

NATIONAL INSTITUTE FOR CLINICAL EXCELLENCE

INTERVENTIONAL PROCEDURES PROGRAMME

Interventional procedures overview of division of ankyloglossia (tongue-tie) in babies with difficulty breastfeeding

Introduction

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee (IPAC) in making recommendations about the safety and efficacy of an interventional procedure. It is based on a rapid review of the medical literature and specialist opinion. It should not be regarded as a definitive assessment of the procedure.

Date prepared

This overview was prepared in February 2005.

Procedure names

- Division of ankyloglossia (tongue-tie).
- Frenulotomy.
- Frenotomy.
- Frenuloplasty.
- Lingual frenectomy.

Specialty societies

Specialist advice was sought from:

- British Association of Oral and Maxillofacial Surgeons
- British Association of Otorhinolaryngologists – Head and Neck Surgeons
- British Association of Paediatric Surgeons
- Royal College of Paediatrics and Child Health
- British Association of Plastic Surgeons
- Royal College of Midwives
- Royal College of Nursing
- Lactation Consultants of Great Britain.

Description

Indications

Ankyloglossia, also known as tongue-tie, is a congenital anomaly characterised by an abnormally short lingual frenulum, which may restrict mobility of the tongue. It varies in degree, from a mild form in which the tongue is bound only by a thin mucous membrane to a severe form in which the tongue is completely fused to the floor of the

mouth. Breastfeeding difficulties may arise as a result of the inability to suck effectively, causing sore nipples and poor infant weight gain.

Current treatment and alternatives

Many tongue-ties are asymptomatic and some may resolve spontaneously over time. If the condition is causing problems with feeding, conservative treatment includes breastfeeding advice and counselling, massaging the frenulum, and exercising the tongue. Some practitioners, however, believe that if a baby with tongue-tie has difficulty breastfeeding, surgical division of the lingual frenulum should be carried out as early as possible. This may enable the mother to continue breastfeeding rather than having to switch to artificial feeding.

What the procedure involves

If division of the tongue-tie is performed in early infancy, it is usually performed without anaesthesia, although local anaesthetic is sometimes used. In an older infant or child, however, general anaesthesia is usually required. The baby is swaddled and supported at the shoulders to stabilise the head and sharp, blunt-ended scissors are used to divide the lingual frenulum. There should be little or no blood loss and feeding may be resumed immediately.

Efficacy

One randomised controlled trial was reported, comparing division of tongue-tie with 48 hours of intensive support from a lactation consultant. The study reported that 95% (19/20) of babies had improved breastfeeding 48 hours after tongue-tie division, compared with 5% (1/20) of babies in the control group ($p < 0.001$).

In one case-series, 80% (173/215) of babies had improved breastfeeding at 24 hours after the procedure. In another case-series, 100% (123/123) babies had an improved latch after the procedure and there was a significant decrease in maternal nipple pain. In a third case-series, 100% (36/36) of babies had a normal tongue motion at 3 months.

Some of the Specialist Advisors stated that it is difficult to ascertain that any improvement in breastfeeding is actually due to the procedure.

Safety

Few adverse effects were reported. One case-series reported that 2% (4/215) of babies had an ulcer under the tongue for more than 48 hours and 0.5% (1/215) of babies had soreness for more than 24 hours. Two studies, including a total of 159 babies, stated that there were no complications.

Two studies reported that 8% (3/36) and 18% (39/215) of babies slept through the entire procedure.

The Specialist Advisors listed bleeding, infection, ulceration, pain, damage to the tongue and submandibular ducts, and recurrence of the tongue-tie as potential adverse effects of the procedure but several advisors stated that these were likely to be very rare events.

Literature review

Rapid review of literature

The medical literature was searched to identify studies and reviews relevant to division of tongue-tie in babies with difficulty breastfeeding. Searches were

conducted via the following databases, covering the period from their commencement to December 2004: MEDLINE, PREMEDLINE, EMBASE, Cochrane Library and Science Citation Index. Trial registries and the Internet were also searched. No language restriction was applied to the searches.

