

Original articles

Posterior lingual frenulum in infants: occurrence and maneuver for visual inspection

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ABSTRACT

Purpose: to verify the occurrence of posterior or submucosal lingual frenulum and evaluate the efficiency of a special maneuver for its visual inspection.

Methods: an experimental study including 1,715 healthy infants, in which prematurity, perinatal complications, craniofacial anomalies neurological disorders, and visible genetic syndromes were the exclusion criteria. A clinical examination was performed by means of a maneuver that consisted in rising the lateral margins of the tongue to visualize the anatomical characteristics of the lingual frenulum. In some of the infants, a special maneuver was performed to assist visualization of posterior lingual frenulum, since its visualization was not possible. The maneuver consisted in two simultaneous actions: elevating and pushing the tongue back.

Results: 558 infants (32.54%), out of the 1,715 had posterior frenulum, which required the special maneuver that consisted in both elevating and pushing the tongue back, simultaneously.

Conclusion: the occurrence of posterior lingual frenulum was high and the special maneuver consisted in elevating and pushing the tongue back proved to be efficient to visualize the posterior lingual frenulum.

Keywords: Lingual Frenulum; Speech, Language and Hearing Sciences; Anatomy, Ankyloglossia; Tongue

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INTRODUCTION

Although lingual frenulum is a widely discussed subject¹⁻⁷, its anatomical characteristics have not been extensively studied. Differentiating anatomical variations of lingual frenulum requires deep knowledge of the anatomy of both the tongue and the floor of the mouth.

The posterior ankyloglossia or submucosal tongue-tie, which consists of the presence of abnormal collagen fibers in a sub mucosal location surrounded by tight mucous membrane under the front of the tongue is a variation poorly described in the literature⁸.

There are a few studies in the literature on posterior lingual frenulum and all of them classify it as posterior ankyloglossia⁹⁻¹³. Nevertheless, Douglas¹⁴ states that the published studies regarding posterior tongue-tie do not provide clear evidence that the diagnosis of posterior tongue-tie has validity, or that frenotomy is an effective treatment. The author also reports that often, photographs of the frenula purported to show posterior tongue-tie are indistinguishable from normal frenulum variants. According to the author, data are either unreliable or interpreted through the lens of posterior tongue-tie when multiple other potential factors could explain the results. Douglas claims that health professionals should be extremely cautious given the absence of reliable evidence or historical precedence to support the efficacy of frenotomy other than for anterior tongue-tie.

In a study including 1,084 healthy newborns, Martinelli et al.⁸ concluded that 35% of newborns had posterior lingual frenulum. However, this type of lingual frenulum did not interfere with breastfeeding; therefore, surgery was not recommended. There are few studies concerning the absence of lingual frenulum¹⁵⁻¹⁹.

A study published recently described the phenotypic spectrum of congenital Zika syndrome, and the absence of lingual frenulum was one of the characteristics observed in this syndrome¹⁹. However, Fonteles et al. reported that the absence of lingual frenulum was not observed in Brazilian infants with congenital Zika syndrome. Many of those newborns had submucosal frenulum, what could be misinterpreted as absent frenulum²⁰.

This study aimed to verify the occurrence of posterior or submucosal lingual frenulum and evaluate the efficiency of a maneuver for its visual inspection.

METHODS

This experimental study, which included 1,715 healthy infants, was approved by the Ethic Committee of CEFAC under the number CAEE 47613115.9.0000.5538. All the participants were informed about the procedures and signed the Free Informed Term of Consent (FITC).

Prematurity, perinatal complications, craniofacial anomalies neurological disorders, and visible genetic syndromes were the exclusion criteria. The clinical examination was performed by a Speech Language Pathologist (SLP) specialist in Orofacial Myofunctional Disorders, who was trained and calibrated to administer the validated Neonatal Tongue Screening Test²¹ in the first 48 hours after birth, before hospital discharge. All assessments were registered in patient records and filmed.

The mothers of the infants were requested to cradle hold their babies holding the infant's hands during the assessment. Visual inspection was conducted by performing a maneuver that consisted of rising the lateral margins of the tongue using the right and left gloved index fingers to visualize the anatomical characteristics of lingual frenulum.

In some of the infants, a special maneuver was then performed to assist visualization of posterior lingual frenulum, since its visualization was not possible by simply elevating the lateral margins of the tongue. The maneuver consisted in two simultaneous actions: elevating and pushing the tongue back. Both thickness and place of attachment of lingual frenulum could be visualized by means of the maneuver²².

Posteriorly the images of the assessments were analyzed independently by two SLPs experienced in lingual frenulum assessment. There was agreement between both SLPs regarding the findings. The data were submitted to descriptive statistical analysis.

RESULTS

Of the 1,715 infants, 1,157 (67.46%) had the lingual frenulum visualized by the simple maneuver consisting in elevating the lateral margins of the tongue (Figure 1). 558 infants (32.54%) had posterior frenulum, which required the special maneuver that consisted in both elevating and pushing the tongue back simultaneously (Figure 2).

