

DOI: <https://doi.org/10.33314/jnhrc.v19i1.3475>

Morphology of Maxillary Labial Frenum in Chepang Community of Chitwan

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ABSTRACT

Background: Labial frenum is a fold of mucous membrane whose function is to attach lips and cheek to the alveolar mucosa, gingiva and underlying periosteum. The maxillary labial frenum has lot of variation in shape, size location. This study was aimed to assess the variation of maxillary labial frenum in the indigenous Chepang community of Nepal.

Methods: A descriptive cross-sectional study was conducted among the Chepang community at Madi municipality in Chitwan, Nepal. The clinical examination was done by distending the upper lip upward for viewing. The obtained data was classified according to Mirko and Sewerin classification. Data was entered into Statistical Package for the Social Sciences version 16 and descriptive statistics was performed.

Results: All the Chepang participants 102 (100 %) had mucosal type of maxillary frenum. Among the variations normal frenum was mostly present 74 (72.5%). This type was mostly present in male participants 44 (43.1%). Apart from this frenum with nodules and appendix was also observed.

Conclusions: The mucosal type of frenal attachment was prevalent in Chepang Community and normal frenum was the most common type of frenal morphology.

Keywords: Chepang community; maxillary labial frenum; mucosal

INTRODUCTION

The maxillary labial frenum, a mucous membrane fold, is a midline structure that is present between the upper central incisor. It attaches the lingual surface of lips and cheeks to the periosteum.¹

Clinically, if aberrantly placed, maxillary labial frenum leads to midline diastema,² complicate the orthodontic spacing.^{3,4} It is also the cause of post orthodontic relapse.⁵ It is also associated with esthetic problems and speech disorder and at times requires surgical excision.⁶

Variation of frenum both morphological and location wise have been reported. Studies have also reported variation based on race or ethnicity.^{7,8} Only two studies have been conducted in Nepal based on Mirko's classification and limited on patients coming to hospital.^{9,10} However, study pertaining to typical indigenous ethnicity and including Sewerin's classification¹¹ has not been conducted. This study was aimed to assess the variation of maxillary labial frenum in the indigenous Chepang community of Nepal.

METHODS

This was a descriptive, cross-sectional study conducted from 19th February 2021 to 28th February 2021 at Madi municipality of Chitwan, Nepal. The ethical approval for the study was obtained from CMC-IRC (CMC-IRC/077/078-165). Convenience sampling of Chepang community at Madi municipality was done and only those who fit into the inclusion criteria were taken into study. Participants within the age of 6-60 years were included in the study. While participants who had trauma in the premaxillary region, any operation done on upper labial frenum, any developmental abnormality of upper frenum were excluded from the study.

The sample size was calculated using the formula $n = Z^2pq/d^2$ where $Z = 1.96$ at 95% confidence interval, $p = 61.1\% = 0.611$,⁹ $q = 1 - p = 0.389$ and $d = 10\%$. The sample size was 91. However, in the study 102 participants were enrolled. In the beginning of the study all the participants were explained about the objectives of study by a Chepang lady who was familiar with both Nepali and Chepang language and informed consent was

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taken. The demographic details of each participants were recorded. Then the clinical examination of frenum was done under adequate light. The site of attachment of frenum and the morphology was examined gently by distending the upper lip upward. All the required intraoral photographs were taken (Figure 1-3). The morphology of the maxillary labial frenum was classified into different groups according to the Sewerin's frenum classification,¹¹ and on the basis of attachment location given by Mirko et al.¹²



Figure 1. Normal Frenum.



Figure 2. Frenum with appendix.



Figure 3. Frenum with nodule.

The data obtained from the study was entered into

IBM SPSS Statistics for Windows, version 16 (IBM Corp., Armonk, N.Y., USA) software and was analyzed with descriptive statistics and presented in the form of tables.

RESULTS

A total of 102 participants were enrolled in this study, out of which 55 (54.9%) were females and rest were males. All the participants had mucosal type of frenal attachment. Normal frenum was found in 74 (72.5 %) of study population. Normal frenum was mostly observed in females 44 (43.1%) than males 30 (29.4 %) while more males showed frenum with nodule 12 (11.8%) (Table 1).

Table 1. Distribution of types of frenum based upon gender.

Types of frenum	Male n(%)	Female n(%)	Total n(%)
Based on attachment site			
Mucosal	46 (45.1)	56 (54.9)	100 (100)
Based on variations in morphology			
Normal frenum	30 (29.4%)	44 (43.1%)	74 (72.5)
Frenum with nodule	12 (11.8%)	8 (7.8%)	20 (19.6)
Frenum with appendix	4 (3.9%)	4 (3.9%)	8 (7.8)

Table 2 showed age wise distribution of frenum Thirty four participants belonged to age group under or equal to 10 years. All the participants had mucosal type of frenal attachment. Normal frenum was found in 74 (72.5 %) of study population (Table 2).

