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TONGUE TIE AND LIP TIE, ORAL MOTOR LIMITATION, DIAGNOSIS AND TREATMENT OPTIONS IN BABIES

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Abstract

Background/aim:This article has been prepared in order to emphasize the negative effects of tongue tie and lip tie on infant feeding and oral motor activity in infants and current

Results: Tongue tie (hypertrophic lingual frenulum, ankyloglossia) and lip tie are genetic conditions that can cause feeding problems, limitation of mouth and jaw muscle activity, problems with the development of facial and jaw bones, and symptoms such as reflux and colic pain in infants. Tongue ties may be short and tight, or they may be very close to the tip of the tongue. In both cases, it may cause adverse effects on tongue and intraoral muscle activity in infants. Lip ties occur when the tissue that connects the upper lip to the gums (frenulum) attaches too short or too tightly to the gum. Both lip tie and tongue tie can cause serious adverse effects on breastfeeding and nutrition in babies, permanent changes in the jaw and teeth, speech disorders and psychiatric effects in the future, breast damage and psychological effects in mothers.

Conclusion: In this presentation, it is aimed to give information about examination and limitation assessment methods, treatment options, breastfeeding and nutritional support, post-operative care recommendations in babies with tongue and lip ties, in the light of current publications.

Keywords: Tongue Tie, Lip Tie, Hypertrophic Lingual Frenulum, Short Tongue Tie, Short Lip Tie, Infant Nutrition

Cite

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1. Introduction

Ankyloglossia (Short Tongue Tie / Hypertrophic Lingual frenulum / Short Frenulum / Tongue Tie) causes the tongue tie, which is a structure normally located under the tongue and in the midline, to remain attached to the floor of the mouth; means shorter or thicker than normal. Lip tie and tongue tie may cause limitation of oral motor muscle activity in infants, adversely affect jaw and facial bone development, feeding and swallowing, and may cause stress in mothers related to infant feeding. There is still no clear treatment guideline for the diagnosis and treatment of lip and tongue tie and the medical approach to patients.

Coryllos tongue-tie classification, Dr. It was completed by Elisabeth (Betty) Coryllos and similarly popularized by Dr. Kotlow, one of the world's most well-known physicians on this subject (Genna, C. W., & Coryllos, E. V., 2009).

Coryllos Tongue Tie Classification

- Type I Frenulum reaching the tip of the tongue
- Type II adhesion 2-4 mm behind the tip of the tongue or 2-4 mm above or behind the alveolar ridge
- Type III Adhesion in the middle of the floor of the mouth or tongue
- Type IV Thick and inelastic submucosal adherence of the tongue to the floor of the mouth (submucosal tongue tie, posterior tongue tie, posterior tongue tie)

In fact, Class IV tongue-tie in the classification of tongue-tie made by Dr.Kotlow is like Type I tongue-tie in the Coryllos tongue-tie classification and is defined from front to back. In this classification system, there is no posterior tongue tie, namely Type IV tongue tie. This classification system, which was first defined in 1999, is combined with the Coryllos tongue-tie classification and is accepted as follows (Kotlow L. A., 1999)) (Figure 1):

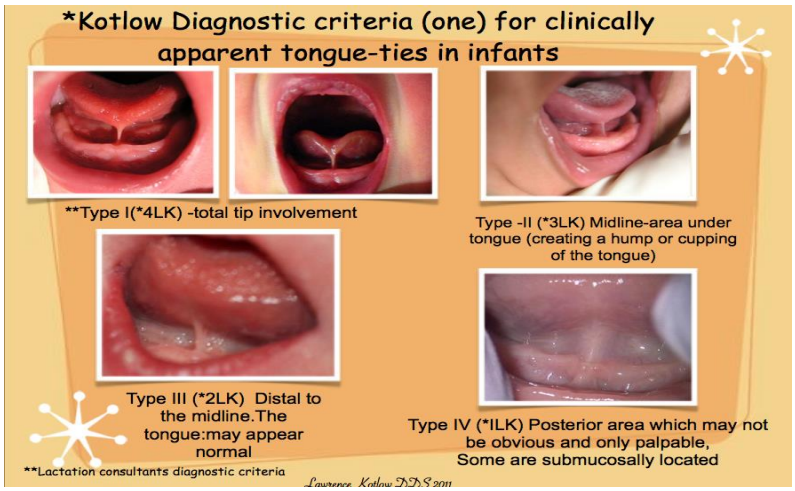

Figure 1: Tongue tie classification.

