

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

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## **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.*

**Keywords:** Ankyloglossia, breastfeeding cessation, frenotomy, frenulum, tongue-tie  
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## INTRODUCTION

Recent literature reviews confirm the overwhelming evidence that breastfeeding and breastmilk provide many health benefits for both mothers and infants (Horta et al 2007; Ip et al 2007; National Health and Medical Research Council 2003). Despite this, Australian breastfeeding rates drop significantly over the first 6 months of an infant's life. A recent National Health Survey found that breastfeeding rates fell from 80% of infants fully breastfed at 1 week of age to only 14% of infants being fully breastfed at 6 months of age (Australian Institute of Family Studies 2008). Since breastfeeding has been shown overwhelmingly to be of significant benefit to infants and mothers, it is important to address any condition that may impair breastfeeding. One condition that can have a negative effect on breastfeeding for some infants and mothers is tongue-tie.

Tongue-tie or ankyloglossia is described as a congenital condition with an unusually thickened, tightened or shortened frenulum (membrane or string under the tongue) (Hillan 2008; Wallace & Clarke 2006). The frenulum may vary in length, elasticity and placement along the underside of the tongue to the floor of the mouth, which then can affect infants' breastfeeding skills in different ways (Watson Genna 2008) and can affect other activities such as feeding, dental hygiene, and speech (Amir 2006; Kummer 2005; Messner & Lalakea 2002; Wallace & Clarke 2006).

Tongue-tie occurs in between 2.8% to 10.7% of all infants (Ballard, Auer & Khoury 2002; Hogan, Westcott & Griffiths 2005; Messner & Lalakea 2000; Ricke et al 2005; Ridgers, McCombe & McCombe 2009; Messner & Lalakea 2000). This range is similar to the prevalence of 4.2–10.7% found in a 2007 review by Segal et al.

The infant's tongue is a vital component of the suckling process during breastfeeding and various methods have been used to study its action. Ardran, Kemp and Lind (1958) examined cine-radiographic films taken of mothers while breastfeeding. They concluded that the lower jaw is raised during suckling, with the nipple 'teat' being compressed between the upper gum and the tip of the tongue, which is resting on the lower gum. Weber, Woolridge and Baum (1986) used ultrasound to study breastfeeding women. They described how the tongue and the upper gum hold the elongated nipple or 'teat' during feeding, with milk being removed by a peristaltic action. More recent ultrasound research by Geddes, Kent et al (2008) found that milk flow during breastfeeding occurs when the infant's mid to posterior section of the tongue is lowered and increasing vacuum is applied without accentuated peristaltic action. Geddes, Kent et al (2008) concluded that vacuum played an important part in milk removal during breastfeeding; however, they were unable to define the role of the tip of the tongue in milk removal and concluded that further research was needed.

Tongue-tie may prevent the infant from taking enough breast tissue into its mouth to form a teat, which may affect breastfeeding (Hillan 2008). Some infants with tongue-tie are

unable to attach to the breast, while others are able to attach but are less efficient at breastfeeding, due to reduced tongue mobility (Hillan 2008). Infants may fail to transfer enough breastmilk for adequate growth, while poor attachment due to tongue-tie may reduce stimulation of the breast and lead to a reduction in milk supply (Amir 2006; Ricke et al 2005). As a result of this restricted tongue action, the mother may experience painful, bleeding nipples from the friction created by abnormal tongue movements (Griffiths 2004). Despite frequent feeds, the infant may have poor weight gain due to poor milk intake (Amir, James & Beatty 2005; Blenkinsop 2003; Dollberg et al 2006; Wallace & Clarke 2006). Nipple tenderness, nipple damage, and breast pain are common symptoms experienced by mothers who are breastfeeding an infant with tongue-tie (Amir, James & Beatty 2005). Often, the level of discomfort and pain becomes unbearable, and these are primary factors that led to early breastfeeding cessation. This, in turn, can lead to maternal feelings of failure and high levels of emotional distress (Amir et al 1996).

