



Breastfeeding difficulties and oral cavity anomalies: The influence of posterior ankyloglossia and upper-lip ties



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ARTICLE INFO

Article history:

Received 19 June 2015

Received in revised form 23 July 2015

Accepted 24 July 2015

Available online 31 July 2015

Keywords:

Ankyloglossia

Upper-lip tie

Frenotomy

Frenulotomy

Breastfeeding difficulty

ABSTRACT

Objective: Oral cavity anomalies may contribute to breastfeeding problems. The objective of this study was to describe our experience in a high-volume breastfeeding difficulty clinic with a focus on posterior ankyloglossia and upper-lip ties.

Methods: A retrospective review of patients from a dedicated breastfeeding difficulty clinic from January 2014 to December 2014 was performed. Those identified to have ankyloglossia and/or upper-lip ties underwent release procedures. Subjective breastfeeding changes were documented afterwards.

Results: Of the 618 total patients, 290 (47%) had anterior ankyloglossia, 120 (19%) had posterior ankyloglossia, and 14 (2%) had upper-lip tie. Some patients had both anterior ankyloglossia and upper lip-tie (6%), or posterior ankyloglossia and upper-lip tie (5%). For those with anterior ankyloglossia, 78% reported some degree of improvement in breastfeeding after frenotomy. For those with posterior ankyloglossia, 91% reported some degree of improvement in breastfeeding after frenotomy. Upper lip-tie release also led to improved breastfeeding (100%).

Conclusions: Anterior and posterior ankyloglossia and upper-lip tie, or combinations thereof, were commonly recognized in our study population. Many newborns, however, also had no oral cavity anomalies. Although causation cannot be implied, these oral cavity anomalies may contribute to breastfeeding difficulties in some cases.

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1. Introduction

Ankyloglossia, or tongue-tie, describes a congenital anomaly characterized by an abnormal lingual frenulum, which can limit tongue movement. In the recent past, some clinicians have suggested that infantile ankyloglossia does not contribute to breastfeeding problems [1]. There are, however, a host of contemporary studies suggesting a strong association between ankyloglossia and breastfeeding difficulties [2–5], and resolution of these difficulties with a tongue-tie release procedure [6–9]. A recent systematic review verified the efficacy of frenotomy in alleviating breastfeeding problems [10]. Many physicians and lactation consultants now believe that ankyloglossia can lead to

breastfeeding difficulties with poor latch, maternal nipple pain, mastitis and in some infants, poor weight gain and early unnecessary weaning [6,11,12].

With more mothers now wanting and expecting to breastfeed, most clinicians who currently manage newborns are well aware of the overt cases of ankyloglossia. That is, when there is an obvious anteriorly positioned lingual frenulum causing restricted tongue movement, most clinicians will recommend a frenotomy to help with breastfeeding. However, not infrequently, there are cases of posterior ankyloglossia and/or upper-lip ties that may not be readily recognized as their contribution to breastfeeding difficulties remain controversial.

Posterior ankyloglossia does not have the usual appearance as the traditional 'anterior' ankyloglossia. It is a relatively newly recognized clinical entity most commonly identified by lactation consultants; however, it is still a widely unknown and under-recognized entity among most healthcare providers. In fact, there are a limited number of publications in the literature that discuss posterior ankyloglossia to date [13,14]. These studies showed that

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breastfeeding problems resolved post-frenotomy and thus the authors concluded that posterior ankyloglossia may be a contributor to breastfeeding difficulties.

Upper lip-ties are also now being recognized as a possible contributor to breastfeeding problems by some clinicians [15]. It is characterized by a tight maxillary or labial frenum, which may limit upper-lip movement. It is a benign condition that tends to improve with normal facial growth [16]. Currently, there is only anecdotal evidence that upper-lip ties can cause breastfeeding problems. Restricted movement or the inability to flange the upper-lip has been purported to interfere with proper attachment during breastfeeding, which may lead to maternal nipple pain, poor latch and fussiness for the infant at the breast [15].

