All tied up – navigating tongue-tie in children

The pre-hospital discharge check and two-week check in general practice are the optimal times to screen for ankyloglossia, writes Vanessa Stitt

"A child's being tongue-tied will impede and hinder his sucking freely. When that happens, he may be observed to lose his hold very often, and when he draws the breast he frequently makes a clicking noise. Upon this occasion the mouth must be examined and the tongue set at liberty by cutting a ligament or string which will be found to confine the tongue down to the lower part of the mouth"

– **William Moss, 1794**[1]

TONGUE-TIES ARE BEING DIAGNOSED and released at an ever-increasing rate. In Canada, diagnosis of tongue-tie has increased by 90% in the past 10 years,[2] and in the US there has been an 870% increase.[3] Where did this entity come from? Until now, tongue-tie has only been briefly covered or omitted entirely from undergraduate and postgraduate medical education. However, tongue-ties have been around for a long time. Operative interventions for tongue-tie were proposed in Greek medicine. In the Middle Ages, competition arose between midwives, who used their nails to detach the frenulum, and surgeons, who were allowed to use instruments.[4]

There has been an explosion of research relating to tongue-tie in recent years. An article in 2017 found that the number of tongue-tie-related studies have increased in cubic fashion over 67 years, but that the majority of these studies are low hierarchy categories of evidence, with only eight randomised controlled trials (RCTs) and 10 systematic reviews.[5]

Recent increases in breastfeeding rates in Ireland and globally have brought feeding challenges, including tongue-tie, to the fore. Social media and infant feeding support groups have provided a platform for feeding issues to be discussed and information disseminated. A popular tongue-tie Facebook support group has more 80,000 members. In 2017, Wong et al conducted a qualitative analysis on these online tongue-tie forums and found that one-fifth of parents wrote about a missed diagnosis, 14% reported improved breastfeeding, reduced nipple pain and latching issues after frenotomy, and many found dealing with this issue to be an emotionally heightened experience, reporting feelings of sadness, anger and despair.[6]

Figure 1. Mid-tongue depression due to restriction

There is considerable controversy among healthcare professionals regarding the diagnosis, clinical significance and management of tongue-tie, and there is wide variation in practice in this regard. Another study in 2018 surveyed 1,721 healthcare professionals for their views on tongue-tie across 30 different professions, and there was a variety of opinions on the impact of this condition, with doctors found to be less likely than nurses, dentists, speech therapists and lactation consultants to agree that tongue-tie could cause infant feeding problems.[7]

The International Affiliation of Tongue-tie Professionals defines tongue-tie, which is also known as ankyloglossia, as an embryological remnant of tissue in the midline between the undersurface of the tongue and the floor of the mouth that restricts normal tongue movement. In other words, if a lingual frenulum is especially short, thick or tight, and it restricts normal tongue range of motion and thereby impacts normal tongue function, it is considered to be a tongue-tie.

Last year, Dr Nikki Mills defined the anatomy of the tongue frenulum using adult and infant cadavers and concluded that frenula are dynamic structures that vary widely in their attachment to the tongue and the floor of the mouth. Dr Mills said they can be composed of submucosal tissue, fascia and sometimes genioglossus muscle.[8,9] The terms 'anterior' and 'posterior' are outdated in relation to tongue-tie, and are an anatomical description of the frenulum's attachment to the tongue only, not the severity of restriction or the functional deficit. Several classifications and protocols for assessment are available, namely the Hazelbaker Assessment Tool for

Lingual Frenulum Function (HATLFF), the Bristol Tongue-tie Assessment Tool (BTAT), the Lingual Frenulum Protocol with Scores for Infants, etc. For adult assessments, the Tongue Range of Motion Ratio (TRMR) is used.

The most substantial evidence base for indication for frenotomy is breastfeeding difficulty. Studies that show the importance of tongue mobility for effective removal of milk at the breast date as far back as the 1950s, and was demonstrated with ultrasound by Geddes in 2008.[10] Tongue mobility serves multiple other roles and impacts feeding, speech and breathing. In its normal resting posture, the tongue acts as a 'scaffold' for the maxillary arch, flattening and widening it over time during maxillofacial development. A tongue-tie can prevent this resting posture and lead to a high, narrow palate, with less room for the nasal passages to develop.

