

## Analysis of the efficacy of frenotomy in the treatment of difficulty in breastfeeding caused by the lingual frenum



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### ABSTRACT

**Introduction:** The lingual frenum is a mucous membrane that connects the tongue to the oral floor, it is responsible for the free movement of the tongue in the mouth. The altered lingual frenulum can be responsible for several problems for the newborn, including difficulties to perform functions such as sucking and swallowing, as well as impairing the proper grip of the breast during breastfeeding, which can cause pain in the mother and difficulties for the baby such as gaining weight and early weaning. Phrenotomy is a simple surgical procedure that has been employed as a treatment option for lingual frenulum alteration, with the aim of improving the condition and quality of life of the mother and newborn in the context of breastfeeding. **Objective:** To analyze the efficacy of frenotomy in the treatment of difficulty in breastfeeding caused by the lingual frenum, based on a review of the

available medical literature on the subject. Clinical studies, such as literature reviews, case reports and research on this topic will be evaluated, in order to identify the evidence on the efficacy and safety of this procedure, pointing out the improvements identified after surgery. Literature review: It is important to identify changes in the lingual frenulum, as they negatively affect the patient's quality of life. Therefore, it is crucial to carry out an early diagnosis in order to offer the most effective treatment for this problem. For this, it is essential that professionals have adequate knowledge to make an accurate diagnosis and solve the issue. Phrenotomy is an option to be considered due to its simplicity in clinical and surgical practice, in addition to presenting few risks in the postoperative period. Final considerations: Given that the initial phase of breastfeeding is crucial for the health and quality of life of the baby, phrenotomy is a safe and effective treatment, which also avoids or decreases the consequences of long-term lingual frenulum alteration. Even though there is still research that reports that it is a temporary improvement, this improvement is quite necessary to prevent early weaning, thus avoiding weight loss and the difficulty that mothers face to maintain breastfeeding.

**Keywords:** Phrenotomy, Lingual frenulum, Breastfeeding.

## 1 INTRODUCTION

The alteration in the lingual frenulum, is a congenital anomaly that is called ankyloglossia, popularly known as "stuck tongue", where it can be detected early or not. (Pinto et al, 2019)

This occurs in the process of embryogenesis, where there may be a failure in apoptosis, in which the residual tissue disrupts the formation of the frenulum. (Marcione et al, 2016) (Pinto et al, 2019)

The altered lingual frenulum can cause several problems for the newborn, including difficulties to perform functions such as sucking and swallowing, as well as impairing the proper grip of the breast during breastfeeding, which can cause pain in the mother, difficulties for the baby to gain weight and



early weaning. In addition, it is possible to observe problems in diction and phonetics as the child grows. (Marcione et al, 2016).

The intervention indicated when the change in the lingual frenulum is detected, is the phrenotomy. The lack of intervention can have consequences on the quality of life of the child, due to the difficulty in performing the linguistic functions (Luis et al., 2018)

(Marcione et al, 2016) (Pinto et al, 2019)

Phrenotomy is a simple surgical procedure that involves cutting the lingual frenum, and has been employed as a treatment option to improve the condition and quality of life of the mother and newborn in the context of breastfeeding. However, there are still many controversies about the effectiveness of phrenotomy in these cases. (Son et al, 2022).

The requirement of evaluation of the frenulum of the tongue has been fundamental to identify early the alteration of the lingual frenulum and to enable the necessary intervention to avoid the difficulties arising from this condition.

This study aims to analyze the efficacy of frenotomy in the treatment of difficulty in breastfeeding caused by the lingual frenum, based on a review of the available medical literature on the subject. Clinical studies, such as literature reviews, case reports and research on this topic will be evaluated, in order to identify the evidence on the efficacy and safety of this procedure, pointing out the improvements identified after surgery.

