ORIGINAL ARTICLE

ANATOMICAL CHARACTERIZATION OF THE LINGUAL FRENULUM IN NEONATES WITH ANKYLOGLOSSIA

CARACTERIZACIÓN ANATÓMICA DEL FRENILLO LINGUAL EN NEONATOS CON ANQUILOGLOSIA

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RESUMEN:

Introducción: La anquiloglosia es el anormal desarrollo del frenillo lingual que conlleva a que este sea corto o grueso, impidiendo la movilidad de la lengua. El objetivo es describir las características anatómicas del frenillo lingual en Neonatos con Anquiloglosia atendidos en la E.S.E Hospital San Juan de Pamplona **Métodos:** Estudio cualitativo, descriptivo, correlacional de corte transversal, se seleccionaron 26 neonatos con diagnóstico de anquiloglosia reportado en historia clínica, de la E.S.E Hospital San Juan de Dios de Pamplona, con edades desde los 0 hasta 29 días, en el periodo comprendido del enero de 2022 a junio de 2023. **Resultados:** El 57,7% de los neonatos son de sexo masculino y el 42,3% femenino, en 65,4% presento frenillo lingual grueso, el 46,2% con fijación en el ápice lingual y el 100%

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fue visible a partir de la Cresta alveolar interior. **Análisis y Discusiones:** Los criterios de caracterización de la anatomía de frenillo lingual son inapropiados para aplicar neonatos, esto dificulta el proceso de diagnóstico, haciendo necesaria una unificación de criterios diagnósticos, así como una clasificación universal, en este sentido la caracterización anatómica del frenillo lingual en las características de espesor del frenillo lingual y las fijaciones superior e informar en un imperativo para el avance en la comprensión de la anquiloglosia. **Conclusiones:** El frenillo lingual grueso, con fijación entre el tercio medio y/o ápice y visible a partir de la cresta alveolar interior; son las principales características anatomías de un frenillo lingual con anquiloglosia en neonatos.

Palabras Claves: Anquiloglosia, Frenillo Lingual, Neonato

SUMMARY:

Introduction: Ankyloglossia is the abnormal development of the lingual frenulum that causes it to be short or thick, preventing the mobility of the tongue. The objective is to describe the anatomical characteristics of the lingual frenum in Neonates with Ankyloglossia treated at the E.S.E Hospital San Juan de Pamplona **Methods**: Qualitative, descriptive, correlational cross-sectional study, 26 neonates with a diagnosis of ankyloglossia reported in the clinical history were selected, from the E.S.E Hospital San Juan de Dios in Pamplona, with ages from 0 to 29 days, in the period from January 2022 to June 2023. **Results:** 57.7% of the neonates are male and 42.3 % female, 65.4% had a thick lingual frenulum, 46.2% had fixation on the lingual apex and 100% were visible from the interior alveolar ridge. Analysis and **Discussions:** The characterization criteria of the anatomy of the lingual frenulum are inappropriate to apply to neonates, this makes the diagnostic process difficult, making it necessary to unify diagnostic criteria, as well as a universal classification, in this sense the anatomical characterization of the lingual frenulum on the thickness characteristics of the lingual frenulum and superior attachments and inform an imperative for advancement in the understanding of ankyloglossia. **Conclusions:**

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The thick lingual frenulum, with fixation between the middle third and/or apex and visible from the inner alveolar crest; These are the main anatomical characteristics of a lingual frenulum with ankyloglossia in neonates.

Keywords: Ankyloglossia, Lingual Frenulum, Neonate,

INTRODUCTION

Ankyloglossia is the abnormal development of the lingual frenulum, leading to it being short or thick, thus limiting tongue mobility.(1) It is a common congenital anomaly of lingual development, well-known and widely documented. However, despite this, it generates diverse opinions and controversies among experts. (2) Interest in this anomaly not only lies in its impact on basic functions during early childhood but also finds justification in its high prevalence rate among newborns, ranging from 4% to 10%, particularly in males, where it is more common.(3) However, other authors report prevalence rates between 0.02% and 4.8%,(4) and between 0.1% and 11%. (5)(6).

The exact etiology of ankyloglossia remains unclear. Nevertheless, hereditary factors are associated with this anomaly, (7) It usually occurs as an isolated anomaly not linked to other pathologies, although in some cases, it can be associated with syndromes that show anomalies related to lingual frenula, such as Pierre-Robin syndrome, oro-facial-digital syndrome, holoprosencephaly, and cleft palate. (8).

Ankyloglossia is a craniofacial malformation of congenital origin, occurring when tissue portions meant to disappear during embryological development via apoptosis persist on the sublingual surface, thereby affecting tongue movement.(9)(10). During embryonic development, the tongue forms from the first, second, third, and fourth branchial arches. The epithelial cells of the ridges do not expand sufficiently into the mesenchyme. (11) By the fifth week, the tongue develops from the mandibular arches laterally, forming

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two lateral tongue swellings and the tuberculum impar. This results in a vertical fold of mucosa along the midline that adheres to the floor of the mouth, thus forming the lingual frenulum (12).

In a significant number of cases, ankyloglossia manifests without symptoms and may go unnoticed, (5) Nonetheless, in some cases, the following signs are observed: the tongue apex presents a heart shape, difficulty with the tongue tip contacting the palate or gums due to limited tongue movement (e.g., protrusion and elevation), and in severe cases, issues with breastfeeding, feeding, or speech.(13)(14)(15).

Considering this, the research aims to describe the anatomical characteristics of the lingual frenulum in newborns with ankyloglossia treated at E.S.E. Hospital San Juan de Pamplona.