There are seven frenula in the mouth; dental surgeon Kevin Boyd coined the term 'tethering of oral tissues' (TOTS) in 2014 to include tissue restriction of the tongue, lips and buccal frenula. Lip frenula are sometimes associated with breastfeeding difficulties and, less commonly, frontal incisor teeth decay and diastema. However, unlike tongue-ties, lip frenula can stretch with time or even tear. The current body of evidence concerns tongue-tie and so this is what this article will focus on.

Prevalence figures vary, but is likely that between four and 10 babies in every 100 are affected,[4] most of whom are male. Its causes are still unknown, but genes may be a factor and there can often be other members of the family with tongue-tie.[11] There is no established connection between folic acid, the methylenetetrahydrofolate reductase (MTHFR) gene mutation and the increase in incidence of infant tongue-tie.[12]

Assessment of possible tongue-tie involves a pregnancy and birth history, feeding history, an intra-oral examination with a gloved finger, observation for any fascial or body asymmetry (torticollis, plagiocephaly), examination of tone and an observation of infant feeding. If the dyad is breastfeeding, assessment by a lactation consultant, preferably an International Board Certified Lactation Consultant (IBCLC) should take place.

Potential challenges for the breastfed baby with a tongue-tie include:

- Difficulties in achieving and maintaining deep attachment to the breast
- Weight loss or challenges to gain weight due to poor milk transfer
- Restless and unsettled feeds
- Noisy or clicking sounds during the feed
- Tiring easily and falling asleep on the breast
- Colic or reflux symptoms as a result of swallowing air during feeds (aerophagia).

Challenges for the mother breastfeeding a baby with a tongue-tie include:

- Distorted nipple shape after a breastfeed
- Bleeding, damaged or ulcerated nipples resulting in nipple pain
- Incomplete milk transfer by the baby, resulting in engorgement and/or mastitis.

Potential challenges for the bottle-fed baby with a tongue-tie include:

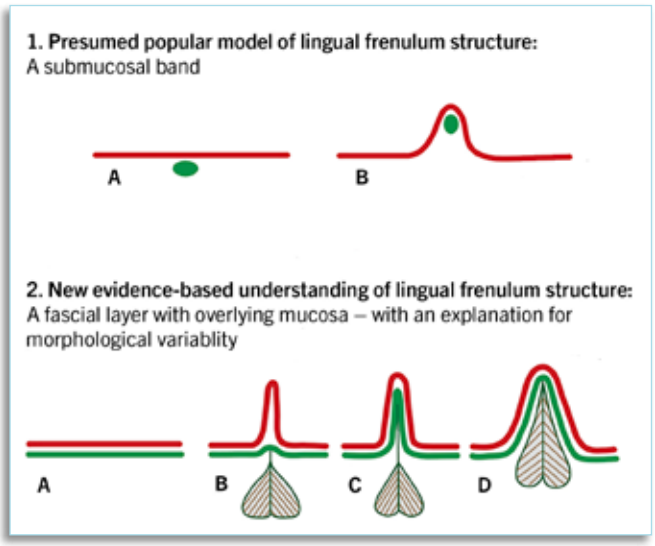

Figure 2. What is a tongue tie? Defining the anatomy of the *in situ* lingual frenulum

- Frequent small volume feeds
- Slipping off the teat
- Excessive dribbling of milk during feeds
- No improvement when the teat is changed for a different type
- Difficulty keeping soother in mouth
- Colic or reflux symptoms as a result of swallowing air during feeds (aerophagia).

Potential challenges for a weaning baby with a tongue-tie include:

- Food refusal
- Spitting food back out
- Difficulty moving on from very thin consistency foods
- Choking or gagging when feeding.

There is growing evidence that tongue-ties impact other areas and can affect an individual throughout their lifespan, including difficulties with tongue-tip elevation for speech sounds and articulation, suboptimal maxillofacial development, dental malocclusion, gum recession and crowded teeth, increased dental caries, poor forward head posture and neck pain, sleep-disordered breathing, open mouth posture, nasal congestion, snoring and sleep apnoea.[13] Many of the symptoms listed can have other causes and so a comprehensive assessment is optimal when undertaken by a multidisciplinary team. This may include the individual's GP, a lactation consultant, paediatrician, ENT, dentist, SALT etc.

There are many techniques used to release the lingual frenulum – frenotomy, frenectomy and frenuloplasty. Scissors and lasers are employed and stitches may be placed, and these procedures may be done with topical, local analgesic, under sedation or general anaesthetic. This is dependent on the individual, on the frenulum itself, the age of the patient and the ability to do aftercare. Much like after knee surgery, rehabilitation is needed as the surgery only corrects the anatomy and not tongue function. Postoperative care varies also, but often involves mouth work for neuromuscular re-education and strengthening, tummy time and frequent feeding. Postoperative wound massage may reduce rates of reattachment and encourages healing by secondary intention, but this has not been proven.