## 2 LITERATURE REVIEW

### 2.1 ANATOMY OF THE LINGUAL FRENUM

The lingual frenulum, can vary between normal and altered, where its classification varies by anatomical aspects, they are short, when the length is less than the standard. Anteriorized, when it is near the apex of the tongue. Short and anterior, when it presents the two characteristics presented above. (Marcione et al, 2016) (Pinto et al, 2019)

### 2.2 INDICATIONS FOR FRENOTOMY

Early detection of lingual frenulum alteration is important to perform the intervention. The treatment reviewed has been the phrenotomy, because it is a simple, effective and safe surgical procedure, where it is not common to have complications and there are many benefits to the child. (Son et al.)

The lack of treatment can cause greater consequences, such as difficulty in breastfeeding, difficulty in speaking, difficulty in performing the functions of the language. (Marcione et al, 2016)

To better indicate the surgical procedure in newborns, there is a neonatal examination that occurs in the maternity, screening of ankyloglossia, popularly known as tongue forehead, this



examination consists of the evaluation of the lingual frenulum before possible difficulties in breastfeeding and other problems related to lingual movement, depending on the result of the examination, it is indicated that the patient make a detailed evaluation with a specialist, to check if there is a need for surgical intervention.

There are some known tests, however the one indicated by the Ministry of Health is the Bristol test (BTAT) which is determined by a score and the lower the change is more severe.

Figure 1 Bristol tongue test (BTAT)

Protocolo Bristol de Avaliação da Língua (BTAT)\*

Aspectos avaliados	0	1	2	Escore
QUAL A APARÊNCIA DA PONTA DA LÍNGUA?	 Formato de coração	 Ligeira fenda/entalhada	 Arredondada	
ONDE O FRÊNULO DA LÍNGUA ESTÁ FIXADO NA GENGIVA/ ASSOALHO?	 Fixado na parte superior da margem gengival (topo)	 Fixado na face interna da gengiva (atrás)	 Fixado no assoalho da boca (meio)	
O QUANTO A LÍNGUA CONSEGUE SE ELEVAR (COM A BOCA ABERTA (DURANTE O CHORO)?	 Elevação mínima da língua	 Elevação apenas das bordas da língua em direção ao palato duro	 Elevação completa da língua em direção ao palato duro	
PROJEÇÃO DA LÍNGUA	 Ponta da língua fica atrás da gengiva	 Ponta da língua fica sobre a gengiva	 Ponta da língua pode se estender sobre o lábio inferior	

\* tradução do Inglês para o português autorizada pela equipe de Bristol. Drs. Jenny Ingram e Alan Edmond.

### 2.3 EFFICACY OF PHRENOTOMY IN RELATION TO BREASTFEEDING

The World Health Organization (WHO), recommends that breastfeeding of the newborn is at least until 6 months, as it contributes to the healthy growth of the child and prevents risks of diseases typical of childhood. (Lima and Dutra) Ankyloglossia limits lingual functions, such as sucking and swallowing, which are directly related to breastfeeding, also interfering with breast gripping, and may cause pain in the mother during breastfeeding. (Lima and Dutra) This limitation can cause the child to stop breastfeeding early, which subjects him to risks. For the treatment of ankyloglossia, responsible for this limitation, phrenotomy is recommended, a simple surgical procedure that is considered safe and effective, where it should be done in the first months of life. (Lima and Dutra)

It was reported by the mothers of children with ankyloglossia, who after phrenotomy, perceived better motor coordination in the acts of sucking, swallowing, breathing and improvement in the grip of the chest, resulting in the reduction of pain. (Lima and Dutra)



## 2.4 EFFICACY OF PHRENOTOMY IN RELATION TO SPEECH AND OROFACIAL DEVELOPMENT

Speech depends on the mobility of the phonoarticulatory organs, such as the tongue, mouth, cheek, teeth and jaw. In order for it to be produced properly, it is necessary to balance these organs. (CAMARGO, 2004)

The change in the lingual frenulum, due to the limitation in the movements of the tongue, affects the phonetics. Thus, phonetics is one of the symptoms for the diagnosis of ankyloglossia. (Canevasssi et al, 2019)

To improve the quality of life of patients with this diagnosis, it is necessary for the patient to be consulted by a speech therapist to perform a comparison between the preoperative and postoperative periods.

