

# Lingual frenum and breast feeding: descriptive study

## Frênulo lingual e aleitamento materno: estudo descritivo

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### ABSTRACT

**Introduction:** Breast milk is the most suitable feeding for all newborns and has numerous benefits widely described in the literature. For the extraction of milk, the suckling function of the newborn depends on adequate functioning of the tongue, including the lingual frenum. However, it is unclear the relationship among the lingual frenum and breast feeding. **Purpose:** To evaluate the lingual frenum in newborn infants and to verify their association with breast feeding. **Methods:** The sample consisted of 139 mother/infant binomials, who were born full term. For the anatomy-functional evaluation of the lingual frenum, the "Evaluation protocol of the lingual frenum for infants" was used. For the evaluation of the breast feeding, the "UNICEF observation protocol of breast feeding" was applied. To verify the association among the lingual frenum and breast feeding, the chi-square test was applied. **Results:** In the evaluation of the lingual frenulum of the 139 infants, it was verified only one infant with a frenum alteration, equivalent to a prevalence of 0.8%, was found. In the evaluation of breastfeeding, of the 138 binomials, whose infants did not have alteration of the lingual frenum, 82 of them (59.4%) did not demonstrate any difficulty during breast feeding. The only infant with lingual frenum alteration did not present difficulties in breast feeding. **Conclusion:** There are insufficient subsidies to establish an association among lingual frenum and breast feeding.

**Keywords:** Lingual frenum; Breast feeding; Sucking behavior; Infant, Newborn; Speech, language and hearing sciences

### RESUMO

**Introdução:** O leite materno é o alimento mais adequado para todo recém-nascido e possui inúmeros benefícios amplamente descritos na literatura. Para a extração do leite, a função de sucção do recém-nascido depende de um adequado funcionamento da língua, incluindo o frênulo lingual. No entanto, não está clara a relação entre o frênulo lingual e o aleitamento materno. **Objetivo:** Avaliar o frênulo da língua em bebês recém-nascidos a termo e verificar sua associação com o aleitamento materno. **Métodos:** A amostra foi constituída por 139 binômios mãe/bebê, nascidos a termo. Para avaliação anatomofuncional do frênulo da língua, utilizou-se o Protocolo de avaliação do frênulo lingual para bebês. Para avaliação da mamada em seio materno, aplicou-se o Protocolo de observação da mamada da UNICEF. Para verificar a associação entre o frênulo lingual e o aleitamento materno, aplicou-se o teste Qui-quadrado. **Resultados:** Na avaliação do frênulo da língua dos 139 bebês, constatou-se apenas um bebê com alteração de frênulo, equivalente a uma prevalência de 0,8%. Na avaliação da mamada, dos 138 binômios, cujos bebês não apresentavam nenhuma alteração do frênulo da língua, 82 deles (59,4%) não demonstraram nenhuma dificuldade durante a alimentação em seio materno. O único bebê com alteração do frênulo da língua não apresentou dificuldades na amamentação. **Conclusão:** Não há subsídios suficientes para se estabelecer associação entre alteração no frênulo lingual e aleitamento materno.

**Palavras-chave:** Freio lingual; Aleitamento materno; Comportamento de sucção; Recém-nascido; Fonoaudiologia

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## INTRODUCTION

Breast milk is the most suitable food for any newborn and breastfeeding is extremely important for the baby's health. In the first six months of life, breast milk should be an exclusive source of nutrition. Theoretically, every newborn, without organic involvement, presents conditions for breastfeeding<sup>(1)</sup>.

In order for the suctioning function to occur naturally, the infant must have coordination of the oral reflexes, lip seal and adequate movement and protrusion of the tongue to obtain milk. The ability of tongue distension is essential during the extraction of milk from the nipple ducts, as well as jaw movements, sucking rhythm, alternating pauses and coordination between sucking, swallowing and breathing movements. All these mechanisms are important for the success of breastfeeding. The literature indicates that the functions of sucking and swallowing depend on the correct functioning of the tongue<sup>(2)</sup>.

The tongue is completely formed at the end of the second month of intrauterine life<sup>(3)</sup>, and during its development, lingual brake cells undergo apoptosis and the brake retracts from its apex, forming a fibromucosa fold called the frenulum. There may be, during this stage of programmed cell death, a disturbance and the occurrence of a condition, which is known as ankyloglossia<sup>(4)</sup>.

