exercise for everyone: a randomized controlled trial of project workout on wheels in promoting exercise among wheelchair users. Archives of physical medicine and rehabilitation 95(1): 20-8	- Country Study conducted in the US.
Froehlich-Grobe, Katherine, Lee, Jaehoon, Ochoa, Christa et al. (2022) Effectiveness and feasibility of the workout on wheels internet intervention (WOWii) for individuals with spinal cord injury: a randomized controlled trial. Spinal cord 60(10): 862-874	- Country Study conducted in the US.
Jones, Julie, Alexander, Lyndsay, Hancock, Elizabeth et al. (2021) A collaborative approach to exercise provision for people with Parkinson's - a feasibility and acceptability study of the PDConnect programme [version 2; peer review: 2 approved]. AMRC open research 2021(2): 29	- Other protocol criteria Published protocol.
Jones, Katherine, Hawke, Fiona, Newman, Jane et al. (2021) Interventions for promoting physical activity in people with neuromuscular disease. The Cochrane database of systematic reviews 5: cd013544	- Country Systematic review with 2/13 of the included studies conducted in Denmark, 3/13 in the UK, 4/13 in the US, 3/13 in the Netherlands, 1/13 in Europe. Danish, British, Dutch and pan-European studies were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.
Kim, Yumi, Mehta, Tapan, Lai, Byron et al. (2020) Immediate and Sustained Effects of Interventions for Changing Physical Activity in People with Multiple Sclerosis: Meta-analysis of Randomized Controlled Trials. Archives of physical medicine and rehabilitation 101(8): 1414-1436	- Country Systematic review with 13/24 of the included studies conducted in the US, 5/24 in the UK, 2/24 in Ireland, 1/24 in Canada, 1/24 in Switzerland, 1/24 in Germany, and 1/24 in Belgium, British, Irish, Canadian, Swiss, German, and Belgian studies were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.

Study	Reason for exclusion
Learmonth, Yvonne C, Adamson, Brynn C, Kinnett-Hopkins, Dominique et al. (2017) Results of a feasibility randomised controlled study of the guidelines for exercise in multiple sclerosis project. Contemporary clinical trials 54: 84-97	- Country Study conducted in the US.
Motl, Robert W, Backus, Deborah, Neal, Whitney N et al. (2019) Rationale and design of the STEP for MS Trial: Comparative effectiveness of Supervised versus Telerehabilitation Exercise Programs for Multiple Sclerosis. Contemporary clinical trials 81: 110-122	- Other protocol criteria Published protocol.
Motl, Robert W, Dlugonski, Deirdre, Pilutti, Lara A et al. (2015) Does the effect of a physical activity behavioral intervention vary by characteristics of people with multiple sclerosis?. International journal of MS care 17(2): 65-72	- Country Study conducted in the US.
Motl, Robert W, Hubbard, Elizabeth A, Bollaert, Rachel E et al. (2017) Randomized controlled trial of an e-learning designed behavioral intervention for increasing physical activity behavior in multiple sclerosis. Multiple sclerosis journal - experimental, translational and clinical 3(4): 2055217317734886	- Country Study conducted in the US.
Motl, Robert W, Kidwell-Chandler, Ariel, Sandroff, Brian M et al. (2023) Primary results of a phase-III, randomized controlled trial of the Behavioral Intervention for increasing Physical Activity in Multiple Sclerosis project. Multiple sclerosis (Houndmills, Basingstoke, England) 29(3): 415-426	- Country Study conducted in the US.
Motl, Robert W, Sandroff, Brian M, Benedict, Ralph H B et al. (2024) Internet-delivered lifestyle physical activity intervention for cognitive processing speed in multiple sclerosis. Contemporary clinical trials 138: 107446	- Country Study conducted in the US.
Motl, Robert W, Sandroff, Brian M, Pilutti, Lara A et al. (2023) Randomized controlled trial of the behavioral intervention for increasing physical activity in multiple sclerosis project: Secondary, patient-reported outcomes. Contemporary clinical trials 125: 107056	- Country Study conducted in the US.
Motl, Robert W, Sandroff, Brian M, Wingo, Brooks C et al. (2018) Phase-III, randomized controlled trial of the behavioral intervention for increasing physical activity in multiple sclerosis: Project BIPAMS. Contemporary clinical trials 71: 154-161	- Country Study conducted in the US.
Mulligan, Hilda, Treharne, Gareth J, Hale, Leigh A et al. (2013) Combining self-help and	- Study design (adults)