The evidence of improvement between the preoperative and postoperative periods is evident especially when related to phonetics. After research, it was reported that patients who had been previously examined, after 30 days postoperatively, presented modified tongue tip shape, lip closure as well as improved movements. (Neto et al, 2014)

## 2.5 COMPLICATIONS AND RISKS ASSOCIATED WITH PHRENOTOMY

Phrenotomy is considered a low-risk surgical procedure, in which, its adverse effects are, light bleeding, ulcer formation, pain, infection, inflammation, and scar retraction. (Procopio et al, 2017)

Bleeding usually occurs mildly and can be controlled by means of pressure. However, it can happen in a more intense way, requiring suture or cauterization to control this bleeding. An intercurrent due to bleeding can be the formation of a clot, where you run the risk of aspiration by the baby.

Infection is also a possible complication when dealing with phrenotomy, to avoid it is necessary to keep the surgical field clean and follow the care instructions provided by the health professional. It may happen that the area where the procedure occurred present redness, swelling, severe pain or pus, in which case it is necessary to contact the professional, to better evaluate and find the best way of intervention.

The scar retraction is related to a difficulty of the body in building a new skin. The formation of scars can disrupt the result of the surgical procedure, thus preventing the tongue from being able to perform its movements properly. It is necessary to perform a repeat procedure, or perform other treatment options.



## 2.6 PHRENOTOMY TECHNIQUES

The frenotomy can be performed can be performed by different techniques being them, the classic, and the laser. (Bissoli et al, 2021)

The classic one is made with tentacanula, to lift the tongue, and metzembaum scissors, which has a curved tip to avoid accidents, has no need for anesthesia. It is a simple procedure where there are risks of bleeding. (Bissoli et al, 2021)

It is also possible to perform it by the laser technique, in which it becomes a faster surgery, with the surgical field cleaner and there is no need for suture. And in the post-surgical period there is a reduction in pain, infection, trauma and scarring. (Tomazini et al, 2017)

## 3 METHODOLOGY

In order to perform the scientific analysis, 11 of 370 articles were selected in the Scielo and Pubmed databases between 2004 and 2021, using the terms "lingual freno", "ankyloglossia", "breastfeeding" and "frenotomy".

To select the studies, criteria were used that include lingual anatomy, lingual frenulum changes, the consequences caused by these changes, the diagnosis of ankyloglossia, the form of treatment, studies of phrenotomy surgery results, case reports with post-surgical results and the indications for frenotomy.

The exclusion criteria consist of eliminating studies that were not published in Portuguese or English, articles published before 2004, those that do not relate to the topic in question.

A table with the methods and results of 10 of the selected articles was included in the review, covering subjects relevant to the chosen theme. In summary, the content presented consisted of a description of the consequences of ankyloglossia, as well as treatment options, including phrenotomy surgery and its postoperative results

## 4 FINDINGS

A study was conducted regarding the type of alteration, 166 patients were included, in which it was observed that 95.1% of the patients had the slender frenulum and 4.8% with the thick frenulum. (Marcione et al, 2016) Of the thick frenulum, 50% had fixation in the middle third/sublingual caruncles and 50% between the middle third and the apex/inferior alveolar crest. (Marcione et al, 2016)

Regarding fixation on the sublingual surface of the tongue and on the floor of the mouth, with regard to the normal frenulums, fixation on the middle third/sublingual caruncles predominated 28%. In the altered frenulum, the highest frequency was with fixation between the middle third and the apex/lower alveolar crest 32.2%. (Marcione et al, 2016)



