

# Influence of frenotomy on breastfeeding in newborns with ankyloglossia

## *Influência da frenotomia na amamentação em recém-nascidos com anquiloglossia*

### Keywords

Lingual frenulum  
Breastfeeding  
Infant  
Newborn  
Ankyloglossia  
Clinical Protocols

### Descritores

Freio lingual  
Aleitamento materno  
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Protocolos Clínicos

### ABSTRACT

**Purpose:** evaluate the influence of frenotomy on the breastfeeding of newborns diagnosed with ankyloglossia. **Methods:** this is an intervention study performed with 50 newborns diagnosed with ankyloglossia. It was conducted in three stages: diagnosis, intervention and reassessment. In the diagnostic phase, the Protocol for the Assessment of Speech Language with Scores for Babies was applied to diagnose ankyloglossia and a questionnaire assessing the symptoms and coordination of sucking, swallowing and breathing during breastfeeding. In the intervention, frenotomy was performed, and at reassessment, the diagnostic protocol and questionnaire in order to compare the post-surgical effects. **Results:** of the 50 babies participating in the study, 35 (70%) were boys and 15 (30%) girls. A total of 68% of ankyloglossia cases were reported in the family, a majority (38%) involving cousins. There was a statistically significant reduction in the average protocol score in the reassessment stage, from 8.38 (7-12 points) to 0.86 (0-5 points), as well as a statistically significant improvement in all variables related to the symptoms of breastfeeding. **Conclusion:** surgical intervention, known as frenotomy, made it possible to improve the negative symptoms of breastfeeding in newborns diagnosed with ankyloglossia.

### RESUMO

**Objetivo:** avaliar a influência da frenotomia sobre a amamentação de recém-nascidos com diagnóstico de anquiloglossia. **Método:** trata-se de um estudo de intervenção realizado com 50 recém-nascidos com diagnóstico de anquiloglossia. Foi realizado em três etapas: diagnóstico, intervenção e reavaliação. Na fase diagnóstica, foram aplicados o Protocolo de Avaliação do Frênulo da Língua com Escores para Bebês para o diagnóstico de anquiloglossia e um questionário de avaliação dos sintomas e coordenação de sucção, deglutição e respiração durante a amamentação. Na intervenção, foi realizada a frenotomia e, na reavaliação, foram reaplicados o protocolo de diagnóstico e o questionário para comparação dos efeitos pós-cirúrgicos. **Resultados:** dos 50 bebês participantes do estudo, 35 (70%) eram do gênero masculino e 15 (30%) do gênero feminino. Foram relatados 68% dos casos de anquiloglossia na família, sendo primo (a) o grau de parentesco na maioria desses casos (38%). Houve redução estatisticamente significativa na média de pontuação no protocolo de 8,38 (7-12 pontos) para 0,86 (0-5 pontos), na etapa de reavaliação, assim como melhora estatisticamente significativa em todas as variáveis relacionadas aos sintomas da amamentação. **Conclusão:** a intervenção cirúrgica, denominada frenotomia, possibilitou a melhora dos sintomas negativos da amamentação em neonatos com diagnóstico de anquiloglossia.

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## INTRODUCTION

Lingual frenulum is a small fold of mucous membrane that connects the floor to the underside of the tongue (midline)<sup>(1)</sup>. Ankyloglossia (tongue-tie) is a developmental anomaly that involves the lingual frenulum, characterized by its shortening and/or increase in thickness, as well as anteriorized insertion (near the tip of the tongue), limiting normal tongue movements<sup>(2,3)</sup>.

Several studies report the influence of ankyloglossia on breastfeeding<sup>(4,5,6)</sup>. The World Health Organization (WHO) recommends exclusive breastfeeding in the first six months of a child's life<sup>(7)</sup>. Breastfeeding contributes to a child's healthy growth, since it minimizes the risks of contracting typical childhood diseases such as allergies, infections, obesity and cognitive development disorders<sup>(5,8)</sup>.

Correct tongue protrusion, areola sealing and mouth opening are essential to efficient breastfeeding<sup>(9)</sup>. The limited tongue movements of babies with ankyloglossia may compromise sucking and swallowing, which are directly related to breastfeeding<sup>(10)</sup>, in addition to interfering in the correct positioning and fit of the baby's mouth over the mother's nipple, causing "stinging" sensations, pain and nipple fissures<sup>(11)</sup>.

