Ankyloglossia (Tongue Tie) Research Findings
Updated 2-2012

Efficacy of neonatal release of ankyloglossia: a randomized trial


BACKGROUND:
Ankyloglossia has been associated with a variety of infant-feeding problems. Frenotomy commonly is performed for relief of ankyloglossia, but there has been a lack of convincing data to support this practice.

OBJECTIVES:
Our primary objective was to determine whether frenotomy for infants with ankyloglossia improved maternal nipple pain and ability to breastfeed. A secondary objective was to determine whether frenotomy improved the length of breastfeeding.

METHODS:
Over a 12-month period, neonates who had difficulty breastfeeding and significant ankyloglossia were enrolled in this randomized, single-blinded, controlled trial and assigned to either a frenotomy (30 infants) or a sham procedure (28 infants). Breastfeeding was assessed by a pre-intervention and post intervention nipple-pain scale and the Infant Breastfeeding Assessment Tool. The same tools were used at the 2-week follow-up and regularly scheduled follow-ups over a 1-year period. The infants in the sham group were given a frenotomy before or at the 2-week follow-up if it was desired.

RESULTS:
Both groups demonstrated statistically significantly decreased pain scores after the intervention. The frenotomy group improved significantly more than the sham group (P < .001). Breastfeeding scores significantly improved in the frenotomy group (P = .029) without a significant change in the control group. All but 1 parent in the sham group elected to have the procedure performed when their infant reached 2 weeks of age, which prevented additional comparisons between the 2 groups.

CONCLUSIONS:
We demonstrated immediate improvement in nipple-pain and breastfeeding scores, despite a placebo effect on nipple pain. This should provide convincing evidence for those seeking a frenotomy for infants with significant ankyloglossia.

Immediate nipple pain relief after frenotomy in breast-fed infants with ankyloglossia: a randomized, prospective study.


PURPOSE: Ankyloglossia ("tongue-tie") occurs in nearly 5% of neonates, but its clinical significance relating to breast-feeding difficulties is controversial. We tested the hypothesis that in infants with ankyloglossia referred because of breast-feeding difficulties, frenotomy alleviates the symptoms.

METHODS: Twenty-five mothers of healthy infants with ankyloglossia were recruited because of sore nipples. Infants were randomized to either of 2 sequences: (1) frenotomy, breast-feeding, sham, breast-feeding (n = 14) or (2) sham, breast-feeding, frenotomy, breast-feeding (n = 11). The mothers as well as all personnel taking care of the child after each sham or frenotomy procedure were masked.
as to the study sequence. In every sequence, and after each sham or frenotomy procedure, a
standardized latch score and pain score were obtained from the mother.

**RESULTS:** There was a significant decrease in pain score after frenotomy than after sham (P = .001). There was also a nearly significant improvement in latch after the frenotomy in these mothers (P = .06).

**CONCLUSION:** Frenotomy appears to alleviate nipple pain immediately after frenotomy. We speculate that ankyloglossia plays a significant role in early breast-feeding difficulties, and that frenotomy is an effective therapy for these difficulties.

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**Frenulotomy for breastfeeding infants with ankyloglossia: effect on milk removal and sucking mechanism as imaged by ultrasound.**


**Source**
School of Biomedical, Biomolecular, and Chemical Sciences, University of Western Australia, Pert, West Australia, Australia. donnageddes@uwa.edu.au

**Abstract**

**OBJECTIVE:**
There is evidence that infants with ankyloglossia can experience breastfeeding difficulties including poor attachment to the breast, suboptimal weight gain, and maternal nipple pain, which may lead to early weaning of the infant. No studies have investigated the cause of these breastfeeding difficulties. The objective of this study was to determine the effectiveness of frenulotomy in infants experiencing persistent breastfeeding difficulties despite professional assistance by measuring changes in milk transfer and tongue movement during breastfeeding before and after frenulotomy.