Table 2. Age wise distribution of frenum according to Mirko Classification.

Age Groups	Male n(%)	Female n(%)
≤10 years	17 (37.0)	17 (30.4)
11-20 years	11 (23.9)	9 (16.1)
21-30 years	7 (15.2)	11 (19.6)
31-40 years	1 (2.2)	7 (12.5)
41-50 years	4 (8.7)	7 (12.5)
51-60 years	6 (13.0)	5 (8.9)

Table 3. Age wise distribution of frenum based on variations in morphology.

Age Groups	Normal frenum n(%)	Frenum with appendix n(%)	Frenum with nodule n(%)
≤10 years	31 (41.9)	0	3 (15.0)
11-20 years	11 (14.9)	3 (37.5)	6 (30.0)
21-30 years	13 (17.6)	3 (37.5)	2 (10.0)
31-40 years	4 (5.4)	1 (12.5)	3 (15.0)

41-50 years	9 (12.2)	1 (12.5)	1 (5.0)
51-60 years	6 (8.1)	0	5 (25.0)

Normal frenum 31 (41.9%) was found more in age group ≤ 10 years. Similarly, in the age group 11-20 years normal frenum was observed in 11(14.9%) of participants while 6 participants of this age group showed frenum with nodule (Table 3).

DISCUSSION

The labial frenum is typically a mucosal fold whose main function is to provide stability to lips and to attach the lips to alveolar mucosa, gingiva and periosteum.¹³ The development of this mucosal fold usually begins around 8-10 weeks connecting the tubercle of upper lip to the palatine papilla and with further development of alveolar process this fold takes a more apical position.^{13,14} Aberrant location of maxillary labial frenum has also been reported to influence the growth and development of premaxilla,⁷ problems in speech, mastication and maintenance of oral hygiene.⁶ Abnormal development of maxillary labial frenum has also been correlated with formation of midline diastema^{2,15,16} and further complicate the orthodontic treatment.^{3,4} In addition upper lip tie has been reported to cause breastfeeding problems.¹⁷⁻¹⁹

Studies have shown several variations on the maxillary labial frenum. The results may vary in different age group, gender.^{1,20,21} Rathod et al reported gingival type of maxillary labial frenum was the most common type followed by papillary type.²² Study performed in Nepal showed mucosal type as the most common type (70.5 %) followed by gingival type (28.4%).¹⁰ In another study conducted in Nepal, gingival type of maxillary labial frenum was the most common type.⁹ The present study investigated the prevalence of different types of maxillary labial frenum among 102 participants from the Chepang community of Chitwan. This study is different from previously published study in Nepal,^{9,10} as both Mirko¹² and Sewerin¹¹ classification of maxillary labial frenum was taken into consideration.

It was observed the all the study participants had mucosal type of maxillary labial frenum. This finding varies from the other studies as all of them have shown different types of maxillary labial frenum in the study participants.^{4,20-22} Studies have also suggested the need of ethnicity dependent differences.^{1,21,22} The result thus obtained in this study can be said to be specific to the Chepang community as similar pattern of mucosal type of attachment location was seen in all ages.

Based on Sewerin classification,¹¹ the normal frenum was mostly observed in most of the studies followed

by differences in other types.²³⁻²⁵ The present study showed that the normal frenum was the most common morphology of frenum prevalent in 72.5% of study participants, followed by frenum with nodules and frenum with appendix. Nageveni et al.²⁶ and Birader et al.²⁰ in contrast to our study, reported persistent tectolabial frenum as being the second most common type. In the present study other types of frenum such as persistent tectolabial frenum, frenum with nichum, double frenum were also not observed. This difference in the study finding may be due to study population selected, sample size taken into consideration.

The study is not devoid of limitation. The main limitation is the cross-sectional study design and smaller sample size as it was conducted in 102 participants. However, the authors would like to emphasize on the shy nature of the Chepang community, hiding among the houses and trees, during data collection. This community is also the most backward indigenous groups of Nepal and have the habit of expecting gifts from social agencies. So, few of the Chepang participants denied appearing during data collection. Most of them did not speak with the strangers, did not open mouth during data collection. The authors would like to highlight the need of further studies involving genetic study, morphometric and cephalometric analysis of this community taking a large sample size.

CONCLUSIONS

This study showed that the mucosal type of frenal attachment was prevalent in all the Chepang participants and the most common type of frenal morphology was normal frenum.

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