With the recent increase in referrals for breastfeeding difficulties due to ankyloglossia and other oral cavity anomalies, a dedicated clinic was created at our institution to help improve access for the evaluation and treatment of infants and mothers in the newborn period who are experiencing breastfeeding problems. The objective of this study was to describe our experience in a high-volume breastfeeding difficulty clinic with a focus on posterior ankyloglossia and upper-lip ties.

2. Methods

Local Institutional Review Board approval was obtained for this study.

A retrospective review of patient records from a dedicated ankyloglossia clinic from January 2014 to December 2014 was performed. This biweekly half-day outpatient clinic is run by a physician assistant (DL), who is an Otolaryngology-Physician Assistant trained in assessing and managing various oral cavity anomalies that may contribute to breastfeeding problems. The ankyloglossia clinic is supervised by an attending pediatric otolaryngologist (SMP), who is available to review any cases with the physician assistant. Patient and caregiver demographics, presenting complaints, and clinical outcomes were retrieved. The study population was composed of healthy infants with no other significant medical issues. Infants with other medical problems were seen in clinics run by attending pediatric otolaryngologists.

All infants underwent a full head and neck examination, which included palpation of the floor of mouth and lingual frenulum. Ankyloglossia, if present, was then classified as either anterior (types I and II) or posterior (types III and IV) subtypes [17]. This grading was subjectively determined by the examiner based on the physical prominence, tightness and location of the lingual frenulum on inspection and palpation, as well as on the apparent limitation of tongue movement and notching of the tongue tip. The mothers were then asked if the upper-lip was able to fully flange when breastfeeding, or if they had difficulty in manually flanging the upper-lip of their newborn. If they reported that the upper-lip did not flange, or if the upper-lip curled under during breastfeeding, inspection of this occurrence during an actual breastfeeding episode was carried out during the visit. Visualization and palpation of the maxillary frenum was then performed to confirm the presence of upper-lip tie on examination.

The option for tongue-tie release and/or upper-lip tie release was given to the parents after examination. If agreeable, consent was obtained and the release procedure was performed in the clinic. For ankyloglossia, the grooved director was used to isolate the lingual frenulum. A straight hemostat clamp was then placed on the frenulum; after waiting a few seconds, the clamp was released and the lingual frenulum was incised using an iris scissor. The release maneuver was performed far posteriorly to open up the

mucosal reflection to ensure that the chances of recurrence were low. Care was taken not to injure the Wharton's ducts. Any bleeding was controlled with direct pressure with gauze moistened with oxymetazoline. A similar technique was used if a labial frenotomy (upper-lip tie release) was required. All mothers were given a chance to breastfeed immediately afterwards and asked to rate whether improvements were noted. Specifically, they were asked to rate the post-procedure breastfeeding as follows: no change, mild improvement, moderate improvement, or significant improvement. The patients were sent home with saline packets and gauze, and instructed to perform stretching and massaging exercises under the tongue before each feeding for the next five days to help decrease the chance of scar band formation. They were also encouraged to see lactation consultants or nurses that specialized in breastfeeding, if problems persisted. Finally, all parents were asked to call the clinic for any complications (e.g., persistent bleeding, scarring), or if breastfeeding worsened at home.

3. Results

A total of 618 infants and their mothers were seen in the ankyloglossia clinic during the study period. All patient-mother dyads presented with breastfeeding difficulties and were being referred for infants to be examined to rule out any structural oral cavity anomalies. There were 362 (59%) male and 256 (41%) female infants. Regarding ethnicity, there were 338 (55%) Caucasians, 157 (25%) Hispanics, 7 (1%) African Americans, and 11 (2%) Asian Americans; 105 (17%) did not specify their ethnicity. Two-hundred and seven (33%) reported a positive family history of ankyloglossia and 410 (66%) did not report a family history. There was one child who presented with their foster parent and therefore the family history was unknown. This child initially had some issues with breastfeeding with the biological mother and also some bottle-feeding concerns.

