The lingual frenulum, ankyloglossia, and breastfeeding

Norma E. Rossato

ABSTRACT
Between 1997 and 2012, the diagnoses of ankyloglossia and the indication for frenotomy increased by >800%. About 38% of diagnosed cases are surgically treated.
Breastfeeding promotion includes evaluating maternal hereditary and personal history of breastfeeding, breast structure, endocrinological physiology, emotional well-being of the mother, breastfeeding technique, quality and quantity of milk, and the newborn’s ability to latch on and suckle.
Frenotomy would be indicated when restriction of tongue function causes difficulties that have not resolved after thorough evaluation and counseling to correct other causes.
Frenotomy can have complications: feeding and respiratory difficulties, pain, weight loss, vascular or nerve damage, and delayed diagnosis of other underlying pathologies. It does not always solve breastfeeding difficulties. Interdisciplinary teamwork reduces the frequency of unnecessary frenotomies.

Keywords: ankyloglossia; lingual frenulum; breastfeeding; oral frenectomy.

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1 Department of Pediatrics and Neonatology, Sanatorio de la Trinidad Palermo, City of Buenos Aires, Argentina.

Correspondence to Norma E. Rossato: nerossato@gmail.com

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INTRODUCTION

In December 2023, *The New York Times* published a front-page article, “Inside the Booming Business of Cutting Babies’ Tongues”, which mentions that dentists and lactation consultants nationwide promote frenotomy for newborns of mothers who have difficulty breastfeeding.¹

Coinciding with this publication, in January 2024, *Breastfeeding Medicine* published a study on the prevalence of short frenulum and its association with breastfeeding duration. In the editorial accompanying this issue, Eidelman discusses the possible factors that led to the worldwide boom in this procedure, unaccompanied by evidence-based scientific knowledge.²

Brief history

The lingual frenulum has appeared in medical texts since the beginning of our era. A surgical text by Johannes Scultetus (1595-1645), a surgeon from Ulm, Germany, shows, among the illustrations of surgical procedures, the image of a child undergoing a frenotomy with scissors.³ During the 18th century, midwives had a sharp fingernail to free the tongue in all newborns. The consequences of these procedures could be severe in some cases: infections, lingual artery injury, hemorrhages, asphyxia, and scars.⁴

Ankyloglossia

The lingual frenulum is a fold that joins the tongue to the floor of the mouth. Its histologic structure is like a diaphragm. The mucosa covers a fascia of variable thickness and histologic composition. Partial ankyloglossia (short frenulum) is the anatomical variation that can limit tongue function, and total ankyloglossia is the apparent fusion of the tongue with the floor of the mouth.⁵

Despite the time, controversies continue about its diagnosis, clinical significance, and treatment.⁶ The prevalence of short frenulum ranges from 2 to 10% of newborns. Diagnosis and surgical treatment have increased in recent decades due to several factors (different diagnostic criteria, particular emphasis on the benefits of breastfeeding, more significant concern about the relationship between ankyloglossia and breastfeeding impairment, greater involvement of lactation consultants in diagnosis, increased media coverage, increase in the number of professionals, particularly dentists, who treat ankyloglossia).²⁷ Between 1997 and 2012 was reported an increase of more than 800% in the diagnosis of ankyloglossia and the indication for frenotomy. About 38% of the diagnosed cases receive surgical treatment.⁶

Like so many entities, ankyloglossia has nuances. Among the scales for evaluating the degree of compromise of tongue function, one of the most widely used is the Bristol Tongue Assessment Tool (BTAT) or its similar Tongue-tie and Breastfed Babies (TABBY).⁸ This instrument assesses the contour (heart-shaped, slightly ribbed or rounded), the place of attachment of the frenulum (anterior, middle, posterior), the ability of the tongue to lift (little, moderate, high), and the possibility of protrusion (does not pass the gums, reaches the labial border, comes out of the mouth). Each item has a score (0 for the most limited and 2 for the greatest mobility).

A score of 8 implies normal tongue function. When the score is 6 or 7, breastfeeding counseling should be provided, and the results monitored. In cases with a score of 5 or less, there may be a functional alteration of the tongue, with or without effects on lactation.

Studies are needed to evaluate not only the anatomy of the frenulum but also its functionality and the adequacy of the infant’s sucking. For sucking, the elevation of the tongue is more important than its protrusion ability.⁵

In 2020, the American Academy of Otolaryngology-Head and Neck Surgery published a consensus on the subject, where 86 topics were addressed. In 41 (48 %), there was consensus (Table 1); in 45 (52 %), there was not.⁹

Short frenulum and lactation

In the newborn, breastfeeding promotion includes assessing all the components necessary for successful breastfeeding. These include maternal hereditary and personal history of breastfeeding, breast structure, endocrinological physiology, emotional status, breastfeeding technique, milk quality and quantity, the newborn’s ability to latch on and suckle (prematurity, airway obstruction, neuromuscular or cardiac disease, craniofacial anomalies).

When difficulties with breastfeeding occur, all these aspects should be evaluated to provide appropriate counseling and improve the evolution. During the puerperium, women are considered a vulnerable population. The family-centered model of care should be present in all therapeutic recommendations and decisions.

A prospective, multicenter, observational study...
in Brazil, in 3 state capital cities, determined the prevalence of ankyloglossia and the association with duration of breastfeeding. They evaluated 293 children at birth and at 6 and 12 months of age. In the last opportunity, with dental examination for the classification of the frenulum with the Bristol Tongue Assessment Tool. The prevalence of confirmed ankyloglossia was 1%, and probable ankyloglossia was 4.8%, with no statistically significant differences in the prevalence of exclusive breastfeeding at the age of 1, 4, and 6 months in children with definite or probable ankyloglossia. The risk of cessation of exclusive breastfeeding was associated with pacifier use, maternal age <24 years, and low birth weight. Mothers reported rejection of the baby, the need to go back to work, low milk supply, or pain as causes of exclusive breastfeeding cessation.

