

Original Article

## Description of the Upper Labial Frenulum Characteristics in Preschool Children of Passo Fundo, Brazil

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### Abstract

**Objective:** To describe the morphological and insertion characteristics of the Upper Labial Frenulum in preschool children of Passo Fundo, Brazil. **Material and Methods:** This cross-sectional study performed clinical tests in 304 children aged 0-6 years enrolled in Early Childhood Education Schools of Passo Fundo. The five investigators were previously trained and calibrated. Children were examined in the classroom with natural light. The clinical examination consisted of upper lip distension for viewing and classification according to morphologic criteria and upper labial frenulum insertion. Demographic (ethnicity, age and gender) and clinical variables (morphologic aspects and the upper labial frenulum insertion) were collected. Data were processed and descriptive statistical analysis was performed. **Results:** Most of the evaluated preschoolers were white (71%) and aged 37-60 months (50%). The most prevalent labial frenulum type was simple, found in 77.3% of children, followed by simple with appendix (8.6%), and persistent tectolabial frenulum (8.6%). The most prevalent insertion type was attached gingiva in 51% of cases. **Conclusion:** This study found that in the study sample, considering simple, simple with nodule and single with appendix, they are the majority. In most cases, labial frenulum insertion is found in the attached gingiva. Only a small proportion shows penetrating insertion. Thus, the prevalence of normal labial frenulum is high, suggesting the follow-up of the labial frenulum characteristics in preschool children.

**Keywords:** Labial Frenulum, Epidemiology, Preschool Children.

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## Introduction

Labial frenulum is a thin triangular fold of base toward the apical in knife blade, which origin is relatively deep in the interior of lips. Insertion, in normal conditions, is the mucogingival limit in "V"-shape depression that separates the attached gingiva from the alveolar mucosa. Its histology consists of three planes: ortho or parakeratinized stratified epithelium, dense and loose connective tissue and submucosa containing mucous glands and lymph vessels [1]. When present, muscle fibers derived from the orbicularis oris muscle [2,3].

Its function is to limit the lip movements, promoting stabilization in the midline, and preventing over-exposure of the gingival mucosa [4].

Some studies report the importance of insertion and morphology of the labial frenulum because it is an anatomical structure with biological function may limit lip movements [3,5-9]. When insertion is abnormal, there is interference in the proper toothbrush positioning, making it difficult oral hygiene and leading to biofilm accumulation, pulling the gum tissues and leading to gingival recession, which may hinder the adaptation of mobile prosthetic devices, causing mechanical trauma to oral tissues. Whenever necessary, lip frenectomy is performed, either conventional or laser [10,11].

The aim of this study was to describe the anatomical characteristics and the insertion location of the labial frenulum and its prevalence in preschool children.

## Material and Methods

This is an observational cross-sectional study conducted in 04 Early Childhood Education Schools of Passo Fundo, Rio Grande do Sul, Brazil. These schools were selected, respecting sampling criteria and location. Schools should be located in different places of the city (neighborhoods and downtown), and add the number of children shown in the sample calculation.

Passo Fundo is the largest city of northern Rio Grande do Sul, with a population estimated at 200,028 inhabitants, GDP of 4.551,198 thousand reais (2015) and *per capita* income of 24.618,50 reais (2015). The illiteracy rate is around 2.18%, below the average rate of Brazil of approximately 11.40%. The city has 73 public schools (34 state schools and 39 municipal schools) and 9 private schools, and of these, 27 Municipal Early Childhood Education Schools. The data provided by the Municipal Council of Education of Passo Fundo / RS indicate a total of approximately 3167 children enrolled in elementary schools in 2015 [12].

The target population is composed of children aged 0-6 years of both sexes enrolled in Early Childhood Education Schools of Passo Fundo. The study is characterized by using a probabilistic sample, and all children present in school could perform the test and be part of the study, provided of having the written consent from parents and / or guardians. The sample size was calculated using the Epi Info [13] for a 95% confidence interval with an error of 5.62%.

The tests were performed by five trained and calibrated examiners. Training was composed of exhibition classes on the subject, with illustrative photos in power point. For calibration, 20

children selected had the same characteristics as those of this study; however, they were students from private schools and were not included in this research. The re-test was performed within one week. The kappa index to test the inter- and intra-rater agreement level was carried out and 0.78 and 0.82 were obtained, respectively.

Examiners used full PPE (lab coat, mask, cap, gloves and goggles) and children were placed in a way that would enable the intra-oral examination of the labial frenulum, using wooden sticks and hands to raise and / or distend the upper lip.

Survey data were recorded in the clinical record. The criteria used to evaluate labial frenulum were based on the Sewerin classification (1971) [14], identifying morphological characteristics. The classification includes simple frenulum, simple frenulum with nodule and simple frenulum with appendix, which are within normality. Bifid frenulum; frenulum with recession; double frenulum and persistent tectolabial frenulum are among abnormalities.

Regarding the insertion location, according to criteria of Placek et al. (1974) [15], it can be inserted in the alveolar mucosa (when fibers are connected to the muco-gingival junction), in the attached gingiva (fibers are inserted into the attached gingiva) in the interdental papillae (fibers extend to the interdental papillae) and penetrating insertion (fibers cross the alveolar process and extend to the palatal papilla).

For data processing, questionnaires were numbered and children were identified, which allows some numbers are repeated for conference. This procedure with the database provides quality control in typing and formation of the database. In the database, a variable identified the child through the number. The database was structured in Excel, and a descriptive analysis of the variables studied in this research was conducted.