**PATIENTS AND METHODS:**
Twenty-four mother-infant dyads (infant age: 33 +/- 28 days) that were experiencing persistent breastfeeding difficulties despite receiving professional advice were recruited. Submental ultrasound scans (Acuson XP10) of the oral cavity were performed both before and >or=7 days after frenulotomy. Milk transfer, pain, and LATCH (latch, audible swallowing, type of nipple, comfort, and hold) scores were recorded before and after frenulotomy. Infant milk intake was measured by using the test-weigh method.

**RESULTS:**
For all of the infants, milk intake, milk-transfer rate, LATCH score, and maternal pain scores improved significantly postfrenulotomy. Two groups of infants were identified on ultrasound. One group compressed the tip of the nipple, and the other compressed the base of the nipple with the tongue. These features either resolved or lessened in all except 1 infant after frenulotomy.

**CONCLUSIONS:**
Infants with ankyloglossia experiencing persistent breastfeeding difficulties showed less compression of the nipple by the tongue postfrenulotomy, which was associated with improved breastfeeding defined as better attachment, increased milk transfer, and less maternal pain. In the assessment of breastfeeding difficulties, ankyloglossia should be considered as a potential cause.

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**Tongue-tie and breastfeeding: a review of the literature.**


**Source**
Darling Downs West Moreton Health Service District. janet.edmunds@health.qld.gov.au
Abstract
In Australia, initial exclusive breastfeeding rates are 80%, reducing to 14% at 6 months. One factor that contributes to early breastfeeding cessation is infant tongue-tie, a congenital abnormality occurring in 2.8-10.7% of infants, in which a thickened, tightened or shortened frenulum is present. Tongue-tie is linked to breastfeeding difficulties, speech and dental problems. It may prevent the baby from taking enough breast tissue into its mouth to form a teat and the mother may experience painful, bleeding nipples and frequent feeding with poor infant weight gain; these problems may contribute to early breastfeeding cessation. This review of research literature analyses the evidence regarding tongue-tie to determine if appropriate intervention can reduce its impact on breastfeeding cessation, concluding that, for most infants, frenotomy offers the best chance of improved and continued breastfeeding. Furthermore, studies have demonstrated that the procedure does not lead to complications for the infant or mother.

[Neonatal tongue-tie: myths and science].
[Article in Hebrew]


Source
The Department of Neonatology and Pediatric Dentistry, Tel Aviv Medical Center, Tel Aviv, Israel. dolberg@post.tau.ac.il

Abstract
Anatomical restraining of tongue movement (tongue-tie, ankyloglossia) has been known for centuries and the subject of dozens of articles. The heated debate persists on its clinical significance and indications for treatment. Most authorities in the field of infant feeding and Lactation agree that breastfeeding problems, such as nipple pain and latching difficulties, are common signs of clinically significant tongue-tie and indications for performing a frenotomy, while the sole presence of a visible lingual frenulum is not. In contrast, the lack of a visible frenulum does not rule out the diagnosis of clinically significant tongue-tie since submucosal ties, also called "posterior tongue-tie", may interfere with efficient breastfeeding. Whether tongue-tie interferes with speech articulation to a significant extent is currently unknown. Theoretically, articulation of some consonants (e.g., /s/, /th/, /r/) would be affected by impeded tongue movement. These articulation problems are, however, Less common than tongue-tie itself, and children and adults characteristically use various compensatory techniques of mouth opening and tongue movements. When it is indicated, frenotomy is performed by lifting the tongue and snipping the frenulum with scissors. Complications of frenotomy are rare and consist mainly of self-limited minor bleeding. The significance of posterior tongue tie and the long-term effects of frenotomy performed during early infancy are unresolved issues.

A Double-Blind, Randomized, Controlled Trial of Tongue-Tie Division and Its Immediate Effect on Breastfeeding.


Source
Wessex Regional Centre for Paediatric Surgery, Southampton General Hospital, Southampton, United Kingdom.