Overall, 127 of 618 (21%) had no oral cavity anomalies noted on physical examination and therefore had no intervention. Of those who had breastfeeding difficulties and oral cavity anomalies, the majority ($n = 290$, 47%) had anterior ankyloglossia. There were 120 (19%) infants that were deemed to have posterior ankyloglossia and 14 (2%) were found to have upper-lip tie. Thirty-four (6%) infants had both anterior ankyloglossia and upper-lip tie, while 33 (5%) presented with posterior ankyloglossia and upper-lip tie. All mothers were offered tongue-tie release and/or upper lip-tie release procedures depending on their findings and all agreed to proceed. Consent was then obtained and the release procedures were performed as described above.

All patients who underwent tongue-tie and/or upper-lip tie release procedures had no complications. All mothers (except the foster parent) were given a chance to breastfeed immediately afterwards and asked to rate whether improvements were noted. There were six infants who were sound asleep after the procedure, and they were not breastfed afterwards. Similarly, there were eight mothers who wanted to try breastfeeding at home and only tried bottle-feeding after the procedure.

For those that had anterior ankyloglossia, most (78%) reported some degree of immediate improvement in breastfeeding post-frenotomy, with majority (61%) reporting a significant improvement (Table 1). For those with posterior ankyloglossia, 91% reported some degree of immediate improvement post-frenotomy, with majority (55%) reporting a moderate improvement in breastfeeding. Similar favorable findings were observed for participants with upper-lip tie (100% improved), anterior ankyloglossia and upper-lip tie (91% improved), and posterior ankyloglossia and upper-lip tie (85% improved) (Table 1).

Table 1
Summary of oral cavity anomalies and changes reported after release procedures.

	Anterior	Posterior	Upper-lip	Anterior & upper-lip	Posterior & upper-lip
Significant improvement	178/290 (61%)	27/120 (23%)	0	26/34 (76%)	20/33 (61%)
Moderate improvement	38/290 (13%)	66/120 (55%)	7/14 (50%)	3/34 (9%)	6/33 (18%)
Mild improvement	9/290 (3%)	15/120 (13%)	4/14 (29%)	2/34 (6%)	2/33 (6%)
No change	54/290 (19%)	10/120 (7%)	3/14 (21%)	2/34 (6%)	5/33 (15%)
Bottle feeding	5/290 (2%)	2/120 (2%)	0	1/34 (3%)	0
Asleep	6/290 (2%)	0	0	0	0

4. Discussion

During the study period, there were 120 infants with posterior ankyloglossia and 14 with upper-lip tie, which represents a relatively high prevalence rate compared to other reported series in the literature [12]. Furthermore, these rates are higher when considering the infants with multiple oral cavity anomalies. In total, 81 (13%) infants had an upper-lip tie release procedure and 153 (25%) infants had posterior ankyloglossia frenotomy performed in our study population. The high prevalence rates in this study are likely due to the selection bias of a highly sub-specialized clinic and the associated referral patterns. We work very closely with our referring physicians and lactation consultant colleagues to assess these infants for evaluation in an expedited manner. Also with more reported success, higher volume of referrals was received over time for breastfeeding difficulties. With greater recognition of anomalies such as upper-lip tie and posterior ankyloglossia, the true incidence rate will be known, which may be higher than currently thought or reported.

Interestingly, many newborns ($n = 127$, 21%) who presented with breastfeeding difficulties were deemed not to have any oral cavity anomalies. This is an important finding since these children were referred with a suspicion of oral cavity anomalies, which indicates that there are multiple reasons why a newborn may have breastfeeding difficulties.

Whether an upper lip-tie alone can cause breastfeeding difficulty remains controversial. This is mainly due to the lack of evidence supporting or refuting this relationship. Severe cases of upper lip-tie have been associated with maxillary diastema, or gap between upper two central teeth [18], but the relationship to breastfeeding problems has not been clearly documented. The proposed mechanism of functional problems caused by tight maxillary frenum involves the inability to normally move the upper-lip [15]. Yet, due to the limited amount of upper-lip movement required for breastfeeding and speech production, as well as the possibility of physical adaptation, significant functional problems may not occur. However, in some rare cases there may be breastfeeding difficulties attributed to severe upper-lip ties as demonstrated by the current study. Although our sample of infants with upper-lip tie alone was very small ($n = 14$) and therefore causative relationship cannot be proven, most mothers (79%) reported improved breastfeeding post upper-lip tie release. Thus, upper lip-tie may be a contributing factor to breastfeeding difficulties that clinicians should at least be more aware of.