Ankyloglossia is a congenital anomaly, in which the lingual frenulum is abnormally short and thick (or even thin), and may vary widely in thickness, elasticity and fixation site on the tongue and floor of the mouth. Such features may restrict tongue movements to varying degrees. Ankyloglossia can be classified as mild or partial, which is the most common type, and severe or complete, a rare condition in which the tongue is fused to the floor of the oral cavity<sup>(5)</sup>. Thus, in severe cases, this membrane interferes with the free movement of the tongue and the alteration in the lingual frenulum implies consequences in the functions of suction and speech.

Babies evaluated and diagnosed with altered lingual frenulum are commonly submitted to a surgical procedure, known as frenotomy. The frenotomy may be partial (frenulotomy), or total (frenectomy). The need for such a procedure is still very much discussed in the literature, and there is no scientific evidence indicating which technique would be the most recommended and its consequences<sup>(6)</sup>.

On June 20, 2014, Law 13.002 - Language Test - was established, which establishes the obligation to carry out the protocol for the evaluation of language frenulum in infants. In this way, all hospitals and maternities should perform the evaluation of the lingual frenulum. The justification for such an evaluation is that the detection of changes in the lingual frenulum can prevent difficulties in breastfeeding and speech<sup>(7)</sup>.

Some authors consider that the frenulum is altered when it is short and thick in the evaluation and that, during protrusion, the projection of a heart form between the apex of the tongue

and the floor of the mouth occurs. Another characteristic pointed to characterize the alteration of the frenulum is related to the functionality of the tongue, which is prevented from protruding beyond the gingival margin, besides the difficulty in touching the incisive papilla, among others<sup>(8)</sup>. Others consider an alteration when the insertion of the frenulum extends more than usual, towards the apex of the tongue<sup>(4)</sup>. Still, there is classification of frenulum with the following characteristics: thick, tight or short<sup>(9)</sup>. Finally, it is considered as altered frenulum that is presented short and previously inserted<sup>(10)</sup>.

In the Brazilian literature, there is a classification of the frenulum<sup>(11)</sup>, considering normal lingual frenulum, in which the insertion begins in the lower half of the tongue to the floor of the mouth; anterior insertion frenulum, when the insertion in the sublingual face is between the middle third and the tip of the tongue; short frenulum, when its insertion is normal, in the middle of the sublingual face, but its size is small; short frenulum with anteriorized insertion, at the junction of the two alterations.

In view of the foregoing, the great variation in the classification of the altered frenulum is evident. In addition, there is also a great variation in terms used in the literature, being tongue-tie<sup>(12)</sup>, ankyloglossia<sup>(4)</sup>, and typical ankyloglossia<sup>(13)</sup>.

With special emphasis on ankyloglossia, several studies report that such an alteration causes difficulties in breastfeeding<sup>(8,14)</sup>, which appear in 25% of the cases of children with this anomaly<sup>(15)</sup>. Another study, involving breastfeeding and bottle feeding, found feeding difficulties in 44% of children with ankylosis<sup>(16)</sup>.

In relation specifically to breastfeeding, it is believed that its success is not necessarily related to the type of newborn's frenulum. In addition, from the clinical practice, it is noticed that the prevalence of the altered lingual frenulum is rare. Thus, the objective of this study was to evaluate the language frenulum in term newborn infants and to verify their association with breastfeeding.

## METHODS

It is an exploratory descriptive study, transversal character. The population consisted of 139 mother/baby pairs assisted by the Unified Health System, in the joint housing modality of a hospital in the interior of Paraná (BR), certified by the Child Friendly Hospital Initiative (*Iniciativa Hospital Amigo da Criança* - IHAC). The sample was statistically calculated to be representative of the population.

Inclusion criteria were: healthy, full-term babies with an Apgar score higher than 7 in the first minute, with a minimum weight of 2,500 grams and mothers willing to breastfeed, regardless of the type of delivery. Exclusion criteria were: newborns with genetic syndromes, neurological disorders, motor, oral and congenital malformations, low birth weight and premature birth.

Data collection was done in two moments. In the first moment, the evaluation of the lingual frenulum of the baby was carried out and, in the second moment, the observation of the performance of the newborn in the breastfeed in the maternal breast.