The aims of this review are to examine the research evidence of the impact of infant tongue-tie on breastfeeding and early cessation, to examine the effectiveness and safety of frenotomy (tongue-tie separation), to identify any possible complications of frenotomy, and to appraise the evidence concerning the treatment of tongue-tie with respect to breastfeeding continuation. In addition to research evidence, this review also examines research that assesses medical opinion in regard to the management and treatment of tongue-tie, in order to determine consensus views regarding treatment.

## METHODS

The search strategy for this review included searches through medical and nursing databases including CINAHL, Pre-CINAHL, Medline and Academic Search Premier, ERIC and Health Source Nursing/Academic Edition for both quantitative and qualitative research papers on tongue-tie and breastfeeding. The keyword search terms included: tongue-tie, ankyloglossia, frenotomy, frenulotomy, breastfeeding and infants. All articles were obtained, particularly those that examined tongue-tie, its impact on breastfeeding, its management — including frenotomy — with additional specific searching for research evidence. The only limit applied was English language. The initial search was undertaken in 2007 with ongoing searches undertaken since then, including Cochrane Database of Systematic Reviews and Ovid Journals. Eighty articles were retrieved, of which 25 were relevant to this review. Of these, 19 were research articles, including a randomised controlled trial, two prospective uncontrolled cohort studies, a randomised prospective study, two telephone surveys, a prospective controlled study, a case controlled study, seven case series, two audits of tongue-tie services and two surveys. Articles excluded from this review were informational articles, letters, research papers that did not include tongue-tie and breastfeeding, case studies with only one or two infants, and research older than 10 years. Literature reviews and

systematic reviews were used as a literature source but were excluded from the review itself.

## REVIEW

### The impact of tongue-tie on breastfeeding

A number of high-quality studies demonstrate that tongue-tie affects breastfeeding. One large study from the USA demonstrated that tongue-tie causes breastfeeding difficulties and pain for mothers (Messner et al 2000). This prospective controlled study was undertaken to determine the incidence of tongue-tie in a population of healthy babies who had been admitted to a well-baby nursery, and also to determine whether mothers of infants with tongue-tie experienced any breastfeeding difficulties. Fifty infants from a total of 1041 infants (4.8%) in the well-baby nursery were identified as having tongue-tie. Of these, 36 mothers of infants with tongue-tie who planned to breastfeed were compared with a matched control group of 36 mothers of unaffected infants. The researchers found that 83% of infants with tongue-tie were breastfed for at least 2 months compared to 92% of the control infants without tongue-tie. They also found that mothers of infants with tongue-tie generally had more difficulty latching their baby onto the breast and/or experienced nipple pain extending for longer than 6 weeks when compared to the control group. Infants with a thick frenulum were more likely to have breastfeeding difficulties. This study demonstrated that mothers of infants with tongue-tie experienced more breastfeeding difficulties than mothers whose infants did not have tongue-tie, and that tongue-tie can affect breastfeeding duration. This finding is supported by a case-control study, which examined the effect of tongue-tie on breastfeeding (Ricke et al 2005). During the study, 3490 infants were assessed, with 148 infants identified as being tongue-tied; a prevalence of 4.2%. Researchers found that tongue-tied infants were three times more likely to be bottle-fed at 1 week than control infants, but by 1 month control infants and tongue-tied infants were equally likely to be bottle-fed. Twice as many mothers of tongue-tied infants had sore nipples and breast pain at 1 month compared to control infants. This finding provides further evidence to indicate that tongue-tie reduces breastfeeding duration and is associated with breastfeeding difficulties.

