Chiropractic management of ankyloglossia & retrognathia and their impact on breastfeeding: A case study

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ABSTRACT

Ankyloglossia diagnosis and its' management is varied. This case study followed a newborn with breastfeeding difficulties and inadequate weight gain and investigated the relevance of musculoskeletal management in supporting the dyad with breastfeeding difficulties post frenectomy. Chiropractic care was provided post frenectomy along with lactation management to assist the infant who was unable to latch directly to breastfeed and transfer milk efficiently. Further studies are needed to study the impact of chiropractic treatment on the success of frenectomy.

Key Words: neonate, breastfeeding difficulties, chiropractic, retrognathia, frenectomy, ankyloglossia, lactation difficulties.

Introduction

The management and diagnosis of ankyloglossia are varied. Ankyloglossia, also known as tongue-tie, is a congenital oral anomaly that may decrease the mobility of the tongue in elevation, extension and lateralization, therefore may decrease tongue function. It is caused by an unusually tight, short and or thick lingual frenulum, a connective tissue membrane consisting of fascia and oral mucosa, connecting the underside of the tongue to the floor of the mouth. It can be located along the entire underside of the tongue (root to tip) or a more posterior location leaving the tongue tip free.¹ The prevalence varies widely, possibly due to disagreements in how to assess and diagnose a tongue tie. Values in studies vary between 4.2 percent - 10.7 percent, however a recent meta-analysis concluded for infants under one year of age it's 8 percent.² Restricted tongue mobility as a result of ankyloglossia may lead to feeding difficulties, speech problems and can affect the height and width of the palate, position of the mandible and alignment of the teeth.³ Mills, et al., 2020 cadaver studies demonstrated the lingual frenulum to be a dynamic structure formed by the midline fold of the floor of mouth fascia together with the overlying floor of mouth mucosa.4

The floor of the mouth is made up of four muscles: paired mylohyoid muscles, geniohyoid, digastric muscle and stylohyoid muscle. The oral diaphragm (muscular floor of the oral cavity) bridges between the two rami of the mandible and is formed from the mylohyoid muscles.⁵ The tongue directly influences facial development due to its role in the development of the oral skeletal structures. Outward pressure is exerted on the palate, gums and descending teeth and the mandible by the tongue. The buccal musculature constricts in response to the outward forces to maintain equilibrium. In this way, the tongue drives the developing

position and shape of both the maxillae (palate and dental arch) and that of the mandible as well as the space for the erupting dentition.⁶ The alveolar bone is connected to lip, tongue, and buccal musculature via frenums (folds of tissue); the primary function of these is to maintain balance between growing bones, the tongue and lip musculature. This occurs during development of the fetus and limits movement of lips, tongue, and cheeks. Abnormal frenal attachment may affect lips, tongue and cheeks and may influence the position and shape of the jaw (as well as the maxillae) and dentition. Hence, the issue of ankyloglossia can have both long-term as well as short-term effects.⁶

Frenectomy is commonly proposed to obliterate or incise the tethering tissue(s) using laser, scalpel, or surgical scissors. However, there is much disagreement amongst health care professionals as to whether frenectomy is the sole reason for resolution of symptoms. The evidence for short term efficacy of the frenectomy show improvement in breastfeeding, immediate changes in the mothers' nipple pain, milk transfer and weight gain.^{7,8} Long term improvements are not demonstrated.

Clinical presentation varies. The focus in this case was on the complications related to breastfeeding issues. These included but were not limited to; latching difficulties, inability to sustain a latch, irritability while feeding and nipple pain during feeding for the mother. Although there are many different approaches to the problem, this case study specifically demonstrated the utility of musculoskeletal management of breastfeeding difficulties in infants with tethered oral tissue.

Methods

The literature search was conducted in six databases

(ScienceDirect, NCBI, PubMed, Sci-Hub, Academy of Breastfeeding Medicine, JAMA Network) from inception and completed using search terms relevant to breastfeeding difficulties, chiropractic management, retrognathia, frenectomy, ankyloglossia, lactation difficulties. The case records of the chiropractor and lactation consultant were consulted to review the case presentation and management.