Table 1

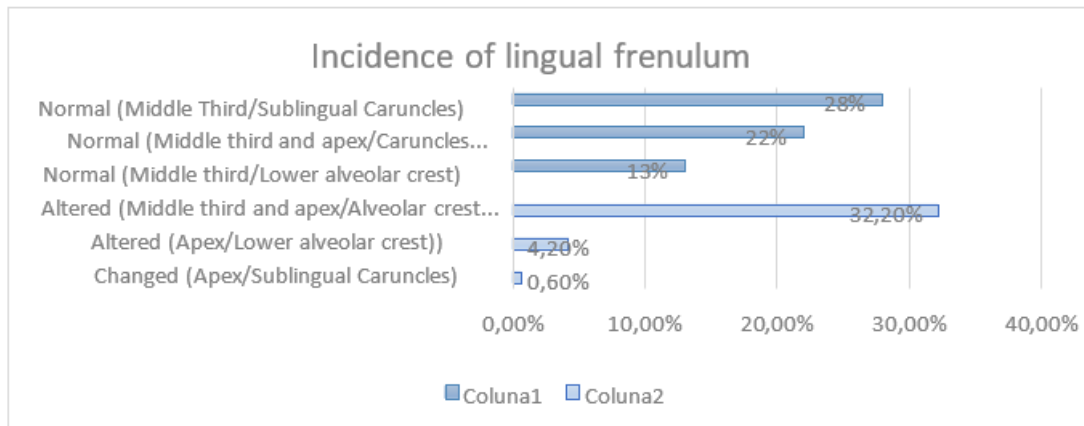
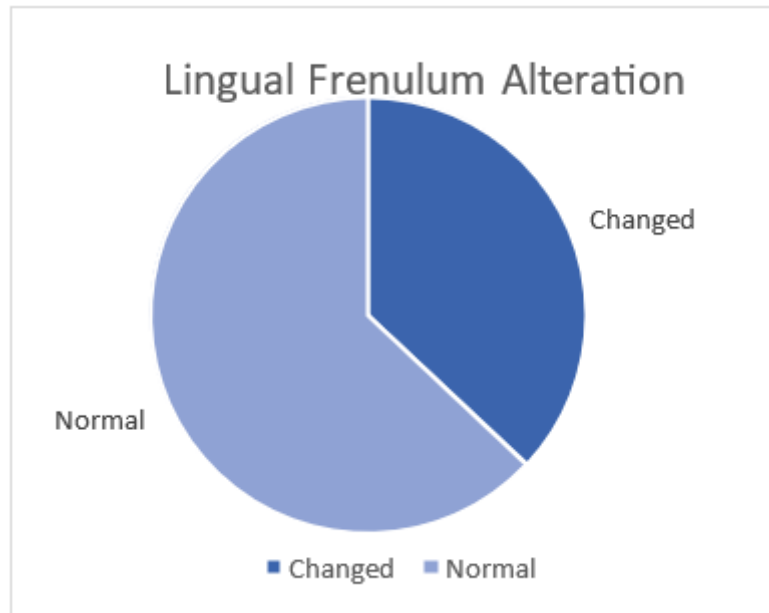


Table 2

Authors	Year	Nature of Research	Methods	Conclusion
Fraga et al	2020	Review of literature	Relationship between ankyloglossia and breastfeeding	Newborns with altered lingual frenulum have higher chances of presenting difficulties in suction and there tendency to have an early weaning.



Marcione et al	2016	Review of literature	Analysis in a baby aged between 1 and 4 months, where it was observed the thickness of frenulum and its fixation on the tongue and floor	In the study it was noted that the frenulum alteration prevailed in the male gender. Infants with altered lingual frenulum were more likely to change in suction, although the correlation between frenulum and suction was low.
Pinto et al	2019	Review of literature	A cross-sectional study was conducted with the professionals of the public network of health of the municipality of Maringá.	The professionals evaluated, the majority, have no knowledge About the Evaluation Protocol of the lingual frenulum. It was also observed the lack of knowledge of the professionals as for oral anatomy. Logo is necessary Teaching for Network health professionals public, focused in the baby's oral cavity.
Gomes et Al	2015	Case report	Male patient, aged 6 years of age, in good general health. Or	The surgical procedure, was favorable and brought anatomical gains