The special maneuver allowed the visualization of the thickness and place of attachment of lingual frenulum in 549 infants (98.39%) who had posterior lingual frenulum (Figure 3). In nine infants (1.61%), lingual frenulum could not be visualized by means of the maneuver before hospital discharge. In these cases,

the visualization of lingual frenulum was possible within the first 3 months after birth.

Regarding the gender, out of the 558 infants who had posterior lingual frenulum, 302 (54.12%) were females and 256 (45.88%), males.

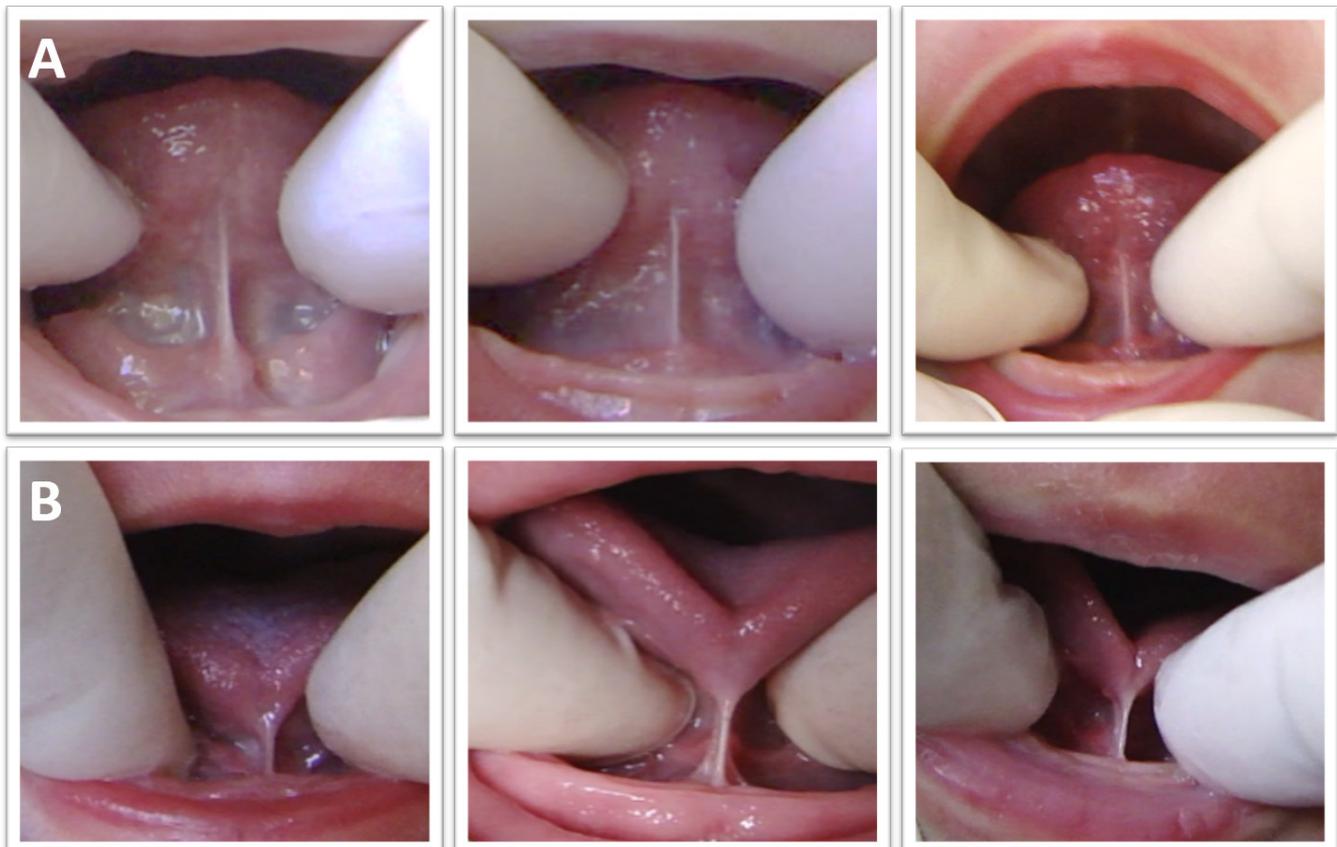


Figure 1. (A) normal lingual frenulum; (B) altered lingual frenulum. Both were visualized by elevating the lateral margins of the tongue (simple maneuver)