Case presentation

The family presented to the chiropractic clinic. The infant was presented to the chiropractor at 32 days of age, weight was 3900g and the chief complaint was breastfeeding difficulties and inability to latch. They were currently finger feeding and using a supplemental nursing system. The lactation consultant was concerned about the infant's inability to transfer milk.

Historical findings were as follows: the mother was Gravida 1, Para 1. She had a natural vaginal delivery at 41 weeks. Delivery duration was 19 hours with active labor of about an hour. The normal vertex delivery was complicated by the use of ventouse suction, and the mother required an episiotomy. Apgar scores were 9 at 1 minute, 10 at 5 minutes and 10 at 10 minutes. Birthweight 3650g. Length 52cm, head 37cm. The discharge weight was 3400g.

Maternal medical history was insignificant; she was taking no medication.

At 12 days of age, the infant presented to a lactation consultant (LC) with an immediate aim to ensure infant received enough nutrition, as the infant's weight was 3500g, not yet achieving birth weight. The mother presented with sore nipples. The infant had no latch, suck, or milk transfer from the breast. Infant was being fed expressed milk via finger feeds or nasogastric tube as a home-made supplemental nursing system. Mother trialed a nipple shield but it did not improve the infant's efficiency in transferring milk and the infant continued losing weight. The lactation consultant encouraged her to pump and give exclusive breast milk (EBM) "top-ups", fed to the infant either using finger feeding or ng tube, or, preferably, supplemental nursing system. The LC corrected the infant's latch and referred them to another healthcare provider to consult on the diagnosis and perform a frenectomy of a posterior tongue tie. They were also referred by the LC for craniosacral therapy as she suspected bilateral tight temporomandibular joints (TMJ).

On day 13 the infant underwent a frenectomy with scissors to release the posterior tongue tie. The procedure was performed by an ear nose and throat (ENT) doctor and weight was 3580g at the local hospital. At 2 weeks old, parents were concerned about bottle feeding interfering with their ultimate goal and were adamant about their choice to breastfeed. They were currently feeding via supplemental nursing system or finger feeding. The lactation consultant had suggested feeding in a laid-back position to assist in moving the jaw forward, as infant weighed 3455g that day, on day 15.

On day 16, three days post frenectomy, the mother messaged the lactation consultant and reported that the infant was not suckling. The mother was finger feeding as she was struggling with the laid-back position. The lactation consultant advised to try the dancer hold. A dancer hold is used to assist infants with low tone who struggle to latch. This is obtained by the mother gently cupping the underside of the breast with one hand; four fingers under the breast and the thumb on top. The hand slides forward creating a U-shape with thumb and index to hold the infant's cheeks with the chin resting in the middle of the U-shape. The lactation consultant sent suck training videos, post frenectomy exercises and a pump schedule to protect the milk supply.

At 2 weeks 5 days (Day 19) the mother again tried using a nipple shield. On video, the infant showed short sucking bursts. The mother was battling with the supplemental nursing system and was worried about finger feeding. Education on nipple shield use was given by the LC who encouraged continuation of pumping and referred for chiropractic care. No appointment was made at this time.

The following day (day 20) the infant had stopped feeding on the nipple shield and managed to latch directly onto the breast. The mother wanted to discontinue pumping if the infant was latching. The family purchased an infant scale.

At day 22, the infant's weight was 3710g. Because the mother felt the infant was transferring enough milk breastfeeding, she stopped pumping. It is unknown whether the infant was using shields at this stage.

