

Frequency of Somatic Dysfunction in Infants With Tongue-Tie: A Retrospective Chart Review

A. Hope Tobey, DO, FAAP, FACOP, and Albert J. Kozar, DO, FAOASM, R-MSK

ORIGINAL CONTRIBUTION

Abstract

Introduction

The recent increase in breastfeeding has brought an increased awareness of potential causes for breastfeeding difficulties. Many parents are choosing frenectomy or laser revision for their infants with tongue-tie (ankyloglossia). This study aims to identify somatic dysfunctions commonly found in infants with tongue-tie as a first step in distinguishing infants with feeding issues caused by somatic dysfunction from infants with feeding issues directly related to tongue-tie. Since somatic dysfunction of the cranial base and occiput have direct implications for impacting the hypoglossal nerve, which provides motor control of intrinsic tongue musculature, it is our hypothesis that infants with tongue-tie and feeding issues will have a high incidence of cranial base dysfunction.

Methods

A retrospective chart review was performed on 48 charts of infants diagnosed with tongue-tie who had been seen from June 2012 to January 2017 at a multispecialty practice. Thirty-one charts were excluded and 17 charts are reviewed here.

Results

Of the 17 infants with tongue-tie whose charts were included in the review, 76.4% had difficulties with latching and 35.3% had difficulty with suck or coordination of suck. All of the infants (100%) had occipital condylar dysfunction, 94.1% had restriction of at least 1 cranial suture, 94.1% had atlantooccipital (OA) joint dysfunction, and 23.5% had dysfunction at the sphenobasilar synchondrosis.

Conclusions

All of the infants with tongue-tie had somatic dysfunction at the cranial base. This again raises the question of whether or not the feeding issues were directly related to the tongue-tie or to the somatic dysfunction or to a combination of both. This study was limited by sample size and limited diversity of patient sampling. Further studies are necessary.

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From the Edward Via College of Osteopathic Medicine in Blacksburg, Virginia.

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Correspondence address:

A. Hope Tobey, DO, FAAP, FACOP

Assistant Professor Department of Pediatrics,
Assistant Professor Osteopathic Manual Medicine
Edward Via Virginia College of Osteopathic Medicine
2265 Kraft Dr.

Blacksburg, VA 24060

(540) 231-4000

htobey@vcom.vt.edu

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Introduction

Tongue-tie (ankyloglossia) is defined as a restricted, thickened, or shortened lingual frenulum (*see Figure 1*). It is typically an isolated defect but can be associated with other facial defects. It can restrict the tongue's ability to elevate and extend, both of which are necessary for the infant to express milk while breastfeeding. It is more common in males¹ and occurs in 0.2% to 4.8% of infants.^{1,2} A recent rise in women choosing to breastfeed (*see Table 1*), has led to an increased awareness of tongue-tie in the general population and its potential for affecting breastfeeding. This increased awareness has more parents questioning if their infant has a tongue-tie and if so, how is it impacting breastfeeding, what is the best course of treatment, and is a frenectomy or laser tongue-tie revision (*see Figure 2*) necessary.

Based on prior evidence that frenectomy did not significantly impact feeding or speech outcomes for most infants, a majority of pediatricians traditionally recommend not doing a frenectomy unless the tongue-tie interferes significantly with breastfeeding.⁵ In fact, the *Nelson Textbook of Pediatrics* states that "A short lingual

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Figure 1. Three-day-old boy with shortened lingual frenulum.

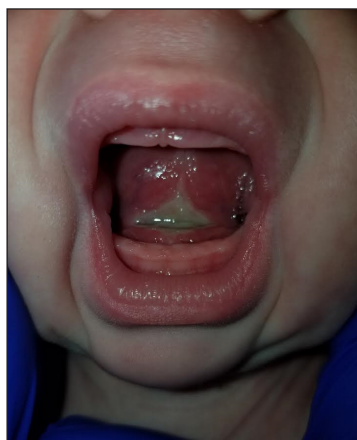


Figure 2. Three-month old girl 3 days following laser tongue-tye revision.

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frenulum may be worrisome to parents but only rarely interferes with eating or speech, generally requiring no treatment.”⁶ A study done in 2000 showed that only 10% of pediatricians and 30% of otolaryngologists who responded to a survey felt that tongue-tye frequently affected feeding, while lactation consultants and speech therapists were more likely to feel that it affected feeding.²

However, recent research has again raised the possibility of tongue-tye as a key to painful breastfeeding and/or poor latch.⁷⁻¹⁰ Additionally, a few small studies demonstrated some potential benefit in feeding and nipple pain after frenectomy.¹¹⁻¹³ These studies have generated an increased interest from parents and some health care providers in frenectomy as a means of helping infants with difficulties in breastfeeding.^{11,14,15} Unfortunately, most of these studies have low to insufficient strength of evidence.⁸ Therefore, further high-quality research is necessary to establish a severity scale, correlate tongue-tye with symptoms, and provide evidence-based recommendations as to which infants would benefit from frenectomy and at what age.