It is important to use clinical protocols to assess ankyloglossia since they make it possible to establish parameters and help professionals make a correct diagnosis and plan an effective treatment program<sup>(10)</sup>. In that respect, Federal Law no.13.003 was enacted in 2014, making it mandatory to apply the Protocol for the Assessment of Speech Language with Scores for Babies in newborns in all the maternity wards of Brazil. This protocol can be applied by trained health professionals, including speech therapists and dentists<sup>(12)</sup>.

Frenotomy is recommended for newborns with ankyloglossia. This simple outpatient surgery should be performed preferentially in the first months of life by dentists, pediatricians or otorhinolaryngologists. It is a fast, safe and efficient procedure that can have a significant influence on breastfeeding, enabling the correct tongue fit and consequent relief from discomfort and nipple trauma<sup>(5,13)</sup>.

As such, there is a close association between ankyloglossia and breastfeeding, and it is important to carefully assess this relationship in order to efficiently contribute to the healthy growth of newborns. The aim of the present study was to assess the influence of frenotomy on the breastfeeding of newborns diagnosed with ankyloglossia.

## METHODS

In line with National Health Council Resolution no. 466/12, the study was approved by the Universidade Federal do Rio Grande do Norte- Faculdade de Ciências da Saúde do Trairi (FACISA Research Ethics Committee, under protocol number 2.625.626).

This is a longitudinal analytical intervention study with a quantitative approach, reported according to the CONSORT protocol<sup>(14)</sup> (Figure 1). There was no randomization due to the absence of a control group and another intervention tested.

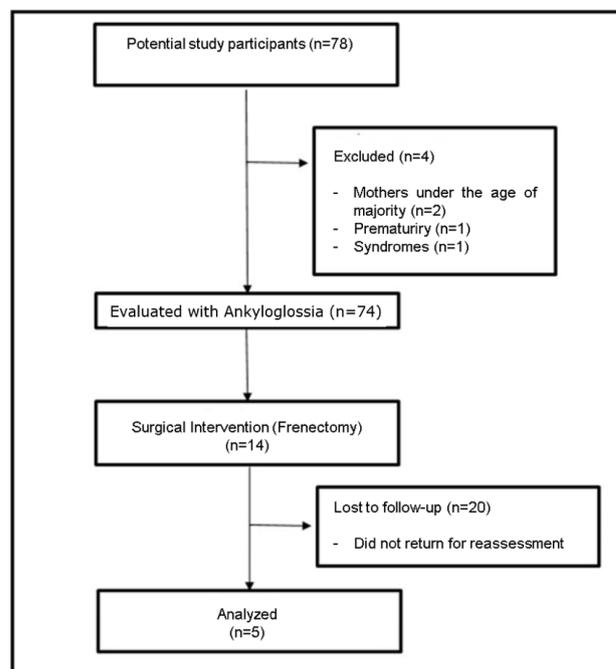


Figure 1 – Flowchart and study design

The study was conducted at the Hospital Universitário Ana Bezerra (HUAB), located in the city of Santa Cruz, Brazil. The sample was recruited by convenience according to assessments of 50 newborns at the institution between April and October 2018.

Included in the study were newborns hospitalized between 24 and 48 hours of life, diagnosed with ankyloglossia. The babies' guardians provided written informed consent and premature newborns, those with perinatal complications, craniofacial anomalies, neurological diseases, visible genetic syndromes at the time of assessment and mothers under the age of majority were excluded. All newborns that did not complete the three research stages were also excluded. The babies' medical charts were analyzed to verify the clinical and sociodemographic data of the families and newborns.

The study was conducted by two assessors in three stages: diagnosis, intervention and reassessment. The intervention was performed by dentists trained by a speech therapist and pediatric dentist with two years of experience in the area. The first stage involved the anatomofunctional assessment part of the Protocol for the Assessment of Speech Language with Scores for Babies<sup>(10)</sup>, in which a score greater than or equal to 7 indicates interference of the frenulum in tongue movements and the need for frenotomy. A 15 dichotomous-question (yes/no) instrument was applied to assess the symptoms and coordination between sucking, swallowing and breathing during breastfeeding<sup>(15)</sup>. Both instruments were applied by one of the assessors. In the intervention stage, the newborns were previously submitted to laboratory examinations (hemogram, coagulogram and platelet counting), followed by frenotomy, performed by two assessors supervised by the pediatric dentist. Finally, in the reassessment stage, the anatomofunctional assessment part of the Frenulum Assessment Protocol<sup>(10)</sup> was reassessed and the breastfeeding questionnaire reapplied<sup>(15)</sup>, between seven and 30 days after the frenotomy, by one of the two assessors from the intervention stage.