At three weeks 6 days (day 27), the infant's weight was 3540g, and the infant had still not regained her birth weight. The lactation consultant advised the mother again to express and bottle feed (and instructed her on paced feeding — hold infant in an upright or semi — upright position, allow the infant to open their mouth over the nipple and close over the base. If the upper lips are pulled in then use your fingers to open them over the nipple to flange them out. Hold the bottle horizontally so the flow is not too fast. Build in pauses as needed), as she was concerned the infant was not transferring milk. There was great concern about possible dehydration and parents were quizzed about sufficient numbers of wet nappies per day. The family booked a follow up with the lactation consultant the same day to be shown the Medela supplemental nursing system as the infant was lethargic and did not want to suck.

The LC provided the supplemental nursing system and demonstrated its' use. Power pumping education was also given as well as information on quantities needed per feed and 3 hourly feeds were recommended.

At 4 weeks (day 28) the LC followed up on the supplementary nursing system — the infant was able to feed but the duration of feed was considered too lengthy (2 hours to drink 100mls). The feeding method was changed to a feeding tube and syringe, along with finger feeding. The mother's milk supply seemed adequate as she was able to pump 120ml per session.

The following day (day 29) the infant managed to take in a total of 630ml and was more awake. The mother was again encouraged to see a chiropractor to rule out a musculoskeletal reason why the infant was unable to transfer milk successfully. The day thereafter (day 30) the infant managed to take in a total of 730ml and feeds seemed to be going faster.

However, on day 31, the intake dropped to a total of 640ml and the mother was concerned about duration of the feeds.

At 4 weeks 4 days (day 32) total intake volume dropped to 590ml and the infant was lethargic. At this point the infant was presented for chiropractic care.

The parents presented the infant to the chiropractic clinic at 4 weeks 4 days (day 32). The infant's weight was 3900g. Previous therapy included craniosacral therapy by physiotherapist with no improvement according to the parents. This therapy was received after the frenectomy, at 2 weeks of age. Figure 1 shows the growth chart.



Figure 1. Weight chart.

Observation revealed retrognathia (recessed jaw), restricted tongue movement and function, decreased temporomandibular joint (TMJ) range of motion (the range was decreased more on the left than the right) and reduced oral reflexes (rooting and sucking).⁹ The infant had a posteriorly translated cranium on cervical vertebrae 1 (C1), hyoid retraction with flexion C0/C1 which causes the chin to chest presenting as "multiple chins," and a collapse in the anterior neck musculature presenting as red lines/ folds of skin under the chin (figures 2 and 3). The infant tilted her head to the left and when observed supine, her entire length of her body was concave on the left as if shaped like a banana. Visual assessment of the mouth was difficult due to the limited range of the jaw. Post frenectomy scarring was seen. The tongue range of motion was limited.

Feeding assessment involved the supplemental nursing system and a nipple shield (Figure 4). The parents were overwhelmed by the lack of weight gain. They were concerned that they were pursuing breastfeeding to the detriment of their infant's health. Feeds at this stage lasted longer than an hour. After these long feeds, the mother then had to pump and get ready for the next feed, and her mental health was a concern.





Figure 2. Treatment Day 1 - Recessed chin and multiple skin folds.

Figure 3. Day 1 Treatment — Recessed chin and multiple skin folds anterior neck.



Figure 5. Second chings

Figure 4. Feeding assessment Day 1 with SNS and nipple shield.

Figure 5. Second chiropractic session — visual decrease in jaw recession.

Management

Management included chiropractic adjustments modified to the age and size of the patient to the cranium, temporal mandibular joint, hyoid and performed a bilateral occipital release. Soft tissue therapy was applied to the anterior neck musculature, including a stretch to release muscle restriction. Home exercise program included massage therapy (anterior neck, face & chest), the guppy stretch (infant lying supine and allowing the head to tilt gently into slight extension opening up the anterior neck), side to play (infant is side lying and looking at parents) and different options of tummy time. These included the rugby ball carry (one hand between legs and the infant's stomach, other hand supports head if needed, holding the infant close to you for support), tummy to mummy (infant lying on your stomach or chest so the infant is face to face) and lap time (infant prone on your lap).