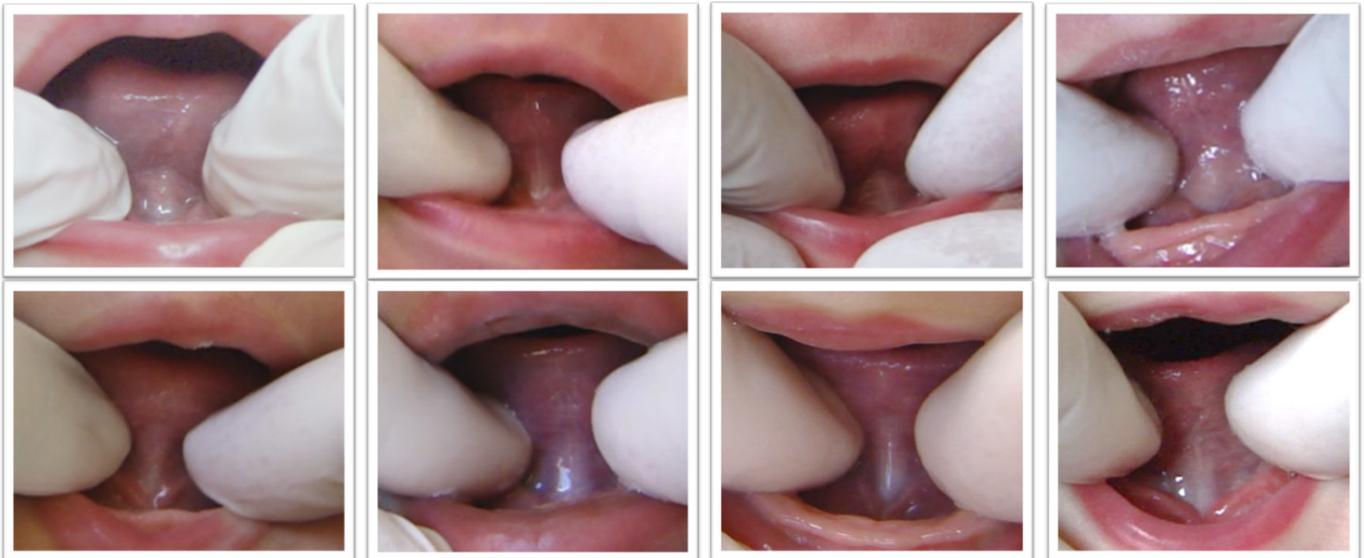


Figure 2. Posterior frenulum not visualized by elevating the lateral margins of the tongue (simple maneuver)



Figure 3. (A) posterior frenulum not visualized by elevating the lateral margins of the tongue (simple maneuver); (B) same lingual frenulum visualized by means of the special maneuver consisting in elevating and pushing the tongue back, simultaneously

DISCUSSION

There is a great variation of anatomical characteristic of lingual frenulum reported in the literature including both healthy²⁻⁷ subjects and individuals with syndromes²³⁻²⁸. However, the literature about posterior lingual frenulum is scarce⁸⁻¹³.

By performing the special maneuver, this study observed the occurrence of 32.54% of posterior frenulum in the sample. Those results indicate that this anatomical variation is not rare. These findings are consistent with another study also conducted with healthy infants, which reported a 35% occurrence of posterior lingual frenulum⁸. Regarding subjects with

syndromes, there are only a few studies reporting on the absence of lingual frenulum, based exclusively on visual inspection without clear criteria for the diagnosis¹⁵⁻¹⁹.

Published in 2017, a study conducted by medical geneticists and pediatric neurologists observed the absence of lingual frenulum in 4 (36.36%) out of 11 infants with the congenital Zika syndrome¹⁹. Conversely, a study conducted by SLPs reported that in a total of 54 infants with the congenital Zika syndrome, lingual frenulum visibility required a specific maneuver to retract the tongue in 20 (37%), since it was covered by mucous tissue²⁰. The authors suggested the terminology “absent lingual frenulum” used by Del Campo et al.¹⁹ be replaced for “submucous lingual frenulum”²⁰.

In 98.39% of the 558 infants diagnosed with posterior lingual frenulum, the special maneuver consisting in elevating and pushing the tongue back allowed the visualization of the thickness and place of attachment of lingual frenulum. Therefore, the maneuver may be performed to visualize these aspects of lingual frenulum when it is covered by mucous tissue. However, in 1.61% lingual frenulum could not be visualized by means of the maneuver before hospital discharge. The visualization could be performed within the first 3 months after birth. This may be explained by the fact that due to the small size of some infants’ oral cavity, pushing the tongue back was not possible immediately after birth. However, those findings cannot be compared to those in the literature since no studies about it were found.

This study observed that females showed a higher occurrence (54.12%) of this anatomical variation of lingual frenulum. This finding is in agreement with another study found in the literature that reported higher occurrence of posterior lingual frenulum among females, observed that this anatomical variation did not interfere with the movements of the tongue – sucking and swallowing – during breastfeeding, and concluded that this variation cannot be classified as ankyloglossia⁸. It is important to highlight that ankyloglossia – an anomaly that restricts the movements of the tongue – is predominantly observed in males^{2,29}.

Thus, posterior lingual frenulum is an anatomical variation that may be present in both healthy infants⁸ and infants with syndromes²⁰. The special maneuver consisting of elevating and pushing the tongue back simultaneously is efficient, easy, and does not require any device for lingual frenulum assessment.

An important contribution for further understanding of this anatomical characteristic and its impact on the

functions of the tongue may be given by future studies performing this special maneuver to assess subjects diagnosed with different syndromes characterized by absent lingual frenulum.

CONCLUSION

In this sample, the occurrence of posterior lingual frenulum was high. The special maneuver consisting in elevating and pushing the tongue back was efficient in visualizing the posterior lingual frenulum.

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