The results obtained were coded and stored in a database organized in Excel (version 2013). Descriptive data analysis was performed in terms of sex, family cases and degree of kinship in percentages, and the pre- and post-intervention scores expressed as mean, minimum and maximum values. The breastfeeding questionnaire and protocol data were assessed statistically using SPSS (Statistical Package for the Social Sciences), version 20.0, Chicago, IL, USA), with a p-value  $\leq 0.05$ .

## RESULTS

Of the 50 babies in the present study, 35 (70%) were boys and 15 (30%) girls, representing a male-female ratio of 2.5:1. In relation to family cases, 34 (68%) reported ankyloglossia cases, a majority (38%) involving cousins.

A statistically significant variation in the lingual frenulum assessment protocol scores was observed between the assessment and reassessment stage, as shown in Table 1.

**Table 1.** Protocol scores in the assessment and reassessment stages

Scores	Assessment	Reassessment	Variation
Mean	8.38	0.86	-7.52
Minimum	7	0	-7
Maximum	12	5	-7
P- Value			0.000*

**Legend:** \* paired t-test. P-value considered significant at less than 0.05.

In order to compare the pre- and post-frenotomy questionnaire answers, the McNemar statistical test was used for dichotomous paired data. The pre- and post-surgery results of the questionnaire that assesses symptoms and coordination between sucking, swallowing, and breathing during breastfeeding are presented in Table 2.

**Table 1.** Pre- and post-surgery of the questionnaire to assess symptoms and coordination of sucking, swallowing and breathing during breastfeeding

BREASTFEEDING QUESTIONNAIRE	Pre (YES)	Post (YES)	P- Value
SYMPTOMS	n (%)	n (%)	
1. Is the time between breastfeedings less than one hour?	42 (84%)	5 (10%)	0.000*
2. Does the baby sleep for less than two hours between breastfeedings?	44 (88%)	17 (34%)	0.000*
3. When the baby is breastfeeding, does it frequently alternate between breastfeeding and sleeping?	47 (94%)	22 (44%)	0.000*
4. Is the baby always tired when breastfeeding (gaspings)?	36 (72%)	1 (2%)	0.000*

5. Does the baby breastfeed little and frequently stop to rest?	41 (82%)	3 (6%)	0.000*
6. Does the baby bite the nipple during breastfeeding?	34 (68%)	5 (10%)	0.000*
7. Does the baby suck the breast hard?	39 (78%)	21 (42%)	0.001*
8. Does the baby frequently exhibit tongue clicking during breastfeeding?	32 (64%)	17 (34%)	0.007*
9. Does the baby let go of the nipple during breastfeeding?	42 (84%)	4 (8%)	0.000*
10. Do you feel pain in your nipple during breastfeeding?	28 (56%)	6 (12%)	0.000*

### COORDINATION

1. Does the baby frequently make noises when swallowing milk during breastfeeding?	26 (52%)	20 (40%)	0.263
2. Does the baby frequently gag during breastfeeding?	17 (34%)	21 (42%)	0.571
3. Does the baby frequently hiccup immediately after breastfeeding?	21 (42%)	20 (40%)	1.000
4. Does the baby frequently cough during breastfeeding?	12 (24%)	16 (32%)	0.556
5. Does the baby frequently regurgitate during breastfeeding?	18 (36%)	10 (20%)	0.096

**Legend:** \* McNemar's chi-squared test. P-value significant at less than 0.05.

## DISCUSSION

The study provides important evidence regarding the influence of frenotomy on breastfeeding in newborns with ankyloglossia. The results demonstrate that frenotomy has a positive effect on breastfeeding symptoms, corroborating the conclusion of recent studies<sup>(16,17)</sup> and reinforcing the importance of the current Ministry of Health recommendation, which guides the identification of severe cases of ankyloglossia in maternity wards due to its potential interference in breastfeeding<sup>(18)</sup>.