Reasons for breastfeeding difficulties were determined in a significant Australian study, where Geddes, Langton et al (2008) used ultrasound imaging to assess infants while breastfeeding, before and after frenotomy (tongue-tie separation). Researchers conducted ultrasound imaging on 24 infants during breastfeeding, both before a frenotomy and at least 7 days afterwards. The researchers identified two groups: one group of infants compressed the tip of the nipple during breastfeeding pre-frenotomy, and a second group compressed the base of the nipple. The authors postulated that the former group might represent the clinical group of infants who are unable to maintain a seal to the breast, whereas the latter group represents infants who either bite or latch strongly to the breast. Both groups may cause nipple trauma. Nipple

compression was reduced or resolved following frenotomy. The distance from the tip of the nipple to the hard soft palate junction was greater before frenotomy than after frenotomy. This demonstrates that tongue movement is restricted by tongue-tie and infant latch to the breast is therefore also affected. The ultrasound demonstrated that the infants had a disorganised, piston-like motion with their tongue when suckling prior to the procedure, which was reduced following the frenotomy. Six of the mothers in this study measured their milk production in the 24 hours before frenotomy and after the procedure, which revealed that the infants were able to remove more milk from the breast post-frenotomy, and that there was a significant increase in total milk production in the 24 hours after frenotomy. All the women reported that breastfeeding comfort was improved. This study was the first to measure the effect of tongue-tie and frenotomy on milk production, providing evidence that tongue-tie can reduce milk intake and affect breastfeeding due to its effect on suckling.

In a recent study using a small case series, Geddes et al (2010) examined the sucking characteristics of five infants with tongue-tie who were successfully breastfeeding. Ultrasound was used to image tongue action, with intra-oral vacuum measured using a supply line filled with sterile water and connected to a pressure transducer. The researchers found that, despite some nipple compression and intra-oral vacuum pressures outside the normal range, milk production, milk intake and maternal pain were not affected by tongue-tie. The researchers suggested that other factors, such as particular breast/nipple shape and milk ejection reflex contribute to some mothers being able to successfully breastfeed an infant with tongue-tie and is in contrast to the previous study. Further research is required in this area.

### Effect of treatment for tongue-tie on management of breastfeeding problems

Given that tongue-tie can affect breastfeeding, it is important to examine the effectiveness of treatment. It can be treated surgically by frenotomy (also termed frenulotomy), a minor surgical procedure involving separation or cutting of the frenulum, undertaken with sterile scissors and without anaesthetic (Ridgers, McCombe & McCombe 2009; The Royal Women's Hospital, Melbourne 2006). A frenuloplasty may also be used, which combines excision and repair of tongue-tie (Ballard, Auer & Khoury 2002). Although laser treatment has been used for older children and adults (Aras et al 2010; Fiorotti et al 2004) there have been no reports in the literature of its use with infants.

Several studies have explored the effectiveness and safety of tongue-tie procedures while studying their effects on feeding problems. In the only randomised controlled trial published to date examining tongue-tie and breastfeeding, 28 infants in an experimental group had immediate division of tongue-tie; 27 of these infants improved and fed normally, while one continued to feed on a nipple shield (Hogan, Westcott and Griffiths 2005). The parents of 29 control group infants

received 48 hours of intensive lactation support; only one of these infants had improved breastfeeding at 48 hours. Parents were offered tongue-tie separation, and all accepted. Subsequently, 27 infants improved and fed normally. Thus, separation of the tongue-tie resulted in improved feeding in 54 of 57 infants, with no complications identified. This high-quality study provides evidence that separation of tongue-tie for infants with feeding problems is more effective in improving infant feeding than intensive lactation support.