The following selection criteria were applied to the abstracts identified by the literature search. Where these criteria could not be determined from the abstracts the full paper was retrieved.

Inclusion criteria for identification of relevant studies

| Characteristic | Criteria |
|-----------------------|---|
| Publication type | Clinical studies included. Emphasis was placed on identifying good quality studies. Abstracts were excluded where no clinical outcomes were reported, or where the paper was a review, editorial, laboratory or animal study. Conference abstracts were also excluded because of the difficulty of appraising methodology. |
| Patient | Babies with difficult breastfeeding as a result of tongue-tie. |
| Intervention/test | Division of tongue-tie. |
| Outcome | Articles were retrieved if the abstract contained information relevant to the safety and/or efficacy. |
| Language | Non-English-language articles were excluded unless they were thought to add substantively to the English-language evidence base. |

List of studies included in the overview

This overview is based on five studies (see Table 1). One randomised controlled trial was reported, comparing division of tongue-tie with 48 hours of intensive support from a lactation consultant.¹ Three case-series were identified, including a total of 374 babies.^{2,3,4} One cross-over study, comparing division with a sham procedure, was reported as an abstract only.⁵

Existing reviews on this procedure

No systematic reviews on this procedure were identified.

Table 1 Summary of key efficacy and safety findings on division of tongue-tie in babies with difficulty breastfeeding

| Study details | Key efficacy findings | Key safety findings | Comments |
|---|---|--|---|
| <p>Hogan M (2005)¹</p> <p>Randomised controlled trial</p> <p>UK</p> <p>2002</p> <p>57 babies with tongue-tie; 40 were breastfed and 17 were bottlefed:</p> <ul style="list-style-type: none"> • 28 had tongue-tie divided (20 breastfed and 8 bottlefed) • 29 controls did not have tongue-tie divided (20 breastfed, 9 bottlefed) <p>Mean age = 20 days (range 3 to 70)</p> <p>Indications: tongue-tie and feeding problems (for breastfed babies these included latching problems, feeding continuously, painful damaged nipples, mastitis; for bottlefed babies these included very slow feeding, major dribbling problems and apparent excess wind)</p> <p>Follow-up: 4 months</p> | <p>Main outcome measures: improvement in feeding, as reported by the mother</p> <p>Improvement within 48 hours:</p> <ul style="list-style-type: none"> • Division group = 96% (27/28) • Control group = 3% (1/29) <p>p < 0.001</p> <p>Improvement within 48 hours for breastfed babies:</p> <ul style="list-style-type: none"> • Division group = 95% (19/20) • Control group = 5% (1/20) <p>p < 0.001</p> <p>The remaining 28 mothers in the control group all subsequently requested tongue-tie division. After the procedure, 96% (27/28) of babies improved (all within 48 hours, except for one baby who improved after 7 days)</p> <p>Overall improved feeding = 95% (54/57)</p> | <p>There were no problems with infection or bleeding</p> <p>Most babies cried for only a few seconds</p> | <p>Randomisation described.</p> <p>During the study period, 1866 live births were recorded, 11% (201/1866) had a tongue-tie. 44% (88/201) of babies with tongue-tie had problems feeding; 75 of these babies were breastfed.</p> <p>2% (4/201) of babies with tongue-tie were lost to follow-up (all 4 were problem-free).</p> <p>31 mothers were not enrolled into the study (11 wanted immediate division, 4 breastfed and improved over 4 weeks, 3 breastfed but had problems, 13 changed to artificial feeding).</p> <p>The controls were given intensive support, advice and help from a lactation consultant. If support and plan of care failed to produce any improvement in breastfeeding within 48 hours, division was offered.</p> <p>There was no association between tongue-tie length and feeding difficulty.</p> |