Abstract
Abstract Aims: This study investigated if a maternally reported, immediate improvement in breastfeeding following division of tongue-tie is due to a placebo effect. Methods: This randomized controlled trial was conducted at Southampton General Hospital, Southampton, UK, in 2003-2004.
Sixty breastfed babies 5-115 days old (mean, 32 days; median, 23 days) were randomized to division (Group A) or non-division (Group B). The mother and a trained observer were blinded and assessed breastfeeding before the intervention. Fifty-seven babies were analyzed because blinding failed in three of the babies in Group A. Following the intervention, the mother’s and observer’s views were noted, and then those infants allocated to non-division had their tongue-tie divided. Results: Seventy-eight percent (21 of 27) of mothers in Group A reported an immediate improvement in feeding following the intervention, compared with 47% (14 of 30) in Group B (two-tailed $\chi^2$ p<0.02; 95% confidence interval, 6-51%). At 1-day follow-up, 90% (54 of 60) reported improved feeding following division. At 3-month follow-up, 92% (54 of 59) still reported improved feeding, with 51% (30 of 59) continuing to breastfeed. Conclusions: There is a real, immediate improvement in breastfeeding, detectable by the mother, which is sustained and does not appear to be due to a placebo effect.

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Tongue Tie and Frenotomy in the Breastfeeding Newborn.

NeoReviews. 11(9):e513-519, 2010. Knox, I

Abstract
Tongue tie or ankyloglossia has been the subject of much controversy. As defined in this review, tongue tie occurs when a common minor embryologic tissue remnant— persistence of midline sublingual tissue that usually undergoes apoptosis during embryonic development—causes restriction of normal tongue movement. Effective breastfeeding requires newborns to fine-tune their tongue movements to adapt to their mothers’ particular nipple and breast anatomy and physiology. In the presence of tongue tie, two categories of signs/symptoms arise: those related to nipple trauma and those related to ineffective breast emptying and low infant intake. Untreated tongue tie can lead to untimely weaning and its attendant health risks. Frenotomy is a safe and effective procedure to release tongue tie and improve tongue function and breastfeeding outcomes.

Summary and Conclusions
When the lingual frenum does not apoptose properly during embryologic development, the residual tissue can, in some cases, interfere with tongue function and cause a variety of breastfeeding problems that may result in early weaning and its attendant risks. Persistence of this tissue beyond infancy can interfere with full tongue function in the older child and adult. Every mother-infant dyad with breastfeeding problems, particularly the maternal symptom of nipple pain and the infant sign of failure to transfer milk despite vigorous attempts to latch and suckle, should be evaluated for tongue tie and treated if it is present. Treatment ideally should occur within 24 hours of diagnosis because of the fragility of lactation physiology in the neonatal period. Frenotomy is an effective treatment and, for thin anterior frena, is a simple and safe procedure. The procedure must be followed by skilled lactation and oral skill development support until breastfeeding is re-established. Thick posterior tongue ties are more difficult to diagnose and treat. Frenotomy is not as widely available as is needed. Because facilitating the full breastfeeding potential of all mother-baby dyads is critical to individual and public health, more practitioners need to be trained to assess tongue tie and perform frenotomy. Neonatologists, with specific procedural skills and commitment to breastfeeding, can lead the way as advocates and teachers. More research is needed, particularly on posterior tongue tie, to facilitate and standardize diagnosis and treatment.

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Randomized, controlled trial of division of tongue-tie in infants with feeding problems.


Summary: A randomized, controlled trial has shown that dividing tongue-ties is safe and results in greater improvements to than the intensive skilled support of a lactation consultant.
A total of 57 babies with tongue-tie and associated feeding problems were randomized to have either immediate division of the tongue tie or 48 hours of intensive lactation consultant support (control group). Of the 29 babies in the control group, one improved (3%) and breast-fed for 8 months, but 28 did not. At 48 hours, these 28 mothers were offered division, which all accepted, and 27 of their babies improved (96%) and fed normally. Of the 28 babies who had immediate division, 27 improved and fed normally but one remained on a nipple shield (P < 0.001). Twenty-four mothers breast-fed for 4 months (24/40, 60%). Overall, division of the tongue-tie babies resulted in improved feeding in 54/57 (95%) babies.