Researchers in Israel also examined the effect of frenotomy on breastfeeding problems (Dollberg et al 2006). Employing a randomised, prospective, blinded trial, the purpose of their study was to identify if breastfeeding improved following tongue-tie separation. Twenty-five full term infants with tongue-tie were recruited, with the main breastfeeding problems identified as nipple pain and trauma, and poor latch. The trial was blinded and randomised in order to reduce favourable bias towards separation of tongue-tie by the mothers. The infants were randomised into two groups: i) a sham procedure followed by breastfeeding then frenotomy followed by breastfeeding (11 infants) and ii) frenotomy followed by breastfeeding then a sham procedure followed by breastfeeding (14 infants). The mothers were supervised during the procedure to verify that they did not try to examine the mouth of their baby to determine whether frenotomy or a sham procedure had been performed. In both groups, nipple pain score when breastfeeding reduced significantly after frenotomy ( $p < 0.001$ ) and the latch score improved, although this was not statistically significant ( $p = 0.06$ ). Following frenotomy, any bleeding was minor and controlled within a few seconds and no other complications were identified. Although the sample size was relatively small, this study provides additional evidence that separation of tongue-tie for breastfeeding difficulties improves pain and infant latch to the breast.

Further evidence supporting frenotomy is provided by Australian researchers who conducted a telephone survey to assess the effect of tongue-tie release on breastfeeding difficulties and maternal satisfaction (Amir, James & Beatty 2005). Initial breastfeeding problems included difficulty latching, nipple pain and damage, frequent and prolonged feeding, and poor weight gain. A structured telephone interview was conducted by a lactation consultant with each mother 3 months after a tongue-tie assessment. Sixty-six infants were assessed initially with follow-up data collected on 46 infants; frenotomy was performed in 75% of the infants assessed. No problems were reported following the procedure; most mothers felt they had been given enough information (89%) and reported being 'very satisfied' with the procedure (74%) (Amir, James & Beatty 2005).

A recent United Kingdom audit of a new service examined the effect of frenotomy on breastfeeding problems for 220 infants with tongue-tie (Ridgers, McCombe & McCombe 2009). Feeding problems resolved following division of tongue-tie in 168 of the infants, improved in 47 infants and were unchanged in only five cases. Minor bleeding following

the procedure occurred in only four cases, which ceased completely within a maximum of 2 minutes. Infant crying was usually caused by the surgeon inserting his finger into the mouth to perform the procedure. This demonstrates the effectiveness and safety of the frenotomy procedure; however, no controls were used to compare breastfeeding outcomes of infants who did not have tongue-tie separation.

A UK prospective cohort study of breastfeeding mothers demonstrated that frenotomy increased breastfeeding duration (Khoo et al 2009). Of the 62 mother-infant pairs who underwent frenotomy, 78% were still breastfeeding at 3 months despite having initial breastfeeding difficulties, including nipple pain and trauma; however, the study was limited because only mothers self-referring to a clinic with their infants for separation of tongue-tie due to breastfeeding difficulties were included in the sample. The study was also dependent on voluntary completion of questionnaires by mothers. Similar results were found in an uncontrolled case series examining the effect of frenuloplasty on maternal pain levels while breastfeeding, and on infants' latch to the breast (Ballard, Auer & Khoury 2002). The researchers examined 2763 in-patient breastfeeding infants and 273 out-patient infants with breastfeeding problems, looking for possible tongue-tie. Each breastfeeding dyad was observed while breastfeeding, and when latch problems were identified, the mother was asked to describe the sensation and quality of the baby's suck at the breast. Tongue-tie was diagnosed in 3.2% ( $n = 88$ ) of the in-patients and 12.8% ( $n = 35$ ) of the out-patients. One hundred and twenty-three mothers elected to have surgery. In all cases, only a simple separation of the tongue-tie was required, and all procedures were performed without complications. Both in-patients and out-patients were followed up after the procedure and all mothers reported improved latch and decreased pain while breastfeeding. The results of this study provide further evidence that separation of tongue-tie improves the ability of the infant to breastfeed and reduces maternal nipple pain when breastfeeding; however, the study lacked a control group and there was no long-term follow up to monitor breastfeeding duration.