Unfortunately, not all infants experience an objective improvement in breastfeeding after frenectomy.¹⁶ Studies cite the incidence of

continued breastfeeding difficulties after frenectomy anywhere from 8% to 28.8%.^{13,16} These infants return to their health care team for further evaluation and treatment. Because infants with a diagnosis of tongue-tye typically have no difficulty with bottle feeding¹⁴ and many practitioners have nothing else to offer, the bottle often becomes the treatment plan regardless of the underlying etiology.

The lack of improvement in breastfeeding after frenectomy raises the question of what factors other than the tongue-tye may be negatively influencing those infants’ ability to breastfeed and whether or not the tongue-tye ever had a substantial negative impact on their breastfeeding.

Infant feeding difficulties have also been shown to improve by treating somatic dysfunction.^{17,18} Somatic dysfunction of the cranial base and occiput have direct implications for impacting the hypoglossal nerve which provides motor control of intrinsic tongue musculature.¹⁹ Additionally, somatic dysfunction of this area would be expected to affect the glossopharyngeal, vagus and spinal accessory nerves as they exit the jugular foramen, further impacting tongue motion, gag reflex, and swallow.

Normal function of the intrinsic muscles of the tongue is essential for effectiveness of the oral and pharyngeal phases of suck and swallow.¹⁷ Without appropriate function, it becomes more difficult for infants to coordinate tongue motion, extract milk from the breast, and coordinate their swallow. These symptoms are also seen in infants diagnosed with tongue-tye.

This leads us to question if some infant breastfeeding difficulties are related to their tongue-tye, a somatic dysfunction, or combination of both. This study aims to identify the frequency of somatic dysfunction in infants with a diagnosis of tongue-tye. We propose that infants diagnosed with tongue-tye should first undergo a thorough feeding evaluation, including evaluation for somatic dysfunction, as a first step in distinguishing infants with feeding issues caused by

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Table 1. Increased frequency of breastfeeding in the USA. Adapted from the CDC’s Breastfeeding Report Card.^{3,4}

| | Ever breastfed | Breastfeeding at 6 months | Breastfeeding at 12 months | Exclusive breastfeeding at 3 months | Exclusive breastfeeding at 6 months |
|------|----------------|---------------------------|----------------------------|-------------------------------------|-------------------------------------|
| 2016 | 81.1% | 51.8% | 30.7% | 44.4% | 22.3% |
| 2007 | 73.8% | 41.5% | 20.9% | 30.5% | 11.3% |

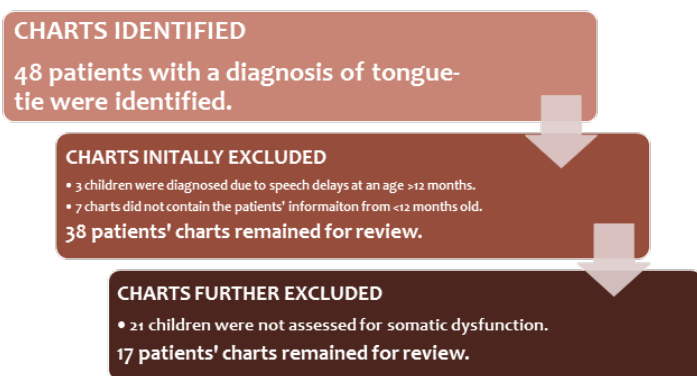
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somatic dysfunction from those infants with feeding issues directly related to tongue-tie. Further, it is our hypothesis that infants with tongue-tie and breastfeeding issues will have a high incidence of cranial base dysfunction.

Methods

Institutional Review Board approval was obtained from the Edward Via Virginia College of Osteopathic Medicine. (IRB approval #2017-007) Following approval, the electronic medical record system (EMR) at an outpatient, multispecialty, academic clinic in Blacksburg, Virginia, was searched for all infants with a diagnosis of tongue-tie (ICD-9 750.0 or ICD-10 Q38.1). Records from the date of installation of the EMR in June 2012 thru January 2017 were searched. Forty-eight charts were identified with a diagnosis of tongue-tie. However, 3 charts were children diagnosed with tongue-tie for the first time over the age of 12 months, and 7 charts were children who came to the practice at an older age without the necessary information for chart review. Therefore, 38 infants with tongue-tie diagnosed under the age of 12 months were identified. Unfortunately, of those 38 infants, only 17 had been assessed for somatic dysfunction (Figure 3). All of the infants' osteopathic exams had been done by the same attending osteopathic physician as part of their physical exam. The infants not assessed for somatic dysfunction had been seen by a mixture of other attending physicians and residents in the practice. The 17 included charts were then reviewed for demographic information, type of delivery, method of feeding, presenting symptom, and somatic dysfunction.

Figure 3. Flow diagram for chart exclusion.