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Ankyloglossia in breastfeeding infants: the effect of frenotomy on maternal nipple pain and latch.


Objective: The aim of this study was to measure the effectiveness of frenotomy in ankyloglossic infants, by quantifying the changes in latch and maternal nipple pain using standardized tools.

Methodology: Infants below 12 weeks of age were recruited from the Goldfarb Breastfeeding Program between August 2004 and February 2005. Infants were selected based on the Frenotomy Decision Rule for Breastfeeding Infants (FDRBI), a new clinical tool for future validation. Latch was assessed using the Latch Tool. Maternal nipple pain was assessed using R. Melzack's Short Form McGill Pain Questionnaire, consisting of the Pain Rating Index (PRI) and Present Pain Intensity (PPI). Frenotomy was performed, followed by repeat latch and pain assessments. Mothers also received breastfeeding counseling throughout and after the procedure. A telephone questionnaire was administered 3 months later.

Results: Twenty-seven (27) mother-infant dyads participated in the study. No complications were seen with frenotomy. All infants had an equal or higher latch score after frenotomy, with an improvement in mean latch score of 2.5 (p < 0.0001, 95% confidence interval [CI], 2.038, 2.925). Maternal pain scores decreased significantly after frenotomy, with mean improvements of -11.4 points (p < 0.0001, 95% CI, -15.544, -7.345) on the PRI subscale and -1.5 points (p < 0.0001, 95% CI, -1.952, -1.011) on the PPI subscale. Seventy-seven point eight percent (77.8%) of subjects were still breastfeeding after 3 months; 92% were pain free after 3 months; and 88% felt the frenotomy had helped them.

Conclusion: Timely frenotomy and breastfeeding counseling is an effective intervention, improving latch and decreasing nipple pain.

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Ankyloglossia: assessment, incidence, & effect of frenuloplasty on the breastfeeding dyad.


Objective: Ankyloglossia in breastfeeding infants can cause ineffective latch, inadequate milk transfer, and maternal nipple pain, resulting in untimely weaning. The question of whether the performance of a frenuloplasty benefits the breastfeeding dyad in such a situation remains controversial. We wished to 1) define significant ankyloglossia, 2) determine the incidence in breastfeeding infants, and 3) measure the effectiveness of the frenuloplasty procedure with respect to solving specific breastfeeding problems in mother-infant dyads who served as their own controls.

Methods: We examined 2763 breastfeeding inpatient infants and 273 outpatient infants with breastfeeding problems for possible ankyloglossia and assessed each infant with ankyloglossia, using the Hazelbaker Assessment Tool for Lingual Frenulum Function. We then observed each dyad while breastfeeding. When latch problems were seen, we asked the mother to describe the sensation and quality of the suck at the breast. When pain was described, we asked the mother to grade her pain on a
scale of 1 to 10. When lingual function was impaired, we discussed the frenuloplasty procedure with the parent(s) and obtained informed consent. After the procedure, the infants were returned to their mothers for breastfeeding. Infant latch and maternal nipple pain were reassessed at this time.

**RESULTS:** Ankyloglossia was diagnosed in 88 (3.2%) of the inpatients and in 35 (12.8%) of the outpatients. Mean Hazelbaker scores were similar for the presenting symptoms of poor latch and nipple pain. Median infant age (25th and 75th percentiles) at presentation was lower for poor latch than for nipple pain: 1.2 days (0.7, 2.0) versus 2.0 days (1.0, 12.0), respectively. All frenuloplasties were performed without incident. Latch improved in all cases, and maternal pain levels fell significantly after the procedure: 6.9 +/- 2.31 down to 1.2 +/- 1.52.

**CONCLUSION:** Ankyloglossia is a relatively common finding in the newborn population and represents a significant proportion of breastfeeding problems. Poor infant latch and maternal nipple pain are frequently associated with this finding. Careful assessment of the lingual function, followed by frenuloplasty when indicated, seems to be a successful approach to the facilitation of breastfeeding in the presence of significant ankyloglossia.