Anterior tongue tie can be easily seen when the mouth is opened and the tongue is tried to be lifted; For posterior tongue tie, it may be necessary to manually examine the tongue tie. Posterior tongue ties are generally not visible and progress submucosal (type IV tongue tie, submucosal tongue tie).

Posterior tongue tie is the presence of abnormal collagen fibers in a submucosal region on the front of the tongue surrounded by abnormally tight mucous membranes. Behind an earlier, classic front tongue tie there is always a back tongue tie component behind it (Ghaheri, B. A., Cole, M., Chuop, M., & Mace, J. C., 2017).

In the above definition, posterior tongue tie may suggest that it may be on the back of the tongue or in an area close to the root of the tongue, tonsils, and may cause misunderstanding. The meaning of "posterior" in the expression posterior tongue tie is "behind the mucosa" or "under the mucosa".

When the tongue is lifted up and the part of the tongue sticking to the gums sticks in three bands, an image similar to the Eiffel Tower emerges when viewed from below. In this type of tongue tie, which can be named as Piston Type Tongue Tie or Eiffel Tower Type Tongue Tie, the back force that increases as the tongue tie is removed can be very high. Adult patients may have more articulation problems when speaking quickly (Figure 2).

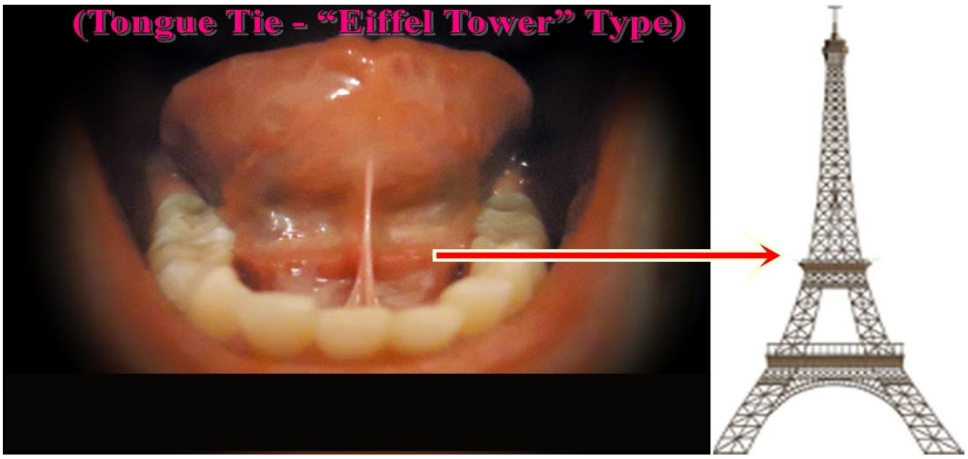

Figure 2: Eiffel Tower Type Tongue Tie

2. Methods or experimental section

Scientific studies on the subject related to lip tie, tongue tie and infant feeding, oral motor activity, published in PubMed database and Google Scholar, have been reviewed and updated information has been presented with these studies.

3. Results

When the lip tie and tongue tie are anatomically short and restrictive and structurally tense, they not only cause adverse effects on infant nutrition; In the future, it may cause premature termination of breast milk production, negative effects on jaw and tooth structure, negative effects on tongue structure, articulation disorders, psychological effects in later ages, jaw and neck pain. While every lip tie and tongue tie does not require treatment; conversely, no lip tie or tongue tie treatment is necessary and the wait-and-see approach is wrong. In case of oral motor limitation and anatomical effects in infants, lip tie and tongue tie treatment should be performed as much as possible and the patient should be followed up with oral motor myofunctional therapy. In order for babies with short and tight tongue-tie to be diagnosed at the youngest possible age, neonatal physicians, midwives and nurses should be informed. As babies get older, normalization of breastfeeding becomes more difficult after tongue tie and lip tie are cut. The reason for this may be that the baby is not able to do the oral phase of swallowing anyway and gets used to an unnatural device such as a bottle, cannot adequately perform the motor muscle activity required while breastfeeding, and breast milk is reduced.