			<p>patient attended a return consultation, but was indicated for a interconsultation with the speech therapist due to the complaint of the mother "talking wrong". Initially in the consultation dental was noticed the brake short lingual, adherent, bulky and limiting movements</p>	<p>and mobility of language, however, there was no speech alteration remained after the intervention requiring the treatment and accompaniment speech-language pathology. Interdisciplinary planning.</p>
Bistaffa et al	2017	Case report	<p>Mother of a patient of 38 days of age, reported pain in the breastfeeding, after the evaluation of the lingual frenum, the patient was diagnosed with ankyloglossia and was indicated of intervention by frenotomy.</p>	<p>In the report, the consequence of the change was: anomalous insertion of the lingual frenum, changed the function breastfeeding of the baby. Surgery of frenotomy of this brake had a favorable prognosis, returning the tongue functions, and the patient presented normality in breastfeeding.</p>
Nogueira et al	2021	Case report	<p>Two cases were evaluated, which had indication of lingual frenotomy, both cases diagnosed with ankyloglossia, to assess whether there was improvement in breast grip and weight gain.</p>	<p>The two reported cases allow conclude that the shorter the time between diagnosis and intervention in ankyloglossia, more effective and easy will be breastfeeding. Is impostante an evaluation interdisciplinary and precocious.</p>





Sanches et al	2004	Review of literature	Clinical management of oral dysfunctions in breastfed children,	Oral dysfunctions can be noticed in a way precocious, before an anamnesis directed, and oral evaluation during the breastfeeding, this Work must be done still in the maternity ward
Martinelli et al	2012	Review of literature	Anatomofunctional aspects of the frenulum and tongue and the proposals for evaluation of nutritional sucking and orofunctional functions.	The frenulum evaluation protocol in infants with Score. The proposal presented can assist the professionals at health to be assessed, and diagnose variations anatomical frenulum and its possible interference with breastfeeding
Lopes et al	2018	Case report	Clinical case of ankyloglossia in newborn. The abduction of information was made in three stages, in the first, the tongue test was performed and diagnosis, in second, photographs of the case and that of the frenotomy and third, accompaniment clinical and photographic of the evolution of the movements of the tongue 7 days after surgery.	The report highlights that the change caused by the anomaly affects the suction, swallowing and tongue movements, and possibly have impact on speech and articulation of words in the near future. Lingual frenulum surgery is a solution that restores the System Functions stomatognathic, providing well-being to the patient.



## 5 DISCUSSION

The shortening of the lingual frenulum is called ankyloglossia, popularly known as stuck tongue, this shortening causes the limitation of the functions and movements of the tongue, which can be harmful to babies especially in their first months of life, by making it difficult during the breastfeeding phase, and may cause early weaning and weight loss, in addition to causing pain in the mother during breastfeeding. (Costa, et al 2020)

The evaluation for an early diagnosis is important to analyze the best form of intervention in each case. To expedite the diagnosis, currently the "tongue test" is part of the neonatal screening, where it may or may not have the indication of phrenotomy, varying from the result of the evaluation.

According to the evaluation method proposed by Martinelli (2015), which consists of evaluation of clinical history, anatomo-functional evaluation and evaluation of non-nutritive and nutritive sucking. To diagnose and differentiate the anatomical variations of the lingual frenulum, it is necessary a broad knowledge of the lingual anatomy and adjacent areas to find anatomical changes that can hinder the tongue to perform its functions.

Based on a study conducted including all health professionals of the Family Health Strategy Program service providers in the Unified Health System (SUS) of the city of Maringá, placing them to answer a questionnaire based on the clinical protocol recommended by Martinelli, it was observed that health professionals do not have the necessary knowledge about the oral anatomy of the baby, to perform the proper evaluation of the lingual frenum, making it impossible and difficult to diagnose and possible surgical indication. (Pinto, et al 2019)

According to Ballard et al. (2019), who based their study on Hazelbaker's quantitative assessment method, noted that a detailed assessment of lingual functions is necessary to perform surgical intervention of the frenotomy, when indicated appropriately, is effective. This approach has been shown to facilitate breastfeeding in cases of ankyloglossia.

Cho et al (2005) suggests that the treatment for ankyloglossia in newborns should be carried out if difficulties are identified during breastfeeding.

Because usually babies with mild to moderate ankyloglossia are usually breastfed successfully, so it does not require treatment. However, mothers of babies with any degree of ankyloglossia who have difficulty breastfeeding report immediate improvement after performing the frenotomy in the baby.