Study	Reason for exclusion
professional help to minimize barriers to physical activity in persons with multiple sclerosis: a trial of the "Blue Prescription" approach in New Zealand. Journal of neurologic physical therapy : JNPT 37(2): 51-7	Non-randomised controlled trial.
Park, A, Zid, D, Russell, J et al. (2014) Effects of a formal exercise program on Parkinson's disease: a pilot study using a delayed start design. Parkinsonism & related disorders 20(1): 106-11	- Country Study conducted in the US.
Pilutti, L A, Dlugonski, D, Sandroff, B M et al. (2014) Randomized controlled trial of a behavioral intervention targeting symptoms and physical activity in multiple sclerosis. Multiple sclerosis (Houndmills, Basingstoke, England) 20(5): 594-601	- Country Study conducted in the US.
Plow, Matthew, Bethoux, Francois, McDaniel, Corey et al. (2014) Randomized controlled pilot study of customized pamphlets to promote physical activity and symptom self-management in women with multiple sclerosis. Clinical rehabilitation 28(2): 139-48	- Country Study conducted in the US.
Rezende, Levy Silva; Lima, Markus Brendon; Salvador, Emanuel Pericles (2018) Interventions for Promoting Physical Activity Among Individuals With Spinal Cord Injury: A Systematic Review. Journal of physical activity & health 15(12): 954-959	- Country Systematic review with 3/7 of the included studies conducted in the US, 2/7 in Canada, 1/7 in the Netherlands, 1/7 in the UK. Canadian, Dutch, and British studies were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.
Ridgel, Angela L, Walter, Benjamin L, Tatsuoka, Curtis et al. (2016) Enhanced Exercise Therapy in Parkinson's disease: A comparative effectiveness trial. Journal of science and medicine in sport 19(1): 12-7	- Country Study conducted in the US.
Sajatovic, Martha, Ridgel, Angela L, Walter, Ellen M et al. (2017) A randomized trial of individual versus group-format exercise and self-management in individuals with Parkinson's disease and comorbid depression. Patient preference and adherence 11: 965-973	- Country Study conducted in the US.
Sandroff, Brian M, Klaren, Rachel E, Pilutti, Lara A et al. (2014) Randomized controlled trial of physical activity, cognition, and walking in multiple sclerosis. Journal of neurology 261(2): 363-72	- Country Study conducted in the US.
Sangelaji, Bahram, Smith, Catherin M, Paul, Lorna et al. (2016) The effectiveness of behaviour change interventions to increase physical activity participation in people with multiple sclerosis: a systematic review and	- Country Systematic review with 12/19 of the included studies conducted in the US, 5/19 in the UK, 1/19 in Australia, and 1/19 in the Netherlands.