3. Discussion

In order for babies to be evaluated in terms of tongue and lip tie, babies should be placed on their back and the doctor should lift the tongue upwards from the floor of the mouth with two fingers from the baby's head. During this, anatomical classification of tongue tie and lip tie, elastic-fibrotic distinction should be made and the free tongue distance defined by Doctor Kotlow (the distance between the tongue tip and the beginning of the tongue

tie) should be evaluated. Dr. Kotlow emphasized that the free tongue distance should be at least 16 mm (Kotlow, L. A., 2010).

Figure 3: Tongue tie examination (In the above image, Type 1 anterior tongue tie is seen reaching to the tip of the tongue).

When the little finger is placed under the baby's tongue, without opening the mouths of the babies fully and without a detailed examination, if the resistance is felt below the center of the floor of the mouth, there is a tongue tie under the tongue and it means that it may be restrictive enough to affect the breastfeeding ability of the babies. This maneuver has been called the "Murphy Maneuver" (Baxter, R., & Baxter, D., 2018).

"Quick Tongue Tie Assessment Tool" has been produced to make a quick test for tongue-tie (ankyloglossia) as well as disposable, general mouth and face measurements for the measurement of tongue tie. It is used by placing it on the lower incisors in the form of cardboard. Values such as the length of the tongue tie and free tongue distance can be measured (Ingram, J., Johnson, D., Copeland, M., Churchill, C., Taylor, H., & Emond, A., 2015).

In 2006, the Hazelbaker Assessment Tool for Lingual Frenulum Function (HATLFF) was developed to provide a quantitative assessment of the tongue-tie and advice on frenotomy (release of the frenulum) (Amir, L. H., James, J. P., & Donath, S. M., 2006). After those years, the grouping of tongue-tie as posterior and anterior tongue-tie and the absence of visible mucosal folds in the posterior tongue-tie or bifurcation at the tip of the tongue reduce the value of the HATLFF tongue-tie rating scale. This scale can be used to evaluate tongue tie in newborn babies. There are studies showing that a newer tongue-tie assessment system, "The Bristol Tongue Assessment Tool (BTAT)," is a more accurate scale (Ingram, J., Johnson, D., Copeland, M., Churchill, C., Taylor, H., & Emond, A., 2015).

Simple assessment scales have begun to be developed to provide a consistent assessment of language appearance and function in infants with tongue-tie. Among these, the recently described Bristol Tongue Assessment Tool (BTAT) provides an objective, clear and simple measure of the severity of a tongue-tie and is useful in selecting

infants for frenotomy and monitoring the effect of the procedure. It is a scale developed to make a scientific interpretation of whether a tongue-tie operation is necessary in a baby.

Items Included in the Bristol Language Assessment Tool:

- Appearance of the tip of the tongue (structural changes, chapped tongue, heart-shaped tongue, cleft tongue ...)
- Adhesion properties of the tongue tie to the lower gingiva
- Ability to lift the tongue upwards
- Tongue protrusion (measures the amount of tongue protrusion)

Scores for the four items are summed and can range from 0 to 8. Scores of 0–3 indicate more severe reduction of language function.