It was confirmed by Silva et al (2016) that early diagnosis and intervention, so when frenotomy is performed is a very important step to reduce difficulties during the breastfeeding phase and to avoid future consequences on the development of the child.

In order to determine the occurrence of ankyloglossia in healthy infants and its association with breastfeeding difficulties, Messner et al. (2000) conducted a study in a high-level pediatric hospital. A



total of 1,041 newborns were included in the study, and only those with ankyloglossia were considered. During the research, 50 patients with ankyloglossia were identified. The results indicated that the incidence of ankyloglossia was 4.8%, and nine mothers reported difficulties in breastfeeding. Therefore, it was concluded that ankyloglossia is a common condition in newborns and has a negative impact on breastfeeding.

The study by O'Callahan C et al. (2015) analyzed a group of 311 lactating women to determine the presence of ankyloglossia, and subsequently, 299 of these babies underwent frenotomy. Most babies were diagnosed with type III (36%) or type IV (49%) ankyloglossia. After the intervention, in interviews conducted, it was reported that there was a significant improvement in the baby's grip and that the pain associated with breastfeeding was reduced in all cases. As a result, it was concluded that frenotomy can minimize breastfeeding difficulties related to ankyloglossia.

By conducting searches in the PUBMED, Medline, and Cochrane Library databases, Power RF et al. (2015) identified a wide variation in ankyloglossia prevalence rates in randomized controlled trials (RCTs). In one of these studies, 316 babies were enrolled for frenotomy, with no reports of complications resulting from the procedure. However, complications can be avoided or minimized through prior evaluation and in-depth knowledge of the patient's anatomy. From these observations, it was concluded that it is necessary to carry out a careful evaluation and selection before intervening. It is recommended to wait a period of 2 to 3 weeks before performing the intervention, since the results indicate an improvement in breastfeeding of babies diagnosed with ankyloglossia in this time interval. However, it is important to point out that there may be a placebo effect that is difficult to quantify, even if complications are rare.

With the aim of measuring the effectiveness of frenotomy in lactating women, Srinivasan (2016) did a study with lactating women under 12 weeks of age and selected babies based on the frenotomy rule for breastfed lactating women (FDRBI). The frenotomy was performed after evaluation of grip and pain, the mother also received counseling about breastfeeding during and after the procedure. And it was observed for 3 months. A total of 27 mothers were evaluated, where 92% were pain-free after 3 months, and 88% thought that frenotomy helped. It was soon found that frenotomy and breastfeeding counseling are an effective intervention, improving grip and decreasing nipple pain.

In a study done by Dollberg (2006), where 25 mothers were recruited due to nipple pain during breastfeeding, where they were submitted to one of two sequences (1) frenotomy, breastfeeding, simulation, breastfeeding (14) or (2) simulation, breastfeeding, frenotomy, breastfeeding (11). In both sequences, there was a standardized score of grip and pain. And it was found that frenotomy relieves nipple pain immediately after frenotomy, where it was found that ankyloglossia may be one of the



responsible for the initial difficulty in breastfeeding and that it is an effective treatment to facilitate during this initial period.

O'Shea (2017) also conducted a study with 302 patients, where a standardized assessment of infant breastfeeding was made. In this study it was found that after frenotomy the mothers' pains when breastfeeding were reduced in the short term, and did not find a consistent positive effect on infant breastfeeding. But more study is needed to determine the effects of phrenotomy.

Although phrenotomy is considered a simple surgery, there is evidence of possible surgical complications that should be carefully evaluated before recommending the procedure. Among these complications, infection and hemorrhage stand out, which can occur due to the rupture of the lingual artery. Therefore, it is important to consider these risks and contraindicate phrenotomy when necessary in order to avoid such complications.

## 6 CONCLUSION

Despite the existence of different opinions among the authors, frenotomy demonstrates positive results in relation to breastfeeding, as it reduces pain and improves breast grip. To avoid any type of complication associated with the procedure, a careful prior evaluation and performance of the frenotomy by trained professionals is necessary.



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