There are many studies demonstrating that breastfeeding difficulties due to traditional or anterior ankyloglossia can be alleviated by simple division of the lingual frenulum [10,13]. Several studies have also shown that frenotomy is a well-tolerated and safe procedure [10]. However, posterior ankyloglossia remain an under-recognized clinical entity and many clinicians do not believe that it can cause breastfeeding problems. This may be explained by the subtle and not easily visualized posterior nature of the lingual frenulum, but our series contained 153 (25%) infants, of which 136 (89%) had improved breastfeeding after the release was performed. Therefore, clinicians should be aware that posterior ankyloglossia

can be another factor that may contribute to breastfeeding problems in some cases. Furthermore, it should be noted that visualization alone is not always adequate to detect posterior ankyloglossia. Visualization with the aid of a grooved director with the tongue elevated and/or the palpation of the floor of mouth should be carried out assess for the presence of a thick band of tissue that represents the posterior ankyloglossia [13].

Our ankyloglossia clinic was created to support the demand for nursing mothers who were having difficulty with breastfeeding. All mothers who were offered a release procedure consented to proceed even though it was made clear that improvements in breastfeeding were not guaranteed. It is likely that these mothers were very motivated to try any measures that may potentially improve breastfeeding.

During the study year, we noted that the referring physicians in our community expressed interest in learning how to perform frenotomies and we also developed increased interaction with our local lactation consultants. Another trend noted was the increased recognition of upper-lip tie as a potential factor influencing breastfeeding. More research, including prospective trials, needs to be done to better understand the influence of this rare clinical entity on breastfeeding.

There are several limitations to the current study. First, the study sample was generated from a highly sub-specialized clinic and therefore selection bias is undoubtedly present. Second, the number of infants in the upper-lip tie alone group was very small. Third, the data was gathered in a retrospective manner and the specific presenting issues pertaining to breastfeeding (e.g., latch difficulties, nipple pain, prolonged feeds) were not consistently documented. Fourth, the long-term follow-up data is lacking and therefore it is unknown whether the breastfeeding problems recurred at home. However, no parents called the clinic to report that breastfeeding worsened at home. Fifth, there were some mothers who did not report improved breastfeeding after the tongue-tie and/or upper-lip tie release procedures. Clearly, there are other factors that can contribute to breastfeeding problems that require further assessments. For instance we were not able to assess maternal anatomy or milk supply related issues. Sixth, the method of diagnosis of various oral cavity anomalies has not been standardized and therefore the generalizability of the current results is unclear. Finally, the post-release improvements in breastfeeding were not measured with validated outcome measures and no control group existed. Therefore, future studies should involve multiple providers in diagnosing the oral cavity anomalies to assess for inter-rater variability and validated measures, such as the Infant Breastfeeding Assessment Tool, should be used to document the changes in breastfeeding after release procedures. As well, prospective studies with long-term follow-up should be conducted to determine if breastfeeding improvements are maintained and whether early weaning was avoided.

5. Conclusion

Anterior and posterior ankyloglossia, upper-lip tie, and combinations thereof, were commonly recognized in our clinic.

Many newborns, however, also had no oral cavity anomalies. Frenotomy continued to be a simple, safe, and effective intervention for many infants and mothers. Although anterior ankyloglossia may be promptly recognized and treated, posterior ankyloglossia and upper-lip tie may also contribute to breastfeeding difficulties in some instances. These clinical entities may often be missed due to its subtle nature and it may require palpation and exposure with a grooved director for identification. As causation cannot be implied from the current study, more research needs to be done to better understand the influence of upper-lip tie and posterior ankyloglossia on breastfeeding.

Conflict of interest statement

None.

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