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**Do tongue ties affect breastfeeding?**


This study assessed indications for and safety and outcome of simple division of tongue tie without an anesthetic. There were 215 infants younger than 3 months (mean 0-19 days) who had major problems breastfeeding, despite professional support. Symptoms, tongue tie details, safety of division, and complications were recorded. Feeding was assessed by the mothers immediately, at 24 hours, and 3 months after division. Prior to division, 88% had difficulty latching, 77% of mothers experienced nipple trauma, and 72% had a continuous feeding cycle. During division, 18% slept throughout; 60% cried more after division (mean 0-15 seconds). There were no significant complications. Within 24 hours, 80% were feeding better. Overall, 64% breast fed for at least 3 months (UK national average is 30%). Initial assessment, diagnosis, and help, followed by division and subsequent support by a qualified lactation consultant, might ensure that even more mothers and infants benefit from breastfeeding.

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**Review of tongue-tie release at a tertiary maternity hospital.**


**OBJECTIVE:** To review the first 12 months of assessment and release of lingual frenulum (frenotomy) at a breast-feeding clinic in a tertiary maternity hospital (August 2002 to end of July 2003) and to report on the breast-feeding outcomes and parental satisfaction.

**METHODS:** A structured telephone interview was conducted with the mother at least 3 months after the assessment. Data were collected about the presenting problem and the effect of release of the tongue-tie (if performed). Parents were also asked about their satisfaction with the procedure and of problems following the release.

**RESULTS:** Sixty-six babies were assessed in 12 months. If infants were assessed as: (i) having impaired lingual function (using the Hazelbaker assessment tool for lingual frenulum function); (ii) the frenulum visualized to be a thin membrane; and (iii) the parent(s) gave informed consent, the frenulum was released. Initial and follow-up data are available on 46 infants. Infants had a mean age of 18 days (range 3-98), 63% were male infants and most had difficulties with attachment to the breast. Frenotomy was performed on 35 infants and breast-feeding improved in 83%. Parents reported high levels of satisfaction with the frenotomy procedure and no complications were reported.

**CONCLUSION:** Frenotomy is a safe and easy procedure. Infants with a significant tongue-tie that is interfering with breast-feeding have shown an improvement with breast-feeding following frenotomy.
Tongue tie division in infants with breast feeding difficulties.


**OBJECTIVE:** Tongue tie is a congenital oral abnormality characterised by an abnormally short lingual frenulum. The majority of current medical and surgical opinion is that tongue tie rarely, if ever, causes feeding difficulties and therefore, should not be divided. With increased popularity of breast feeding in the last decade there has been renewed interest in tongue tie and its effect on breast feeding. We present a case series of infants who underwent tongue tie division for feeding difficulties and assess the indications for and outcomes of the procedure.

**METHODS:** Eleven infants with breast feeding difficulties associated with tongue tie underwent tongue tie division using a standard technique in the outpatient clinic. No anaesthetic or analgesia was used and there was little or no bleeding or infant distress. Parents were subsequently contacted by phone at least 4 months after the procedure to inquire about the effect of the procedure on feeding and any complications encountered.

**RESULTS:** The age at tongue tie division ranged from 2 to 31 days (median=10 days). 10/11 of these infants were followed up. The age at follow up was 4-20 months (median=10 months). Prior to division, all mothers had attempted breast feeding and were keen to continue. 9/10 had experienced difficulties due to poor latch (8/10), sore nipples (6/10) and continual feeding cycle (5/10). Only 3/10 mothers were breast feeding exclusively. Following tongue tie division, an improvement in breast feeding was noticed immediately by 4/10 mothers. Three mothers did not notice any improvement. 6/10 mothers successfully breast fed for at least 4 months. There were no reported complications of the procedure.

**CONCLUSIONS:** The benefits of breast feeding are well known and lactation consultants are becoming more aware of tongue tie as a treatable cause of breast feeding difficulty. The procedure is quick and simple, not requiring any analgesia or anaesthesia and can be performed in the outpatient clinic. Although not conclusive, this case series suggests a possible benefit of tongue tie division in symptomatic infants.