Study	Reason for exclusion
meta-analysis. Clinical rehabilitation 30(6): 559-76	British, Australian, and Dutch studies were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.
Selles, William L, Santos, Elinaldo C, Romero, Bianka D et al. (2024) Effectiveness of gamified exercise programs on the level of physical activity in adults with chronic diseases: a systematic review. Disability and rehabilitation: 1-9	- Population Systematic review with 1/7 of the included studies in COPD, 2/7 in diabetes, 1/7 in osteoarthritis, 1/7 in cancer (not CNS), 1/7 in stroke (adults), and 1/7 in multiple sclerosis. Study conducted in multiple sclerosis was checked against protocol criteria and was either not relevant or had been separately located by the literature search and screened.
Shah, Nehal, Shrivastava, Manisha, Kumar, Sanjeev et al. (2022) Supervised, individualised exercise reduces fatigue and improves strength and quality of life more than unsupervised home exercise in people with chronic Guillain-Barre syndrome: a randomised trial. Journal of physiotherapy 68(2): 123-129	- Country Study conducted in India.
Silveira, Stephanie L, Huynh, Trinh, Kidwell, Ariel et al. (2021) Behavior Change Techniques in Physical Activity Interventions for Multiple Sclerosis. Archives of physical medicine and rehabilitation 102(9): 1788-1800	- Country Study conducted in the US.
Silveira, Stephanie L, Motl, Robert W, Sandroff, Brian M et al. (2024) Randomized Controlled Trial of the Behavioral Intervention for Physical Activity in Multiple Sclerosis Project: Response Heterogeneity and Predictors of Change. International journal of behavioral medicine	- Country Study conducted in the US.
Suh, Yoojin, Motl, Robert W, Olsen, Connor et al. (2015) Pilot Trial of a Social Cognitive Theory-Based Physical Activity Intervention Delivered by Nonsupervised Technology in Persons With Multiple Sclerosis. Journal of physical activity & health 12(7): 924-30	- Country Study conducted in the US.
Tarakci, Ela, Tarakci, Devrim, Hajebrahimi, Farzin et al. (2021) Supervised exercises versus telerehabilitation. Benefits for persons with multiple sclerosis. Acta neurologica Scandinavica 144(3): 303-311	- Country Study conducted in Turkey.
Tarakci, Ela, Yeldan, Ipek, Huseyinsinoglu, Burcu E et al. (2013) Group exercise training for balance, functional status, spasticity, fatigue and quality of life in multiple sclerosis: a randomized controlled trial. Clinical rehabilitation 27(9): 813-22	- Country Study conducted in Turkey.
Vachova, P., Fini, N.A., Wittwer, J. et al. (2023) Effectiveness of interventions to increase physical activity in adults with SCI: a systematic	- Intervention

Study	Reason for exclusion
review and meta-analysis. Disability and rehabilitation: 1-11	Systematic review with 4/15 of the included studies with non-tailored exercise interventions, 6/15 behavioural interventions, 5/15 combined exercise and behavioural interventions to increase physical activity. Behavioural interventions and combined exercise and behavioural intervention studies were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.
van der Kolk, Nicolien M, de Vries, Nienke M, Kessels, Roy P C et al. (2019) Effectiveness of home-based and remotely supervised aerobic exercise in Parkinson's disease: a double-blind, randomised controlled trial. The Lancet. Neurology 18(11): 998-1008	- Intervention Standardised aerobic exercise programme, and not an individualised exercise programme for promoting physical activity as outlined in the protocol.
Voorn, Eric L, Koopman, Fieke S, Nollet, Frans et al. (2021) Individualized Aerobic Exercise in Neuromuscular Diseases: A Pilot Study on the Feasibility and Preliminary Effectiveness to Improve Physical Fitness. Physical therapy 101(3)	- Outcomes No relevant outcomes reported. Only reports heart rate.
Watson, Paul K, Eitivipart, Aitthanatt C, Davis, Glen M et al. (2023) Effects of behaviour change interventions on physical activity in people with spinal cord injury: A systematic review and meta-analysis. Psychology of sport and exercise 67: 102408	- Country Systematic review with 4/12 of the included studies conducted in Canada, 3/12 the US, 2/12 in the UK, 2/12 in the Netherlands, and 1/12 in Malaysia. Canadian, British and Dutch studies were checked against protocol criteria and were either not relevant or had been separately located by the literature search and screened.
White, Claire M, Hadden, Robert D, Robert-Lewis, Sarah F et al. (2015) Observer blind randomised controlled trial of a tailored home exercise programme versus usual care in people with stable inflammatory immune mediated neuropathy. BMC neurology 15: 147	- Other protocol criteria Published protocol.
Williams, Alexandra M, Ma, Jasmin K, Martin Ginis, Kathleen A et al. (2021) Effects of a Tailored Physical Activity Intervention on Cardiovascular Structure and Function in Individuals With Spinal Cord Injury. Neurorehabilitation and neural repair 35(8): 692-703	- Outcomes No relevant outcomes reported. Only reports cardiac and vascular structure and function.
Wingo, Brooks C, Yang, Dershung, Davis, Drew et al. (2020) Lessons learned from a blended telephone/e-health platform for caregivers in promoting physical activity and nutrition in children with a mobility disability. Disability and health journal 13(1): 100826	- Country Study conducted in the US.
Yang, Yang, Chen, Lifeng, Yao, Jiarui et al. (2022) Early implementation of intended	- Country Study conducted in China.