On the day after the treatment (day 33), a bottle with a slow flow wide neck peristaltic teat was recommended by the chiropractor after consultation with the lactation consultant, as the mother was battling to feed the infant the required amounts via supplemental nursing system. This bottle was to be used with paced feeding technique and basic sucking exercises were given. These included gum tracing (working on lateralization of the tongue) and biting (finger to back of gum and infant bites down to increase strength of the jaw), suck training (using gentle pressure of the finger on the palate, light so as not to activate the gag reflex but increase pressure as she gets used to it, in order to initiate a seal around the finger). Feeds were to be no longer than 40 minutes in total. Feeding for longer durations meant the energy used to feed outweighed the calories consumed during that time.

The following day (day 33) the infant managed a total intake of 650ml; one feed was directly from the breast. At four weeks 6 days (day 34), she managed a total intake of 750ml from both breast and bottle. Exercises were religiously performed after every feed. Her weight increased to 3990g. Three days later (day 35), a second chiropractic treatment was given (figure 5). The infant was sucking at the breast and able to feed for extended periods of time. A total of 750ml was taken.

The day after the second chiropractic session the infant managed three breastfeeds directly from the breast. The tongue seemed to be protruding further. While breastfeeding, it seemed that the infant became frustrated at flow rate but managed four minutes of direct feeding at a time. Bottle intake was 700mls on Day 36.

Six days after the original chiropractic session (day 38) the mother reported more direct breastfeeding; she also reported a strong suck causing nipple pain. The infant had managed two full feeds from the breast and the mother continued with the home exercise program. A video was sent to the chiropractor from the mother and a feed observed (figure 6). The video showed a deeper latch;

however residual tightness remained in the facial muscles. Her milk supply seemed to have stabilized as she reported, she had "lots of milk."



Figure 6. Feeding assessment received six days post original treatment.

A further consult to reassess the latch and cause of nipple pain occurred on day 40, which was her third chiropractic treatment. The jaw seemed to have reduced the degree of recession (figure 5) and she managed to create a seal around the breast, her tongue was more mobile and range of movement was good. Range of movement in the jaw had improved allowing a wide mouth for latching. The nipple pain the mother had been experiencing seemed to be settling.

At 6 weeks of age the infant weighed 4320g (see growth chart in Figure 1). The infant seemed to be bringing up milk which was attributed to the fact she wasn't used to the volumes she was able to drink. Education and burping techniques were given to the parents, along with holding the infant upright post feed for 20 minutes to minimize the positing as the possibility of aerophagia (taking air in at the breast often seen with oral motor dysfunction as a result of ankyloglossia, coming on and off the breast or during bouts of crying) might be contributing to the increase in refluxing.¹⁰

At 4 months of age she presented to the clinic with an acute torticollis. Treatment included modified cervical adjustments, sternal clavicular mobilizations, thoracic releases and bilateral sacrum adjustments. Home exercise program consisting of neck and core strengthening exercises were given. These included tummy time, encouraging looking up, with every nappy change side to sit up (from supine roll the infant onto their left hip, aim the right shoulder to the left hip and encourage the infant with your voice to sit up, then do opposite side). Neck stiffness cleared

after one session. At this age, infants gain neck control and feeding becomes less reflexive.^{11,12} This may lead to feeding difficulties however this infant experienced no feeding difficulties at this stage. She weighed 6640g meaning she had picked up 232g per week in the last 10 weeks. This was within normal ranges for her current age.¹³

No adverse effects were reported by the parents post chiropractic care and adjustment.

Conclusion

This case study demonstrated that a multi-disciplinary team was required to manage a difficult case of suboptimal breastfeeding. Chiropractic care has proved to be an important part of the multi-disciplinary team used to not only treat breastfeeding difficulties but also play a role in the management of tongue tie or tethered oral tissue.

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Permissions

Permission (informed consent) was received from Christine Swanepoel and most importantly the parents of the patient.

Conflict of Interest

There were no conflicts of interest.

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