Regarding the pacifier, a randomized multicenter study showed that its use in mothers motivated to breastfeed, with satisfactory lactation at 15 days, does not modify the duration of exclusive or partial breastfeeding. Follow-up was extended until 12 months of age or until breastfeeding cessation. Increased pacifier use in cases of breastfeeding difficulties may reflect these difficulties.

Pacifier use decreases the risk of unexpected infant death. It is essential not to consider it as harmful when the priorities of the pairing are respected: attachment bonding and promotion of breastfeeding during the first weeks, and the use of a pacifier as one of the recommendations for safe sleep, once these objectives have been achieved.

The other aspects involved in breastfeeding cessation, rather than causes, are sentinel events. All suggest the need for a comprehensive breastfeeding assessment considering current knowledge.

### Breastfeeding evaluation

There are instruments for breastfeeding assessment. UNICEF proposes that the Breastfeeding Assessment Tools should be applied during the secretory activation stage, at five days of the newborn’s life. It considers aspects of the baby (attitude, weight, diuresis, bowel movements), breast changes, and use of accessories (pacifier, nipple shield, formula). Another instrument is for the first month of life when breastfeeding is expected to have reached its mature phase.

However, the most critical period of this process occurs in the first days of life.
Vaginal delivery, skin-to-skin contact, and early breastfeeding in the delivery room favor breastfeeding progress. The first day of rooming-in is usually for recovery and rest. On the second day, the interaction between the mother and her newborn becomes very frequent, which, on the one hand, stimulates and, on the other, reflects the progress of the process. The beginning of the secretory activation between days 2 and 3, is a moment of special attention. The weight loss, the stools characteristics, the attitude of the newborn, and the mammary changes are clear signs that, added to the hereditary and personal history of the mother about breastfeeding, give an idea about the situation.

At this stage, the junctions between the mammary epithelium cells are still lax, as they were during pregnancy. Lactose secretion is not only discharged into the mammary ducts but can diffuse into the perimammary tissue and cause edema due to the osmotic effect. The paracellular permeability allows the passage of sodium into the mammary gland and keeps its concentration high in the transitional milk. An indicator of this stage is the concentration of sodium in milk secretion, knowledge published by Morton in 1994.  

The clinical picture shows a mother with tense, painful breasts; the infant has difficulty latching on to the breast, becomes irritated or directly refuses it, has no more bowel movements after meconium evacuation, eliminates urates with urine and sometimes the weight loss is beyond what is to be expected.

The physiological basis for this process is hormonal and genetic. Lactation hormones are affected in stressful situations. In the pituitary gland, the secretion of adrenal-activating hormones postpones lactation. From the genetic point of view, the closure of mammary intercellular junctions also depends on the normal functioning of zinc channels. Mutations in the SLC30A2 gene, which encodes zinc transporter 2 (ZnT2), are associated with decreased tight junctions and persistence of intercellular permeability.

Considering current knowledge, incorporating simple data such as sodium dosage in breast milk would give a clearer idea of each woman’s stage of the process. Persistent high sodium content may be clinically related to neonatal hypertonic dehydration, which is potentially severe for the infant. In cases of problematic weight loss, the newborn should be evaluated with an ionogram to decide the appropriate management.

In *Clinics in Perinatology*, June 1999, Neville published an article about lactation physiology. She explains how impaired paracellular barrier function correlates with sodium concentration in breast milk.  

Still, at present, it is stated that “the etiology of high sodium in breast milk is not established in the literature”.

**Frenotomy**

Frenotomy would be indicated when restricted tongue function (Bristol score ≤6) causes difficulties with breastfeeding that could not be resolved after a thorough evaluation of all factors involved and counseling to correct other causes.

A recently published study shows the protocol of the Department of Otorhinolaryngology, Children’s Health Ireland, at Temple Street, a teaching hospital in Dublin (Ireland). An otorhinolaryngologist and a clinical nurse evaluate infants referred for short frenulum and breastfeeding difficulties. All team members have completed professional certification in breastfeeding. They can offer alternatives to frenotomy if they find other causes of difficult breastfeeding. The forms include data on infant feeding and the anatomical and functional characteristics of the frenulum. Once the evaluation is completed, the mother is offered the most appropriate option. In the case of frenotomy, the informed consent form is signed (reasons for the procedure, possible benefits and risks, and other nonsurgical therapeutic options). The procedure is performed with oral sucrose administration. The mother then breastfeeds her child under the supervision of the specialist nurse. The first month of life is considered the ideal moment. The use of topical anesthetics is not recommended.

Oral sucrose is used to decrease the perception of pain. There is no evidence of the superiority of either technique or in favor of post-surgical massage or stretching.

A study carried out in New Zealand showed complications of frenotomy to include feeding and respiratory difficulties, pain, bleeding, weight loss, and delayed diagnosis of other underlying medical conditions because of the priority given to treating ankyloglossia.

Vascular or nerve structures may be damaged. The lingual nerve lies beneath the fascia on the ventral surface of the tongue with branches to the frenulum lingualis.
CONCLUSION
Breastfeeding is a multifactorial process. When difficulties arise, a thorough technical and physiological evaluation of the components involved in the dyad is required. In cases where a short frenulum is the only positive finding, nonsurgical treatment should be attempted first. Frenotomy does not always solve the difficulties of breastfeeding. Like any procedure, it can have complications. Interdisciplinary teamwork decreases the frequency of unnecessary frenotomies. Future high-quality research will clarify controversies about the definition, significance, diagnosis, and appropriate treatment of ankyloglossia.

REFERENCES