The indications, safety and outcome of tongue-tie separation were studied in a large non-randomised, single centre prospective study of 215 infants (Griffiths 2004). Mothers in the sample had major breastfeeding problems including painful, bleeding nipples, continuous feeding cycles and difficulties latching to the breast, despite receiving support from health professionals. Twenty-four hours following frenotomy most infants (80%,  $n = 173$ ) were assessed by their mothers to be feeding better. For 40 infants (19%) there was no change to their feeding while two infants (1%) had increased problems feeding, with no reasons provided. Minor bleeding was identified as a complication, with 113 (53%) producing only 'a few drops of blood' and 18 (8%) producing 'a small amount' following the procedure (Griffiths 2004). Minor ulcers were found under the tongue in four (2%) infants. These results indicate that tongue-tie

is associated with breastfeeding difficulties for some infants, and these difficulties can be resolved in most mother/infant dyads with frenotomy, without complications.

Finigan (2009) published the results of evaluation of a new frenotomy service in northern England. Over a three-year period from 2005 to 2008, 501 women and infants were referred for treatment with 416 infants receiving frenotomy. Of the mothers who were able to latch and breastfeed their infants straight after the procedure, most (n=383) reported that breastfeeding was less painful; that is, the infants latched better and remain latched for a full breastfeed. Of the 33 mothers who did not notice a difference, their infants either would not breastfeed after the procedure or there were other problems before the procedure, such as fungal infection or extremely sore nipples. The 228 women who were contacted 24 hours after the procedure reported that breastfeeding was more comfortable and the infants were latching better. At a three-month phone follow up, contact was made with 139 mothers: 60 mothers reported that they were still exclusively breastfeeding, 13 mothers stated they had exclusively breastfed for their intended period of time, 10 mothers reported mixed breastfeeding and formula-feeding and 2 mothers were expressing and giving breastmilk in a bottle. No problems were identified with the frenotomy.

### Safety of frenotomy

The weight of research evidence reviewed above suggests that frenotomy is an effective treatment for tongue-tie and that it is conducive to successful breastfeeding; however, it is important also to establish the safety of frenotomy. Several of the studies cited above provide evidence concerning safety of frenotomy: no problems, other than minor bleeding, have been identified (Amir, James & Beatty 2005; Ballard, Auer & Khoury 2002; Dollberg et al 2006; Finigan 2009; Griffiths 2004; Hogan, Westcott & Griffiths 2005; Ridgers, McCombe & McCombe 2009). Safety has been examined further by some researchers with the purpose of evaluating complications or negative outcomes following the procedure. These studies are reviewed in this section.

A telephone audit was conducted in Edinburgh, United Kingdom to determine the safety of tongue-tie separation (Hansen, MacKinlay & Manson 2006). This study was not controlled and did not include specific measures of outcome. Breastfeeding problems identified prior to the procedure included poor latch, sore nipples and mastitis. Forty-four mothers were telephoned after a minimum 14-day period following the procedure, with 80% reporting an improvement in feeding and 64% reporting that feeding took less time after the procedure. The study also demonstrated minimal complications following separation of tongue-tie. One infant had a small amount of bleeding after the procedure, which was self limiting. Another infant was given paracetamol for possible pain with good effect. There were no reports of infection or other medical problems identified post-procedure. Although this study provides some evidence supporting the safety of frenotomy, it should be noted

that it was described in brief in response to another article on tongue-tie (Hall & Renfrew 2005). As such the validity of the results cannot be established fully.

The safety of frenotomy is supported by Blenkinsop (2003), who undertook a retrospective audit of 21 infants referred for frenotomy to a feeding clinic in the United Kingdom, to evaluate the success of the treatment and to determine parental satisfaction with the procedure. Information was gathered by reviewing case notes and by contacting mothers by phone to discuss if frenotomy had reduced or eliminated the breastfeeding difficulties they had been experiencing. All mothers reported satisfaction with the procedure, and no complications were identified. The researchers concluded that division of tongue-tie improved feeding in 95% of cases and that frenotomy is a safe intervention for feeding problems caused by tongue-tie.