In order to evaluate the lingual frenulum, the Protocol for evaluation of the lingual frenulum for infants, commonly known as tongue test<sup>(7)</sup>, was applied. This protocol was developed to verify the anatomical characteristics of the tongue frenulum and the functions of suction and swallowing in infants. The protocol is composed of the clinical history, anatomic-functional evaluation and orofacial functions. As the present study was performed in newborns during their stay in the joint housing, we chose to apply the test in the neonatal screening modality<sup>(17)</sup>. In this way, only the anatomic-functional and tongue frenum evaluation was applied, which consists of observing the resting lip position, the tendency of the tongue positioning during crying, the shape of the tip of the tongue when raised during crying, the thickness of the frenulum, fixation of the frenulum on the sublingual (ventral) face of the tongue and fixation of the frenulum on the floor of the mouth. For analysis of the data, it was considered as interference of the lingual frenulum in the language movements the score greater or equal to 7<sup>(7,17)</sup>.

The second procedure consisted of evaluating the performance of the newborn in breastfeeding, and the Protocol of evaluation and observation of the feeding of the UNICEF was applied<sup>(18)</sup>. This protocol, internationally validated, was chosen because it is considered a gold standard to evaluate the performance of the mother/baby dyad at the time of breastfeeding. It is composed of five categories, indicating favorable behaviors and behaviors indicative of difficulties in breastfeeding, addressing aspects of position, responses, affective bonding, anatomy and suction. In this study, the presence of at least one indicative signal proposed by the UNICEF Protocol was considered as a difficulty in breastfeeding. This decision was based on the understanding that breastfeeding happens in the dynamics between mother/baby and that only a sign indicative of difficulty of the mother or baby can already interfere in this dynamic.

The assessment of breastfeeding occurred at least two hours after the last feeding. For this, the mothers were instructed to sit in position. A minimum time of 15 hours after birth and the mothers' desire to breastfeed at the time of collection was respected. Such minimum time was considered in relation to maternal postpartum recovery and the possible interference of the mother's physical status in breastfeeding.

The results were analyzed statistically using the Statistical Package for the Social Sciences (SPSS), version 13.0. The Chi-square test, with a significance level of 95%, was used for statistical analysis to verify the association between the lingual frenulum variables and the performance of the newborn at breastfeeding.

In compliance with Resolution 466/2012, the project was approved by the Ethics Committee of the *Universidade Estadual do Centro-Oeste* (No. 358.809). All the participants signed the Informed Consent Term.

## RESULTS

In the first assessment - anatomic and functional evaluation - of the 139 babies, according to the standards established by the Protocol for evaluation of the lingual frenulum for infants, 138 babies did not present any alteration in the lingual frenulum, which equals 99.2%. This is equivalent to 0.8%. Therefore, for this study, the prevalence of the altered frenulum was 0.8%.

About the 139 infants evaluated, only 1 infant reached a score 7. According to the established protocol<sup>(7)</sup>, when the sum of items 1, 2, 3 and 4 of the anatomical evaluation is equal to or greater than 7 points, we can consider the interference of the frenulum in the movements of the tongue, i.e., altered lingual frenulum. Chart 1 shows the changes found.

In the second part of the evaluation, the breastfeeding was observed with the application of the Protocol of evaluation and observation of the feeding of UNICEF<sup>(18)</sup>. About the 138 binomials, whose babies had no alteration of the tongue frenulum, 82 binomials (59.4%) showed no difficulty during feeding in the mother's womb. However, 56 binomials (40.5%) presented at least one difficulty during maternal feeding, as can be seen in Chart 2.

It should be mentioned that the only baby with a change in the tongue frenulum had no difficulty during feeding in the mother's womb.

The results of the two instruments, the Language Constraint Assessment Protocol<sup>(7)</sup> and the UNICEF Briefing and Evaluation Protocol<sup>(18)</sup>, were compared using the Chi-square test with a significance level of 95%. The variables related to the anatomical and functional evaluation of the protocol of evaluation of the lingual frenulum for babies (resting lip position, tendency of tongue positioning during crying, tongue tip shape when raised during crying, frenulum thickness, frenulum fixation on the sublingual face, fixation of the frenulum on the floor of the mouth) with the performance of the mother/baby dyad in breastfeeding. None of the variables described was related to difficulties in breastfeeding.