Study	Reason for exclusion
exercise improves quality of life in Parkinson's disease patients. Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology 43(3): 1761-1767	

Excluded economic studies

See Supplement 2 for the list of excluded studies across all reviews.

Appendix K Research recommendations – full details

Research recommendations for review question: What is the effectiveness of rehabilitation interventions to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

K.1.1 Research recommendation

What is the effectiveness and cost effectiveness of digital applications to support access to physical activity, exercise or sport, for people with chronic neurological disorders?

K.1.2 Why this is important

Chronic neurological disorders (CND) are lifelong conditions which impact many aspects of the persons health. Living with CND may be positively impacted through participation in physical activity, exercise or sport.

Digital applications and technology are increasingly used to support participation in physical activity but their use within CND has not been explored. Their potential role in helping people with CND access and sustain increased physical activity levels (for improved mental and physical health) should be explored.

K.1.3 Rationale for research recommendation

Table 16: Research recommendation rationale

Importance to 'patients' or the population	People with CND face various barriers to participating in physical activity, exercise or sport. Digital applications may help reduce some of these barriers. Due to their condition, people with CND may be less physically active and suffer secondary health conditions due to their inactivity. Innovative digital application use may help reduce associated morbidities.
Relevance to NICE guidance	Access to physical activity was considered in this guideline and highlighted a lack of research about the use of digital applications. Research in this area would help inform future guidelines.
Relevance to the NHS	Supporting all people to participate in physical activity is a national public health priority. Digital applications may help support people with CND to improve their physical activity levels in clinically and cost-effective ways.
National priorities	Moderate
Current evidence base	This evidence review didn't include any studies on digital applications to support access to physical activity, exercise or sport, for people with chronic neurological disorders.

Equality considerations	Due to their condition, people with CND find it harder to access physical activity, exercise or sport through traditional methods. Digital applications present an opportunity to equalise access, but as they currently exist, remain inaccessible to parts of the CND community. To improve access to physical activity, exercise or sport for the CND community, research needs to consider both: • the use of digital applications in CND • how to develop digital applications that are accessible to people across the range of CND conditions

CND: chronic neurological disorders

K.1.4 Modified PICO table

Table 17: Research recommendation modified PICO table

Population	Adults and children with rehabilitation needs due to the following chronic neurological disorders: • Acquired brain injury • Acquired spinal cord injury • Acquired peripheral nerve disorders • Progressive neurological diseases • Functional neurological disorders
Intervention	Digital applications to support access to physical activity, exercise or sport, for people with chronic neurological disorders.

Comparator	Interventions compared with others in the same group or:
	• Placebo (placebo or sham)
	• Control (no intervention, waitlist, standard rehabilitation care alone, or 'usual care')
	• The same intervention (as listed under 'intervention') but varied in terms of:
	  - Frequency
	  - Intensity
	  - Timing
	  - Setting

Outcome	• Sustained participation in exercise or physical activity • Personal goal attainment • Cardiorespiratory fitness • Physical and mental health related quality of life and social care related quality of life • Anxiety • Depression

	• Cost-effectiveness (including resource use measurements and QALY estimations using a validated preference-based measure such as the EQ-5D or SF-6D)
Study design	• Experimental study with random assignment to intervention and control groups • Experimental study with non-random assignment to intervention and control groups (quasi-randomised controlled trials, non-randomised controlled trials and prospective and retrospective cohort studies) – for children and young people if unable to conduct an experimental study with random assignment to intervention and control groups
Timeframe	Long term with regular revisions, as technology develops
Additional information	None

CND: chronic neurological disorders; EQ-5D: EuroQol 5-dimensions; QALY: quality-adjusted life years; SF-6D: short-form 6-dimension