Wallace and Clarke (2006) had similar findings after they undertook a small case series in Yorkshire, United Kingdom to determine indications for tongue-tie division and the outcomes of the procedure. Eleven infants with breastfeeding difficulties associated with tongue-tie underwent frenotomy in an out-patient setting. Breastfeeding problems identified prior to the procedure included difficulties with latching, sore nipples and continuous feeding. Following frenotomy, the mothers were contacted by phone, with most reporting an improvement with breastfeeding following separation of the tongue-tie. No complications were reported. Neither this study nor Blenkinsop's (2003) study used a control group with non-surgical intervention to compare outcomes and neither assessed breastfeeding technique following the procedure; however, in both studies frenotomy was shown to be a safe, effective procedure for mothers experiencing problems breastfeeding an infant with tongue-tie.

Another small telephone survey follow up was undertaken in Canada (Srinivasan et al 2006) to measure the effectiveness of frenotomy in infants with tongue-tie. This study confirmed that frenotomy reduced pain experienced by mothers when breastfeeding an infant with tongue-tie. The researchers measured the change in latch and nipple pain in the mothers of 27 infants under the age of 12 weeks. No complications were identified during or after the procedure. Mothers were phoned 3 months after the frenotomy to determine if they were still breastfeeding, whether they continued to have nipple pain and whether they found the frenotomy improved breastfeeding. All women who were contacted had decreased nipple pain after the frenotomy. Even though this was a small evaluation study, it demonstrates that tongue-tie does affect breastfeeding and may be a reason why women stop feeding their infants. It also demonstrated that frenotomy was a safe and effective procedure for reducing pain experienced by mothers when breastfeeding infants with tongue-tie.

Yeh (2008) published an anecdotal evaluation of his tongue-tie division service in Taiwan. Between 1980 to 2006, 2620 cases of tongue-tie in infants, and 158 cases in children, were treated with frenotomy. Post-procedure bleeding was

minimal with most self limiting spontaneously in a very short period of time, concluding that tongue-tie separation was a very safe and effective procedure. In this study, three patients required further tongue-tie division under general anaesthetic due to recurrent tongue-tie, which the author stated was most likely due to 'inadequate release by the quick cut'.

### **Lack of consensus regarding tongue-tie management**

While many studies (Amir, James & Beatty 2005; Ballard, Auer & Khoury 2002; Blenkinsop 2003; Dollberg et al 2006; Finigan 2009; Geddes, Langton et al 2008; Griffiths 2004; Hogan, Westcott & Griffiths 2005; Khoo et al 2009; Ridgers, McCombe & McCombe 2009; Srinivasan 2006; Wallace & Clarke 2006; Yeh 2008) have provided evidence for the effectiveness of frenotomy for tongue-tie, a review of medical guidelines reveals a lack of consensus regarding the need to treat tongue-tie in this manner. In 2007, the Canadian Paediatric Society reaffirmed its position statement from 2002, which states that management of tongue-tie should be conservative, 'requiring no intervention beyond parental education and reassurance' (Canadian Paediatric Society 2002 p. 270). Neither the American College of Pediatricians nor The Royal Australasian College of Physicians: Paediatrics and Child Health has a published position statement on tongue-tie and its management, which is significant by omission. This would suggest that the need for treatment of tongue-tie is not well recognised or that there is lack of consensus in regard to tongue-tie management. A lack of consensus is further supported by two large research studies of opinion of tongue-tie treatment.