In relation to the male prevalence of ankyloglossia, the results obtained were similar to those reported in the literature<sup>(4,19)</sup>. Ankyloglossia is hereditary, but the nature of this hereditaryness remains unknown. Most reports of family cases are related to close relatives, such as the mother and father<sup>(20,21)</sup>, but in the present study, the most reported degree of kinship was the newborn's cousin.

Assessment of lingual frenulum is mandatory<sup>(12)</sup> and part of the newborn's physical examination, but there is disagreement among healthcare professionals regarding the classification of altered lingual frenulum<sup>(22)</sup>. Most use subjective criteria correlated with clinical practice to diagnose ankyloglossia<sup>(4,19)</sup>, and a few apply quantitative methods<sup>(22,23,24)</sup>. The use of clinical protocols to assess lingual frenulum is needed to help professionals make the correct diagnosis and prescribe the respective treatment. There are no "gold standard" protocols in the literature to identify ankyloglossia. The Ministry of Health<sup>(18)</sup> recently recommended the Bristol Tongue Assessment Tool for health team members<sup>(25)</sup>. This is an objective and easy-to-use test that helps diagnose the

severity of ankyloglossia and determine the need for surgery. It was developed based on clinical practice and the Hazelbaker Assessment Tool for Lingual Frenulum Function (HATLFF)<sup>(26)</sup>.

Some authors have used the Hazelbaker protocol in their studies, and concluded that it was not useful for identifying which children with tongue-tie are at risk of breastfeeding problems<sup>(23)</sup>. In the present study, the Protocol for the Assessment of Speech Language with Scores for Babies<sup>(10)</sup> was applied because it is used in the institution where the study was conducted. In addition, it is considered a more concise and validated<sup>(27)</sup> protocol applied by most dentists and speech therapists.

The treatment of ankyloglossia is also controversial, but several studies report the benefits of frenotomy for breastfeeding<sup>(4,6,15,17,28,29,30)</sup>, which was also observed here, where all the variables related to breastfeeding symptoms improved statistically after surgery. Of the ten questions related to breastfeeding symptoms, those involving resting between feedings and the baby's tiredness while breastfeeding exhibited the greatest decline. This finding coincides with the results obtained by Martinelli<sup>(15)</sup>, where there was a decline from 92.85 to 0% between feedings and from 100 to 0% in mothers' complaints regarding their baby's tiredness while breastfeeding. These results are also corroborated by other literature findings<sup>(28,29,30)</sup>.

However, Martinelli<sup>(15)</sup> also found improvements in the mothers' reports regarding the coordination between sucking, swallowing and breathing during breastfeeding, agreeing with the present research, in which the values obtained were not statistically significant. One hypothesis for this result is the fact that post-surgery time (between seven and thirty days) is not long enough for the baby to adapt well to the functions, requiring a longer post-surgery time to better assess this part of the questionnaire.

Studies have found that the newborns' grasp of the nipple improved after frenotomy, resulting in less trauma and pain reported by mothers<sup>(17,29)</sup>. These findings were also obtained here. Moreover, frenotomy is considered a safe and effective technique that causes no important postoperative complications<sup>(13)</sup>.

With a view to preventing bias in the study, the assessors were trained by experienced professionals, the diagnostic instrument was validated and measures were adopted to avoid losses (phone call to confirm the appointment and reschedule if necessary). However, the fact that the assessors were the same in the intervention and reassessment stages may be a limitation of the study.

Early diagnosis and treatment are important to guarantee exclusive breastfeeding in the first 6 months of life. As such, this study is important because it provides evidence on the benefits of frenotomy for breastfeeding, a childhood health issue discussed worldwide. Thus, we suggest new studies with larger samples and greater methodological rigor to better understand the influence of frenotomy on the coordination between sucking, swallowing and breathing during breastfeeding.

## CONCLUSION

The findings of the present study demonstrate that ankyloglossia in newborns had a negative influence on several symptoms as

well as coordination between sucking, swallowing, and breathing in breastfeeding, and that after surgery (frenotomy) these reports declined significantly.

The results should alert healthcare professionals to the importance of assessing lingual frenulum in babies and the need for surgery, reinforcing newborn care and supporting breastfeeding.

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#### Authors' contributions

*ALXL.* Participated in the conception of the study; the intervention; data analysis and interpretation and writing of the article; *MRPD.* Participated as an advisor, in study conception, data analysis and interpretation and writing of the article.