When related to baby tongue frenulum change and performance in the mother/baby double feeding, no association between these items was observed, as observed in Table 1.

## DISCUSSION

The prevalence of altered frenulum for this study was 0.8%, consistent with another result presented in the literature, in which the prevalence was 0.88%<sup>(19)</sup>.

The results of the present study differ from those found in another study<sup>(20)</sup>, in which the prevalence was 22.54%. One

**Chart 1.** Distribution of the result of the 139 babies' score in the anatomo-functional evaluation of the Protocol of assessment of the lingual frenulum for infants

Value of pontuation	Number of babies	Description of the changes in the items of the anatomo-functional evaluation of the Protocol of evaluation of the tongue frenulum with scores for infants
0	99	There aren't changes
1	29	Fixation of the frenulum on the floor of the mouth (visible from the inferior alveolar crest) or alteration in resting lips posture (lips parted)
2	6	Fixation of the frenulum on the floor of the mouth (visible from the inferior alveolar crest) and resting lips posture (lips parted)
5	3	Form of the tip of the tongue when it is elevated (slight cleft at the apex), Fixation of the frenulum on the sublingual face (between the middle third and the apex). Fixation of the frenulum on the floor of the mouth (visible from the inferior alveolar crest)
6	1	Shape of the tip of the tongue when it is elevated (slight cleft at the apex), Fixation of the frenulum on the sublingual face (between the middle third and the apex), Fixation of the frenulum on the floor of the mouth (visible from the lower alveolar crest), Posture of lips at rest (parted)
7	1	Tendency of the positioning of the tongue during crying (low tongue), Form of the tip of the tongue when it is raised (slight cleft at the apex), Fixation of the frenulum on the sublingual face (between the middle third and the apex), Fixation of the frenulum on the floor of the mouth (Visible from the lower alveolar ridge)

**Chart 2.** Distribution of unfavorable behaviors in the breastfeeding of the 139 binomials, through application of the Protocol of assessment of the feeding by UNICEF

Domain	Behaviors which are indicative of difficulties	Number of pairs of mother / baby with difficulties
Position	Mother with strained shoulders and leaning on baby	18
	Baby's body apart from mother's	2
	The baby has an upturned neck.	2
	Baby's chin does not touch the chest	1
	Only shoulders/head supported	1
Answers	No response to the breast	1
	No observed search	2
	The baby is not interested in the breast	1
	Restless or crying baby	5
	Baby does not hold the handle of the areola	9
	No signs of milk ejection	2
Establishment of affective bonds	Mother holds baby shaking nervously or weakly	3
Anatomy	Flat or inverted nipples	6
	Breast tissue with excoriations, fissures, redness	14
Suction	Mouth which is almost closed with beak forward	12
	Lower lip facing inwards	9
	The baby's tongue cannot be seen	2
	Tinged or sunken cheeks	1
	Fast sucking with clicks	1

**Table 1.** Distribution of the results of the 139 binomials for tongue frenum association and breastfeeding performance in the mother's womb

Binomial performance in breastfeeding (breastfeeding evaluation - UNICEF)	Binomial without difficulty in feeding	Binomials with difficulty in feeding
Frenum ("Test of tongue")		
Babies who do not have any change in the frenum	82	56
Babies who have change in the frenum	1	0

p=0.410 (Not significant for  $p \leq 0.05$ ) – Chi-square test

of the hypotheses for this difference may be the difficulty pointed out in the international literature, including the uniform evaluation of the frenulum and its characteristics<sup>(20)</sup>.

The Assessment Tool for Lingual Frenulum Function (ATLFF)<sup>(21)</sup> was not effective. In another study<sup>(22)</sup>, the authors concluded that the ATLFF does not point to safe results in determining whether children with “tongue-tied” will present difficulties in breastfeeding.

In the literature, there is not clarity of the relationship between lingual frenulum and breastfeeding. A literature review on the subject analyzed 64 articles, evaluating diagnostic criteria and the need, or not, for treatment at different ages. The results showed that the diagnosis and classification of the lingual frenulum alteration are neither uniform nor unanimous, especially due to the difficulty of evaluating tongue movement, degree of discomfort and difficulties in speech, and factors subjectively described by the subjects studied. In the studies, difficulties were also reported in breastfeeding in newborns, however, the authors pointed out that insufficient studies have been performed that provide an adequate treatment option<sup>(6)</sup>.