A large survey in Canada and the USA of otolaryngologists (n=423), paediatricians (n=425), speech pathologists (n=400) and lactation consultants (n=350) revealed differences of opinions in relation to tongue-tie (Messner & Lalakea 2000). Sixty-nine percent of lactation consultants, but only 10% of paediatricians and 30% of otolaryngologists, believed that tongue-tie was associated with feeding problems. Sixty percent of otolaryngologists and 50% of speech pathologists, but only 23% of paediatricians, believed that tongue-tie was sometimes associated with speech difficulties and 67% of otolaryngologists as opposed to 21% of paediatricians believed that tongue-tie was associated with social/mechanical issues. Surgery was recommended for tongue-tie by otolaryngologists for feeding (53%), speech (74%) and social/mechanical reasons (69%). In contrast, paediatricians recommended surgery for feeding issues (21%), speech (29%) and social/mechanical reasons (19%). This survey highlighted the difference of opinion amongst specialty medical groups, especially paediatricians, in relation to management of tongue-tie. This suggests that mothers may receive conflicting advice from health professionals concerning tongue-tie and its management.

The beliefs and practices of paediatric surgeons in regard to management of tongue-tie were explored in an Australian survey (Brinkmann, Reilly & Meara 2004). Four hundred surgeons in three different specialties were surveyed using a

questionnaire that explored their beliefs and practices and their management and follow up of infants with tongue-tie. The response rate was 80.8% (n=323) with 73% reporting that they practised surgery to release tongue-tie. The majority of participants in this survey (80.5%) stated that reduced tongue mobility was the main indication for releasing the tongue-tie, followed by poor speech/articulation. Over half the surgeons (57.6%) stated that they received less than five referrals per year. Paediatric surgeons stated they received most referrals from dentists (38.1%), followed by speech pathologists (16.9%) with very few received from lactation consultants. In Australia, lactation consultants cannot refer directly to specialist medical officers. If a mother of an infant with tongue-tie is referred to a general practitioner by a lactation consultant for referral to a surgeon for release of tongue-tie, that general practitioner may choose not to provide a referral to a surgeon. As suggested by available research evidence, this is likely due to the fact that many medical officers do not consider tongue-tie to cause problems with breastfeeding (Messner & Lalakea 2000), and medical societies do not have a position statement on tongue-tie management, resulting in a lack of consensus in regard to management of tongue-tie. Finigan (2009) experienced strong resistance to the development of a frenotomy service, and concluded that there is still controversy in the United Kingdom over division of tongue-tie.

### **CONCLUSIONS**

This review of research on breastfeeding and tongue-tie has revealed several key findings. Research evidence demonstrates that tongue-tie does negatively affect breastfeeding for infants and mothers. Where tongue-tie has no effect, no treatment of tongue-tie is warranted, but where tongue-tie is affecting breastfeeding, the evidence indicates that frenotomy offers significant benefit, and is a simple, safe and effective procedure. This finding concurs with the conclusion of Segal et al (2007) following their review of the evidence.

Despite the weight of evidence of the benefits of frenotomy, there is evidence of a lack of consensus regarding tongue-tie management, with some medical personnel not supporting the need for surgical intervention. It is important to raise awareness of the effectiveness and safety of frenotomy as a treatment for tongue-tie, especially when the procedure has been shown in large clinical trials to have positive breastfeeding outcomes for both mother and child.

Further research using blinded randomised controlled trials to compare frenotomy with no treatment for tongue-tie would, theoretically, provide the strongest evidence for frenotomy. However, our review of the evidence demonstrates significant benefits of frenotomy for both mother and infant. Thus, our conclusion, in common with others (Segal et al 2007), is that not offering a treatment that has shown to be beneficial would be unethical.

Based on this review of research, it is concluded that all health professionals should consider referral for frenotomy as the primary strategy for resolution of breastfeeding difficulties

experienced by a mother of a child with tongue-tie, in order to prevent cessation of breastfeeding. It is suggested that further education of health professionals regarding the problems caused by tongue-tie and the effectiveness of frenotomy is required, so that they become aware of the research in this area. This will enhance their ability to confidently inform and refer mothers on the basis of current evidence, while supporting them with breastfeeding for their infant with tongue-tie.

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