This research project was submitted to the Ethics Committee of the University of Passo Fundo and approved under CAAE 48023315.1.0000.5342. An Informed Consent Form was delivered for parents to sign before the start of activities in schools.

## Results

The survey was conducted with 304 children, of these 159 (52%) are female and 145 male (48%), 216 children (71%) are white and 88 (29%) are non-white. The most prevalent age was 37-60 months, with 152 children, representing half of the sample (50%) (Table 1).

**Table 1. Characteristics of the sample (n = 304) composed of preschool children of Passo Fundo, 2015.**

Demographic Characteristics	n	%
<b>Gender</b>		
Male	145	48
Female	159	52
Total	304	100
<b>Ethnicity</b>		
White	216	71
Non-white	88	29
Total	304	100

Age		
0-36 months	46	15
37-60 months	152	50
61-72 months	106	35
Total	304	100

Regarding the morphological characteristics of the upper labial frenulum, prevalence of normality was obtained, verifying that simple labial frenulum was present in 235 children (77.3%), while persistent tectolabial frenulum was present in 26 of them (8.6%) (Table 2).

**Table 2. Prevalence of different characteristics of the upper labial frenulum in preschool children of Passo Fundo, 2015.**

Morphological Characteristics	n	%
<b>Normality</b>		
Simple	235	77.3
Simple with nodule	8	2.63
Simple with appendix	26	8.6
Total	269	88.5
<b>Abnormality</b>		
Bifid frenulum	1	0.32
Frenulum with recession	0	0
Double frenulum	8	2.63
Persistent tectolabial frenulum	26	8.6
Total	35	11.5
<b>Total</b>	304	100

Regarding the location of the upper labial frenulum insertion, insertion into the attached gingiva was found in 155 children (51%), followed by the alveolar mucosa and interdental papillae in 65 (21.4%) and 64 (21%), respectively, and penetrating insertion in 20 children (6.6%) (Table 3).

**Table 3. Prevalence of the different upper labial frenulum insertion locations in preschool children of Passo Fundo, 2015.**

Insertion location	n	%
Alveolar mucosa	65	21.4
Attached gingiva	155	51
Interdental papillae	64	21
Penetrating	20	6.6
Total	304	100

## Discussion

In this study, the following morphological types of upper labial frenulum were found: simple, simple with nodule and simple with appendix, according to the normality criteria [14], except for labial frenulum with recession, which was not observed in this sample. It is a result similar to that reported in literature [17], using children with similar age.

Regarding the morphological classification [14], the study that served as reference found 2.8% of persistent tectolabial frenulum type; however, it included subjects aged 0-60 years. Data on the prevalence of persistent tectolabial frenulum are conflicting in literature; however, it is noteworthy that studies are conducted with individuals at different ages. Other studies [18] with

sample composed of children aged 7-10 years found 15% prevalence of persistent tectolabial frenulum, and evaluating preschool children [19] with the same age as this study, found 10.6% prevalence, almost the same as our results.

Considering the literature on the subject, there is an involution process (atrophy) in the upper labial frenulum with advancing age, which may no longer be abnormal over time, as the child gets older [2].

Table 2 shows that the simple frenulum predominates over the other types, representing 77.3% of cases. In other studies, similar frequencies, between 65.6% and 72%, were found [14,19-21]. It is noteworthy that in some studies, with results more close to those of this study, the same evaluation methodology was used in subjects up to 06 years of age [14]. This reinforces the idea that similar results are expected when the same methodology is applied, particularly regarding research instruments characteristic of the sample [16].

Regarding the types of insertions, this study found four insertion locations [15]. There was a higher prevalence of insertion in the attached gingiva observed in half of preschoolers. The most harmful type of insertion occurs in the penetrating type, which was found in only 6.6% of children. According to literature, this insertion is outside normality standards, that is, it is not in the mucogingival limit, or in a "V"-shape depression that separates the attached gingiva from the alveolar mucosa [3].

The children in this study were in the age group of 06 years, all with primary dentition. For the definition of surgical treatment indication, the presence of permanent incisors is an evaluation criterion, since in the primary phase, few authors indicate any invasive procedure, because when comparing to position of the labial frenulum in the newborn and in more advanced ages, an improvement is observed [3,17,22-27].

At the mixed dentition stage, many questions arise, on the one hand, the ugly duckling stage is physiological and there is a closing of spaces between incisors, in some cases, this does not occur, either for need of space or for orthodontic reasons, and there is surgery indication [22,24,26].

In the permanent dentition, surgery indication changes to the aesthetic issue. After the eruption of permanent teeth, if the child has not performed orthodontic treatment, the presence of anterior diastema does not reflect a comfortable situation [24].

Therefore, the literature recommends caution in performing surgical procedures such as frenectomy, showing a late intervention trend after eruption of permanent canines, or after the ugly duckling stage, since almost all studies show a decrease in the prevalence this type of labial frenulum with advancing age [20,24].

Although this study is important for epidemiological data to be achieved and especially questioning surgical indications, the study design is cross-sectional. This leads to the unique assessment situation and does not contemporize the outcome over the child's growth. If on the one hand, cross-sectional studies have relevance in order to improve the diagnosis and collect data for future actions, on the other, these studies fail to assess other factors associated with the action time.

Further follow-up studies should be conducted with these children at different times and with mixed dentition, observing the same study variables.

## Conclusion

In this study, the most prevalent labial frenulum was simple, followed by simple with appendix, and the most common insertion type was in the attached gingiva. Only a small percentage had penetrating insertion. Thus, the prevalence of normal labial frenulum is high, suggesting the follow-up of the characteristics of labial frenulum in preschool children.

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