Results

Of the 17 charts reviewed, 14 of the infants were born at term gestation, and 3 were born late pre-term. Thirteen infants were male and 4 were female. Fourteen infants were white, while 2 were Asian, and 1 was Hispanic. Eleven of the infants were delivered

Table 2. Patient symptoms (N=17).

| Symptom | No. | Percent (%) |
|-----------------------------------|-----|-------------|
| Difficulty with latch | 13 | 76.4 |
| Difficulty with suck/coordination | 6 | 35.3 |
| Frequent biting while feeding | 4 | 23.5 |
| Poor weight gain | 1 | 5.9 |
| Gastroesophageal reflux | 3 | 17.6 |
| Fussiness | 2 | 11.8 |

vaginally, 2 were born by vacuum-assisted vaginal deliveries, and 4 were born by cesarean deliveries. All 17 of the infants were being breastfed, but 2 (a set of twins) were being supplemented with formula in addition to breastfeeding. Three of the infants were diagnosed with posterior tongue-tie and lip tie while the other 14 had been diagnosed with an anterior tongue-tie alone.

Of the 17 charts reviewed, a majority of patients (76.4%) had difficulty with latch. Other common complaints included difficulty with suck and/or coordination of their suck and frequent biting while feeding. Less frequent symptoms included gastroesophageal reflux, fussiness, and poor weight gain (Table 2).

Evaluation for somatic dysfunction revealed that all infants had a cranial somatic dysfunction in the region of the occipital condyles. A majority (94.1%) had atlantooccipital joint (OA) dysfunction and restriction noted along a suture line(s). The sutures most commonly affected were occipitomastoid and lambdoid. A significant amount of infants also had cervical (76.5%) and thoracic (64.7%) somatic dysfunctions. Almost half of the infants (47%) also had sacral and abdominal somatic dysfunction (Table 3).

Discussion

All of the infants' charts reviewed in this study had somatic dysfunction at the occipital condyles. Remembering that at birth the occiput is still in 4 parts (squamous, basilar, and 2 condylar), it is thought that an intraosseous strain of the condylar parts can directly affect the hypoglossal,¹⁹ while an interosseous strain between the temporal and occipital bones can directly affect the glossopharyngeal, vagus, and spinal accessory nerves as they respectively course through the hypoglossal and jugular foramina that border the condyles.²⁰ With these nerves providing innervation to muscles of the palate and both the intrinsic and extrinsic muscles of the tongue, it is possible that somatic dysfunction of the occipital condyles could have been a significant contributing factor in poor tongue motion and coordination, as well as issues with swallowing

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Table 3. Incidence of somatic dysfunction by body region.

| Somatic dysfunction | No. | Percent (%) |
|---|-----|-------------|
| Cranial dysfunction | 17 | 100.0 |
| Occipital condylar | 17 | 100.0 |
| Occipitoatlantal | 16 | 94.1 |
| Other cranial bone dysfunction | 6 | 35.2 |
| Sphenobasilar synchondrosis | 4 | 23.5 |
| Cranial Suture restriction | 16 | 94.1 |
| All sutures restricted | 8 | 47.0 |
| Occipitomastoid | 6 | 35.3 |
| Lambdoid | 7 | 41.2 |
| Metopic | 1 | 5.9 |
| Frontoparietal | 1 | 5.9 |
| Parietotemporal | 1 | 5.9 |
| No documented suture involvement | 1 | 5.9 |
| Abdomen | 8 | 47.0 |
| Cervical | 13 | 76.5 |
| Lumbar | 6 | 35.3 |
| Pelvis | 7 | 41.2 |
| Rib | 1 | 5.9 |
| Sacrum | 8 | 47.0 |
| Thoracic | 11 | 64.7 |

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and therefore could have played a significant role in the breastfeeding difficulties of these infants.

We have shown that infants with tongue-tie have somatic dysfunction that could cause breastfeeding issues. We also know that treating somatic dysfunction in infants has been shown to improve breastfeeding difficulties^{17,18} and that some studies have shown that as many as 50% of infants with tongue-tie are asymptomatic.⁷ It is therefore possible that there are symptomatic infants with tongue-tie in whom somatic dysfunction is either a major contributor or the primary cause of their feeding difficulties and in whom frenectomy alone would not be therapeutic. Therefore, our recommendation is that all infants with tongue-tie and feeding difficulties have a complete feeding evaluation, somatic dysfunction screening, and if indicated, osteopathic manipulative treatment (OMT) prior to frenectomy.

This study was limited by the small sample size and limited patient diversity. Additionally, due to its retrospective nature, we were

unable to compare somatic dysfunction found in symptomatic infants with tongue-tie to somatic dysfunction found in asymptomatic infants with tongue-tie. Further research is needed to distinguish which infants with tongue-tie would benefit from OMT alone versus treatment with OMT and a frenectomy. A blinded prospective multicenter trial with increased sample size is needed to confirm these findings and evaluate the effect of OMT alone versus OMT and frenectomy, on the quality and duration of breastfeeding.

Conclusion

Infants with tongue-tie have a high incidence of somatic dysfunction in areas which could affect feeding. We recommend that all infants with tongue-tie be screened osteopathically and treated with OMT if indicated. Further research is needed.

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Additional Resources

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