With regard to ankyloglossia, it can be seen that it can influence the practice of breastfeeding in term and healthy newborns. However, it is stated that the relationship is based on a few controlled observational studies and that these present some methodological problems, such as small samples, short follow-up, lack of standardization of diagnostic procedures and non-standardization of breastfeeding evaluation protocols<sup>(23)</sup>.

Regarding breastfeeding evaluation, the high prevalence (40.5%) of difficulties in breastfeeding faced by the mother / baby pairs in the present study, in which the babies did not present a language frenulum change, was noted. In a study<sup>(24)</sup>, which also applied the UNICEF protocol to evaluate breastfeeding, it was concluded that 18% to 34% of the mother / baby pairs had some difficulty during breastfeeding. The high prevalence of difficulties in breastfeeding can also be explained by the fact that the evaluation of the feeding was carried out based on the UNICEF protocol. This protocol is considered a gold standard in the assessment of maternal nutrition, evaluating not only suction but also other aspects of the mother/baby dyad relationship, that is, a very broad and complete evaluation.

With regard to the unfavorable behaviors during maternal feeding, this study pointed, in decreasing order: “mother with strained shoulders and leaning on the baby”, “breast tissue with excoriations, fissures, redness”, “mouth almost closed making a nozzle to front”, “bottom lip facing inwards” “baby does not hold the areola handle”, “flat or inverted nipples”. These findings are in agreement with previous studies, in which the greatest difficulties were found regarding the body position of the mother and baby, anatomy of the breasts and affectivity<sup>(25,26)</sup>.

The unfavorable behavior during maternal feeding that appeared most frequently concerns the mother’s position about tense shoulders and leaning over the baby. The mother’s

position is one of the most important points in the evaluation of the feeding, since the inadequate mother’s position hinders the correct positioning of the baby’s mouth in the breast, resulting in a “bad handle”<sup>(2)</sup>.

In relation to breast tissue with excoriations or fissures, it is known that this factor is due to the inadequate positioning or grasping of the baby in the mother’s womb, related to the position of the mother at the time of breast-feeding<sup>(27)</sup>. Moreover, the unfavorable lower lip inward-facing behavior is significant for nipple lesion<sup>(28)</sup>.

In a recent technical-scientific opinion, the Institute of Children’s Health of São Paulo revealed that there is insufficient scientific evidence to diagnose changes in the frenulum and its relation to breastfeeding, as proposed in the Protocol for evaluation of the lingual frenulum for infants<sup>(23)</sup>. According to the opinion, there is still no gold standard for the diagnostic test of ankyloglossia. The authors point out that additional studies are needed to validate a functional, objective and easily applicable protocol by professionals from different health areas that work in maternities, as well as to relate the diagnosed cases of ankyloglossia (severe and moderate) with difficulties in breastfeeding. Based on the technical advice, the Ministry of Health recommends the use of the Bristol Tongue Assessment Tool (BTAT), an instrument that is easy to apply to check severe cases of ankylosis<sup>(29)</sup>. In the present study, such an instrument was not used and it is suggested that, in new studies, such an assessment is included.

It should be mentioned that there is still no consensus in the literature on the efficacy of frenotomy for the treatment of ankyloglossia in infants. According to available literature, the strength of evidence is insufficient for improvement in breastfeeding and reduction of nipple pain after frenotomy. In addition, adverse events and recurrences should be considered, although they are mild and rare<sup>(23)</sup>.

The size of the sample is highlighted as a limitation of the study. It is necessary to carry out new studies with a larger and more representative sample, since the prevalence of the altered frenulum for this study was low. In addition, it is questioned that other variables may interfere with the breastfeeding process. Thus, understanding breastfeeding as a hybrid nature/culture is to consider that, in addition to being biologically determined, breastfeeding is socially conditioned, impregnated with ideologies, becoming an act that can be regulated by society<sup>(30)</sup>. In view of this concept of breastfeeding, several aspects must be taken into account, broadening the look at so many other variables that may be involved with the breastfeeding process.

## CONCLUSION

There was not association between the lingual frenulum and difficulties in breastfeeding. Thus, this study did not obtain sufficient subsidies to establish a direct relation between lingual frenulum alteration and difficulties in breastfeeding.



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