3.1. Tongue Tie and Lip Tie Symptoms in Infants and Adults

Infants and adults with tongue-tie and lip-tie may experience the following symptoms (www.dilbagiameliyati.com):

- nutritional disorders
- speech disorder
- tooth decay
- bad breath (halitosis)
- reflux in infants, gas swallowing, abdominal pain
- malnutrition and digestive disorders in infants, weight loss
- occurrence of structural changes in the tongue (forked tongue, heart-shaped tongue tip, notched tongue, cup-shaped tongue ...)
- psychological problems (decreased self-esteem)
- sexual dysfunctions
- sleep apnea syndrome
- anatomical influence on the jaw structure
- anatomical influence on tooth structure (separation - diastema in upper teeth)
- temporomandibular joint problems

3.2. Lip tie and Diastema

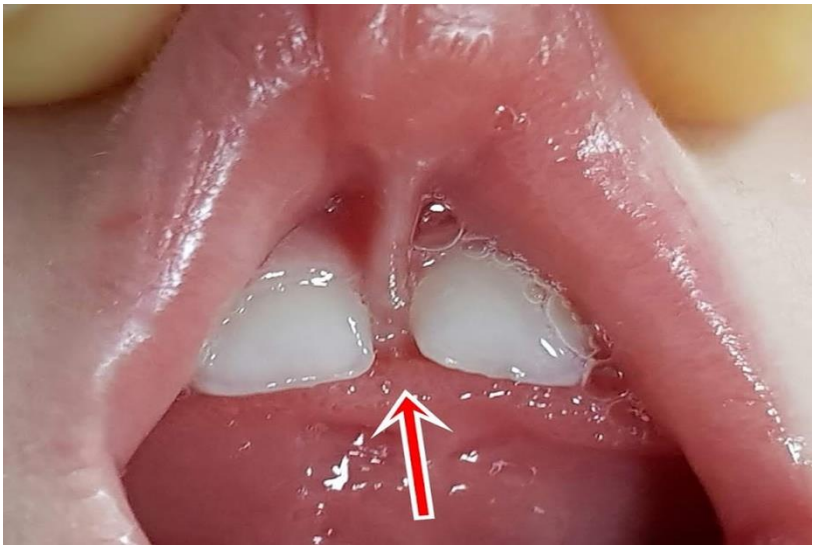

Figure 4: Lip tie and teeth seperation (diastema). The red arrow shows the lip tie that sits between the upper incisive teeth and causes separation between the teeth.

In babies with upper lip tie, if the lip tie reaches the gingival line, if it is tight and thick, over time, it may cause notching in the center line and then splitting (diastema) between the upper incisors when the first teeth come out. Dr. This situation is explained by Ghaheri with the automatic elevator door model. In other words, the thicker the lip tie that goes between the teeth, the more the teeth are separated (i.e. the wider the item is placed between the automatic elevator door, the more the door stays open), the tighter the lip connective tissue between the teeth, the more pitting in the midline and the separation of the teeth. (that is, the stronger we open the automatic elevator door outward with both hands, the more the door stays open). Therefore, taut and thick lip tie can casue creating an gap between the upper front teeth (www.drghaheri.com).

3.3. What are tethered oral tissues (TOTs)?

It is necessary to quote a few information from the article named "The Breastfeeding Dilemma: Misdiagnosed TOTS or Just Ignoring Their Existence?", published by "Lawrence A Kotlow", one of the most experienced physicians in tongue-tie and lip-tie (Kotlow L.A., 2018).

With the expression "Tethered oral tissues (TOTs)", which you can often see in English-language sources about tongue-tie and lip-tie, bonded oral tissues (TOTs) can either be used as a tongue tie (a thin piece of skin under a baby's tongue restricts the movement of the tongue) or as a tongue tie. also refers to the upper lip tie, which binds to the gingiva and limits the movements of the upper lip. While the bond established between the baby and the mother, born after being transported in the womb for 9 months, should continue during breastfeeding, babies' failure to insist on breastfeeding or not sucking can cause disappointments in mothers, depression and insomnia

due to long breastfeeding attempts at night. For correct baby-breast matching, i.e. latching or latching, babies must have no intraoral restraint and have normal motor neural activity. Lip ties and tongue ties can act as a major 'breastfeeding barrier' or 'feeding barrier' for both mother and baby, causing babies to be unable to grasp and vacuum the breast. It is necessary to evaluate the babies in this situation by an experienced lactation consultant or a physician, to plan the treatment as soon as possible and to prevent breast rejection.