METHODS

Qualitative, descriptive, cross-sectional, and correlational study aimed at describing the anatomical characteristics of the lingual frenulum in neonates with a confirmed diagnosis of ankyloglossia. A total of 26 neonates with a diagnosis of ankyloglossia reported in their medical records from the E.S.E. Hospital San Juan de Dios in Pamplona, aged 0 to 29 days, were selected during the period from January 2022 to June 2023.

For the evaluation, the protocol for assessing the lingual frenulum with scoring for infants, screening version (16), was applied. In the anatomofunctional evaluation section, the following items were included: Lingual frenulum: visible, not visible, and visible with maneuver. Thickness of the frenulum: Thin (0) and thick (2). Frenulum attachment to the floor of the mouth: visible from the sublingual caruncles (0) and visible from the lower alveolar ridge (1). See Figure 1.

Figure 1: Protocol for assessing the lingual frenulum in infants, anatomofunctional evaluation, lingual frenulum.

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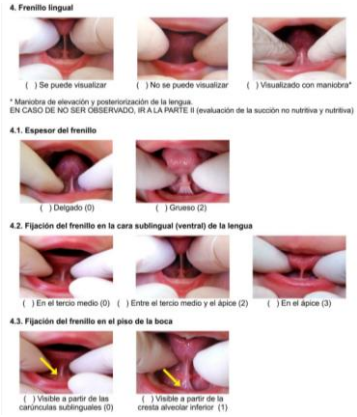

Source: Martinelli, 2015, Protocol for Assessing the Lingual Frenulum in Infants

The study was approved by the Ethics Committee of the Universidad del Museo Social Argentinos, according to Act 008 dated August 27, 2022. It adhered to the principles of the Declaration of Helsinki and Resolution 8430 of October 4, 1993, issued by the Ministry of Health. Participation was voluntary, and the legal representatives signed a written Informed Consent, authorizing participation in the research with full knowledge of the nature of the procedures, benefits, and risks involved. Participants retained the freedom to choose without any coercion, and their continued involvement was voluntary, allowing them to withdraw from the study at any time by any means, without any prejudice.

The research was conducted at the Gyneco-Pediatrics area of the E.S.E. Hospital San Juan de Dios in Pamplona. For descriptive analysis, the statistical program SPSS v.25.0 in Spanish was used.

RESULTS

57.7% of the neonates were male, and 42.3% were female. 61.5% were evaluated on the first day after birth, 23.1% on the second day, and 15.4% on the third day (see Table 1).

Table 1: Sociodemographic Characteristics of the Neonates; n = (26)

Variables		Number of Neonates	%
Sex	Femenine	11	42,3
	Masculine	15	57,7
Days after Birth	1	16	61,5
	2	6	23,1
	3	4	15,4

Source: The authors

Regarding the thickness of the lingual frenulum, in neonates with ankyloglossia, 34.6% had a thin frenulum, and 65.4% had a thick frenulum (see Table 2).

Table 2: Thickness of the Lingual Frenulum; n = (26)

Variables	Number of	%

		Neonates	
Thickness of the Lingual Frenulum	*Thin*	9	34,6
	Thick	17	65,4

Source: The authors

The attachment of the frenulum to the sublingual surface is located between the middle third and the apex in 53.8% of cases and at the lingual apex in 46.2% (see Table 3).

Table 3: Attachment of the Frenulum to the Sublingual Surface; n = (26)

Variables		Number of Neonates	%
Attachment of the Frenulum to the Sublingual Surface	*At the middle third*	0	0,0
	Between the middle third and the apex	14	53,8
	At the apex	12	46,2

Source: The authors

For the attachment of the frenulum to the floor of the mouth, 100% were visible from the lower alveolar ridge (see Table 4).

Tabla 4: Fijación del frenillo en el piso de la boca; n= (26)

Variables		Number of Neonates	%
Attachment of the Frenulum to the Floor of the Mouth	*Visible from the sublingual caruncles*	0	0,0
	Visible from the lower alveolar ridge	26	100,0

Source: The authors

Análisis y Discusiones

The criteria for characterizing the anatomy of the lingual frenulum are inappropriate for application in neonates, which complicates the diagnostic process. This highlights the need for a unification of diagnostic criteria, as well as a universal classification system(17), In this regard, the anatomical characterization of the lingual frenulum, specifically the thickness of the frenulum and the superior and inferior attachments, is imperative for advancing the understanding of ankyloglossia(18).

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In terms of the thickness of the lingual frenulum, neonates with ankyloglossia predominantly had a thick frenulum. This is consistent with the longitudinal study on the anatomical characteristics of the lingual frenulum conducted in Brazil, where among 71 neonates, 22.5% were diagnosed with ankyloglossia, and 20 exhibited a thick lingual frenulum(19), This condition limits tongue movements.

The attachment of the frenulum to the sublingual surface in neonates with ankyloglossia occurs between the middle third and/or the apex, in direct connection with the anterior portion of the tongue(20). In neonates evaluated at the Dr. José María Carabaño Tosta Hospital, located in the city of Maracay, Aragua state, 10.2% of cases showed attachment of the frenulum to the sublingual surface of the tongue at the apex, and 4% showed attachment extending to the apex(21).

Regarding the attachment of the frenulum to the floor of the mouth, neonates with ankyloglossia presented attachment at the lower alveolar ridge in the lingual frenulum. In the study conducted in Venezuela, 18.4% of the neonates showed attachment of the frenulum to the floor of the mouth, visible from the lower alveolar ridge(21).

CONCLUSIONS

A thick lingual frenulum, with attachment between the middle third and/or the apex and visible from the lower alveolar ridge, are the main anatomical characteristics of a lingual frenulum with ankyloglossia in neonates.

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