| Study details | Key efficacy findings | Key safety findings | Comments |
|---|---|--|--|
| <p>Griffiths DM (2004)²</p> <p>Case series</p> <p>UK</p> <p>1999–2001</p> <p>215 infants</p> <p>Mean age: 19 days</p> <p>Inclusion criteria: infant younger than 3 months with a tongue-tie and mother wanting to breastfeed but experiencing difficulty doing so despite professional support. Problems included poor latching, nipple trauma and continuous feeding</p> <p>Follow-up: 3 months</p> | <p>Main outcome measures: improvement in breastfeeding, as reported by the mother</p> <p>Better feeding at 24 hours = 80% (173/215)</p> <p>Increased difficulty feeding = 1% (2/215)</p> <p>Breastfeeding at 3 months = 64% (138/215)</p> <p>At 3 months, 95% (204/215) infants could poke out their tongues</p> | <p>18% (39/215) of infants remained asleep during procedure.</p> <p>Increased cry after division = 60% (128/215)</p> <p>Cried for 5 seconds or less = 26% (56/215)</p> <p>Cried for 20 seconds or less = 85% (183/215)</p> <p>Cried for more than 1 minute = 1% (2/215)</p> <p>No bleeding at all = 38% (84/215)</p> <p>Few drops of blood = 52% (113/215)</p> <p>'Small amount' of bleeding = 9% (18/215)</p> <p>Ulcer under the tongue for more than 48 hours = 1.9% (4/215)</p> <p>Soreness for more than 24 hours = 0.5% (1/215)</p> | <p>All infants whose tongue-ties were divided in the study period were screened for inclusion (n = 519).</p> <p>No anaesthetic or analgesic was used.</p> <p>The thickness, shape and percentage length of the tongue-tie were not predictors of success or failure.</p> |

| Study details | Key efficacy findings | Key safety findings | Comments |
|---|--|---|---|
| <p>Ballard JL (2002)³</p> <p>Case series</p> <p>Ohio, USA</p> <p>1998–2001</p> <p>123 infants</p> <p>Median age at presentation for poor latch = 1.2 days</p> <p>Median age at presentation for nipple pain = 2.0 days</p> <p>Indications: significant ankyloglossia (57% (70/123) presented with poor latch and 43% (53/123) presented with maternal nipple pain). Six outpatient infants presented with failure to thrive</p> <p>Follow-up: 3 days</p> | <p>Main outcome measures: maternal nipple pain (analogue scale of 1 to 10, with 1 representing extremely mild discomfort and 10 representing severe or intolerable pain), subjective descriptions of latch quality</p> <p>Mean preoperative maternal nipple pain level (measured on a scale of 0 to 10) = 6.9 Mean maternal nipple pain level immediately after the procedure = 1.2 p < 0.0001</p> <p>In all instances where poor latch was the presenting complaint, mothers reported improvement.</p> <p>3 patients stopped breastfeeding and the mother of a 4.5 month-old infant with severe failure to thrive was advised to feed him primarily formula</p> <p>83% (5/6) infants with failure to thrive resumed breastfeeding and achieved a normal rate of growth within 3 to 5 days after the procedure</p> <p>88.6% (31/35) reported more comfortable breastfeeding at routine follow-up</p> | <p>No adverse effects were reported</p> | <p>Consecutive patients.</p> <p>The 'Hazelbaker' assessment tool was used to assess lingual frenulum function.</p> <p>3.2% (88/2763) of consecutive breastfeeding infants in hospital after the birth had significant ankyloglossia. 13% (35/273) of infants attending an outpatient lactation centre had ankyloglossia.</p> <p>The outpatients had more severe complications than the inpatients, including mastitis, damaged, infected nipples, and failure to thrive.</p> <p>No anaesthesia was used.</p> <p>There was a significant correlation between function and appearance (r = 0.49, p < 0.001).</p> <p>Routine follow-up results were reported for 28% (35/123) of cases.</p> |