In the presence of problems that may occur while breastfeeding, such as difficulty in breastfeeding, insufficient breast sucking, gas swallowing, baby biting the nipple, breast infection in the mother, the upper lip tie and tongue tie in babies should be evaluated. Apart from anatomical classification, palpation of upper lip and tongue limitation is important.

In babies who have difficulty in ordering the breast due to tongue tie and lip or who have breast rejection, normal breast sucking process can start again after the upper lip tie is cut and the tongue tie is cut. However, it is not always possible to relearn breast vacuuming in infants who have experienced breast rejection and are accustomed to bottle feeding. In addition, removing the limitation of the mouth also helps to eliminate the risk of negative effects on the tongue, palate and jaw structure in babies in the future, and to prevent speech disorders and negative psychological effects.

For tongue tie and lip tie release surgery, only simple incision (frenotomy) and tissue removal (procedures such as frenectomy) can be performed. Devices such as laser, thermal welding, cautery, electrocautery, scissors can be used for cutting. After release surgery, various suture techniques are available. The incision can be sutured in the vertical axis to heal the wound in the vertical axis and reduce the possibility of re-attachment. In cautery, electrocautery and some types of laser, there may be sensory nerve damage in the surrounding area due to heat damage. Although it is a rare surgical risk, there are risks such as submandibular gland duct injury, hypoglossal nerve injury, mucocele formation, wound infection and bleeding (Wen, Z., Walner, D. L., Popova, Y., & Walner, E. G. 2022).

In the guide "Breastfeeding: Best for Baby and Mother" published by the American Academy of Pediatrics, it is recommended to release the tongue tie as soon as possible in babies with tongue-tie and in babies who are found to have tongue tie (https://www.researchgate.net/publication/265252666).

In the "Clinical Consensus Statement: Ankyloglossia in Children" published in 2020, it was emphasized that the term posterior tongue tie is still not accepted by all physicians, a common approach protocol should be established regarding tongue tie, and the criteria for patient selection for surgical procedure should be clarified (Messner, A. H., Walsh, J., Lambie, E., & Satterfield, L., 2020).

haheri, B. A., Lincoln, D., Mai, T. N. T., & Mace, J. C. (2022) reported that after the frenotomy procedure, there were serious improvements and positive changes in the infant and mother's symptoms in infants with posterior tongue tie.

4. Conclusion

Babies with oral motor limitation and malnutrition due to tongue tie and lip tie should be evaluated by a specialist as soon as possible in order to maintain the baby-breast relationship and to normalize the natural feeding process with breast milk. We think that early initiation of tongue-tie and lip-tie surgery, breastfeeding counseling support and myofunctional therapy in the early period, especially in infants who are younger, may prevent breast rejection and termination of early breast milk intake in infants. There is no clear treatment guide or approach regarding this issue in Turkey. In order for infants to be diagnosed at an early stage and for those with severe limitations to be treated early, it may be appropriate to receive training from neonatal specialists, midwives, and neonatal nurses on the subject, to briefly evaluate babies with tongue-tie and lip-tie as soon as they are born, and to use scales containing images that can be attached to the wall. In order to minimize the impact of jaw and teeth as a result of the effects of tongue tie and lip tie in the long term, and to feed babies with breast milk as much as possible, infants with lip tie and tongue tie, which have a severe or restrictive effect, should be treated as soon as possible, We think that comprehensive scientific studies on the subject should be done.

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CONFLICT OF INTEREST

The authors must declare that they have not any conflict of interest.

AUTHOR STATEMENT

The authors have to declare that if there is no any ethical approval, consent to participate, consent for publication, availability of data and material, and code availability etc.

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https://www.drghaheri.com/blog/2014/10/8/the-difference-between-a-lip-tie-and-a-normal-frenulum Kotlow, L. A. The Breastfeeding Dilemma: Misdiagnosed TOTS or Just Ignoring their Existence? Med Case Rep J 2018; 1: 102. 2 Figure 2: Class 3 maxillary lip-tie. doi: https://10.31531/2581-5563.1000102

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