Figure 3. Posterior tongue restriction – no obvious tongue-tie without manoeuvre

Tongue-ties often come hand in hand with fascial strain in the head, neck, jaw, shoulders and back, and there is a role for bodywork – cranial osteopathy and craniosacral therapy. In fact, tension in the muscles between the hyoid bone and base of tongue can often masquerade as a tongue-tie at the base of the tongue. Specific oromyofunctional therapy for individuals with tongue-ties is largely unavailable in Ireland but is freely available in the US, Australia, etc. Many studies published in the early part of the millennium have shown frenotomy as a low-risk procedure, with a risk of complication of less than 1%. The most common complications are bleeding (1:300), serious bleeding (1:100,000), reattachment (approximately 3-8%), pain, temporary refusal to nurse and damage to salivary glands or lingual nerves (rare). Infection is very rare.

In 2014, Brazil passed the Teste da Linguinha, a law mandating that every newborn be evaluated for the presence of tongue-tie. The pre-hospital discharge check and two-week check in general practice are the optimal times to screen for tongue-tie. In 2015, the National Institute for Health and Care Excellence (NICE) made a plea for more reliable and robust, better-quality data in this field. Until this research is available, mothers and infants with latch and transfer problems and mothers with nipple pain and trauma will continue to seek help from their GP. The challenge for us as GPs is to improve our knowledge and counsel our patients about current and emerging evidence.

Vanessa Stitt is a Galway city GP and tongue-tie practitioner

References
1. Moss, W (1974). An essay on the management, nursing and diseases of children from the birth: and on the treatment of diseases of pregnant and lying-in women: With remarks on domestic practice of medicine. 2ND edn. C. Boult
2. Joseph KS et al. Temporal trends in ankyloglossia and frenotomy in British Columbia, Canada, 2004-2013: a population-based study. CMAJ Open. 2016;4(1):E33-E40. Published 2016 Jan 26
3. Walsh J, Tunkel D. Diagnosis and Treatment of Ankyloglossia in Newborns and Infants: A Review. JAMA Otolaryngol Head Neck Surg. 2017;143(10):1032-1039
4. Segal, L.M. Et al. Prevalence, diagnosis, and treatment of ankyloglossia, Can Fam Physician 2007;53:1027-1033
5. Bin-Nun A, Kasirer YM, Mimouni FB. A Dramatic Increase in Tongue Tie-Related Articles: A 67 Years Systematic Review. Breastfeeding medicine: the official journal of the Academy of Breastfeeding Medicine 2017; 12(7), 410-414
6. Wong K, et al. Breastfeeding Infants with Ankyloglossia: Insight into Mothers' Experiences. Breastfeeding medicine : the official journal of the Academy of Breastfeeding Medicine 2017; 12, 86-90
7. Jin RR et al. What does the world think of ankyloglossia?. Acta paediatrica 2018 (Oslo, Norway : 1992), 107(10), 1733-1738
8. Mills N, Pransky SM, Geddes DT, Mirjalili SA. What is a tongue tie? Defining the anatomy of the in-situ lingual frenulum. Clinical anatomy 2019 (New York, N.Y.), 32(6), 749-761
9. Mills N, Keough N, Geddes DT, Pransky SM, Mirjalili SA. Defining the anatomy of the neonatal lingual frenulum. Clinical anatomy 2019 (New York, N.Y.) 32(6), 824-835
10. Geddes DT, et al. Frenulotomy for breastfeeding infants with ankyloglossia: effect on milk removal and sucking mechanism as imaged by ultrasound. Pediatrics 2008; 122(1), e188–e194
11. Han SH et al. A study on the genetic inheritance of ankyloglossia based on pedigree analysis. Archives of plastic surgery 2012; 39(4), 329–332
12. Soto Barreras S, et al. Oral findings and its association with prenatal and perinatal factors in newborns. Korean Journal of Pediatrics 2018; 61. 279-284
13. Baxter R, et al. Functional Improvements of Speech, Feeding, and Sleep After Lingual Frenectomy Tongue-Tie Release: A Prospective Cohort Study. Clinical pediatrics 2020. 9922820928055. Advance online publication (epub ahead of print)