| Study details | Key efficacy findings | Key safety findings | Comments |
|---|--|--|---|
| <p>Masaitis NS (1996)⁴</p> <p>Case series</p> <p>Oregon, USA</p> <p>1993–1994</p> <p>36 infants</p> <p>Mean age: 5.7 days (range 1 to 24)</p> <p>Indications: problems associated with ankyloglossia included heart shaped tongue, inability to bring the tongue over the lower gum ridge, poor attachment at breast, injured nipples (maternal), frenulum attached to the tip of the tongue, previous breastfeeding failure (maternal), inadequate weight gain, clicking sound with nursing, breast abscess (maternal)</p> <p>Follow-up: 3 months</p> | <p>Main outcome measures: current feeding method, range of motion of tongue, rate of infant growth (assessed by follow-up questionnaire)</p> <p>Breastfeeding at 1 week = 89% (32/36) Breastfeeding at 3 months = 53% (19/36)</p> <p>(2 mothers who weaned early did so owing to continued difficulty with breastfeeding)</p> <p>Normal range of motion of the tongue at 3 months = 100% (36/36)</p> <p>Problem resolved at 1 week = 75% (27/36) Problem resolved at 3 months = 100% (36/36)</p> <p>Appropriate rate of infant growth at 3 months = 100% (36/36)</p> <p>Would choose the procedure again = 100% (36/36)</p> | <p>There were no complications.</p> <p>8% (3/36) of infants slept through the entire procedure</p> | <p>Patients were selected from a Mother-Baby programme (a programme that follows up 3- to 5-day old infants) population, which included all primiparous and multiparous women with problems.</p> <p>From a population of 2450 breastfeeding women, 36 (1.5%) frenotomies were performed. An additional five infants were identified as having ankyloglossia but had no problems feeding and did not have the procedure.</p> <p>No anaesthesia was used.</p> |
| <p>Dolberg S (2002)⁵</p> <p>Prospective trial with cross-over of frenotomy</p> <p>12 infants</p> <p>Indications: ankyloglossia and breastfeeding difficulties (inadequate latching, sore nipples, or both)</p> | <p>Main outcome measures: standardised latch score (10 points maximum difficulties) and pain score (10 points maximum pain) were obtained from the mother. The scores were combined to give an overall score</p> <p>The combined score favoured the frenotomy procedure ($p = 0.012$)</p> | <p>None reported</p> | <p>Abstract only.</p> <p>Each infant was randomised to one of 2 sequences: frenotomy, breastfeeding, sham, breastfeeding; or sham, breastfeeding, frenotomy, breastfeeding.</p> <p>All personnel taking care of the child, as well as the mother, were blinded to the sequence.</p> |

Validity and generalisability of the studies

- The main outcome measures in four of the five studies were subjective and based on reports by the mother.^{1,2,3,5}
- The randomised controlled trial did not attempt to blind either the mother or the investigator as to which group the baby had been allocated to.¹
- The randomised controlled trial offered division to the control group after 48 hours because it was considered unethical to withhold this option, so there was no comparison to indicate whether any of the babies would have improved spontaneously.
- The prospective cross-over trial was only reported as an abstract and included a small number of cases.⁵

Specialist advisors' opinions

Specialist advice was sought from consultants who have been nominated or ratified by their Specialist Society or Royal College.

- Most of the advisors consider the procedure to be established practice.
- A more common indication for this procedure is the treatment of speech difficulties in older children, when a general anaesthetic is used.
- Careful case selection is important to ensure that only those tongue-ties that are likely to be causing problems are divided.
- The current alternative treatment is breastfeeding advice and counselling from a lactation consultant.
- Most of the advisors believe that the potential impact of this procedure on the NHS is minor.

Issues for consideration by IPAC

There appears to be considerable controversy regarding the significance of tongue-tie in relation to breastfeeding difficulties and about the appropriate management of the condition.⁶

References

- 1 Hogan M, Westcott C, Griffiths M. A randomised, controlled trial of division of tongue-tie in infants with feeding problems. *Journal of Paediatrics and Child Health*; 2005: in press.
- 2 Griffiths DM. Do tongue ties affect breastfeeding? *Journal of Human Lactation* 2004; 20: 409–14.
- 3 Ballard JL, Auer CE, Khoury JC. Ankyloglossia: assessment, incidence, and effect of frenuloplasty on the breastfeeding dyad. *Pediatrics* 2002; 110: e63.
- 4 Masaitis NS, Kaempf JW. Developing a frenotomy policy at one medical center: a case study approach. *Journal of Human Lactation* 1996; 12: 229–32.
- 5 Dolberg S, Botzer E, Grunis E et al. A randomized, prospective, blinded clinical trial with cross-over of frenotomy in ankyloglossia: effect on breast-feeding difficulties. *Pediatric Research* 2002; 52: 822.
- 6 Messner AH, Lalakea ML. Ankyloglossia: controversies in management. *International Journal of Pediatric Otorhinolaryngology* 2000; 54: 123–31.

Appendix A: Additional papers on division of tongue-tie in babies with difficulty breastfeeding not included in the summary tables

| Article title | Number of patients/ follow-up | Comments | Direction of conclusions |
|--|---|---|---|
| Marmet C, Shell E, Marmet R. Neonatal frenotomy may be necessary to correct breastfeeding problems. <i>Journal of Human Lactation</i> 1990; 6: 117–21. | 7 babies. | Case series. | Breastfeeding was successfully established in 71% (5/7) of babies. The two failures had severe birth defects. |
| Saleh HA, Cain AJ, Mountain RE. Bipolar scissor division of tongue-tie under tubeless anesthesia. <i>The Laryngoscope</i> 1999; 109: 838–9. | 6 patients. 1 month follow-up. | Case series. Patient ages not stated. Indications for dividing the tongue-tie not stated. | Tubeless general anaesthesia used. Complete haemostasis obtained using bipolar scissors. No morbidity and all patients had gained a good range of tongue mobility at follow-up. |
| Wright JE. Tongue-tie. <i>Journal of Paediatrics and Child Health</i> 1995; 31: 276–8. | 287 patients with tongue-tie (156 divided). | Case series. Infants and children. Difficulty sucking or swallowing = 13%, speech difficulties = 32%, mechanical problems = 14%, no symptoms = 38%. | Only 1 patient in series had a neonatal 'snip'. Author concludes that a general anaesthetic is necessary. 'Despite lack of firm evidence, there may be infants with feeding problems that seem clinically to justify frenulotomy.' The appropriate age for division is when the surgeon is convinced that it needs to be done in the interest of the patient. |

Appendix B: Literature search for division of tongue-tie in babies with difficulty breastfeeding

The following search strategy was used to identify papers in Medline. A similar strategy was used to identify papers in EMBASE, Current Contents, PreMedline and all EMB databases.

For all other databases a simple search strategy using the key words in the title was employed.

| | |
|----|-------------------------------------|
| 1 | frenulotomy.tw. (5) |
| 2 | frenectomy.tw. (49) |
| 3 | frenotomy.tw. (17) |
| 4 | (tongue tie\$ adj3 surg\$).tw. (1) |
| 5 | (tongue tie\$ adj4 surg\$).tw. (2) |
| 6 | (tongue tie\$ adj5 divi\$).tw. (2) |
| 7 | tongue tie\$ surg\$.tw. (0) |
| 8 | (divi\$ adj3 ankyloglossia).tw. (0) |
| 9 | or/1-8 (71) |
| 10 | tongue tie\$.tw. (61) |
| 11 | frenulum.tw. (169) |
| 12 | fraenulum.tw. (2) |
| 13 | fraenum.tw. (7) |
| 14 | exp Lingual Frenum/ (223) |
| 15 | short fr?enulum.tw. (10) |
| 16 | ankyloglossia.tw. (140) |
| 17 | or/10-16 (494) |
| 18 | breastfe\$.tw. (5081) |
| 19 | breast fe\$.tw. (9401) |
| 20 | exp Breast Feeding/ (16198) |
| 21 | or/18-20 (20412) |
| 22 | 9 and 17 (21) |
| 23 | 9 and 21 (5) |
| 24 | 17 and 21 (24) |
| 25 | or/22-24 (42) |
| 26 | from 25 keep 1-42 (42) |