ABSTRACT

Background: Maxillary labial frenum is a mucous membrane fold which shows variation in morphology, position. This anatomic structure presents with variety of orofacial problems leading to diastema, phonetic, periodontal, and orthodontic issues thus affecting growth and development. Hence it is mandatory to examine the frenal attachment during oral examination. With this the study was aimed to assess the prevalence of the various types of maxillary labial frenum attachment among the patients and its association with oral hygiene status.

Methods: A total of 260 patients aged from 18 to 35 years were clinically examined to evaluate the type of frenal attachment using Placek’s classification. Oral hygiene index (simplified) was recorded and data was analyzed statistically. The obtained data was statistically analyzed by using SPSS version 23.0 with descriptive and inferential statistics.

Results: Most of the individuals 136 (52.3%) had gingival type of frenum followed by mucosal 92 (35.38%), papillary 21 (8.07%), and least with papillary penetrating 11 (4.23%). There was statistically significance between frenum attachment and gender. The relationship of frenal attachment with oral hygiene status was found to be significant.

Conclusions: In terms of maxillary labial frenum attachment type, gingival frenal type was the most predominant types among the study sample with a low incidence of papillary penetrating frenal attachment. The study showed strong association between type of frenal attachment and oral hygiene status.

INTRODUCTION

A frenum is a fold of mucous membrane attaches lips to the alveolar mucosa and underlying periosteum with the main aim to stabilize the tongue, upper lip and lower lip.1 Depending upon how the fibers are attached and how the frenum is structured, the maxillary labial frenum shows great variations.2 The variation in insertion of labial frenum usually presents with clinical problems that are associated with periodontal, speech, esthetics and orthodontic issues.2

A frenal pull that encroaches on the gingival margin may interfere with proper placement of toothbrush, accumulating plaque and tension on this frenum may tend to open the sulcus, thus interfering with oral hygiene and also increasing the chances of recession of gingiva. This anatomic structure most often goes neglected or unnoticed during routine intraoral examination.3

Studies have shown different types of maxillary labial frenum with variation among age groups, gender and ethnicity.4,5 However, such studies related to labial frenum and the association with the oral hygiene status have not been conducted in Nepal. Hence the present study aimed to assess the prevalence of the various types of maxillary labial frenum attachment and its association with oral hygiene status.

METHODS

This cross-sectional study was carried out on 260 patients consisting of both males and females with an age ranging from 19 to 35 years who visited Department of Periodontology and Oral Implantology. The study was conducted from November 2022 to March 2023. The study group consisted of participants who were systemically healthy, had minimum of 20 teeth in oral cavity and not had any intervention on upper labial frenum or on medications known to affect the gingiva. Ethical clearance was taken from Chitwan Medical College (Ref. CMC-IRC/079/080/069) and written consent was obtained from all subjects.

The sample size was calculated as using the prevalence of 39% gingival type of maxillary labial frenum attachment seen in the study done by Divater et al6 using the formula: Sample size
n=Z^2pq/d^2 where Z= 1.96 at 95%CI, p=0.39, q=1-p=0.61, d= 6%. Thus, a calculated total sample size was 253.87≈254. However, in the study 260 patient data was included.

All examinations were performed by the direct visual method under the natural light by a single examiner. A clinical inspection of the area around the upper labial frenulum was performed. The lip was lifted with the thumb and index fingers of both hands to identify the insertion site of maxillary labial frenum. The different types of frenal attachments followed as given by Placek et al. Patient oral hygiene was evaluated using the simplified oral hygiene index by Greene and Vermillion.

Statistical analysis was done using SPSSVersion 23 and descriptive statistics and inferential statistical tests were calculated. The P-value of 0.05 was considered as significant.

RESULTS

Patients who participated in the present study were aged between 18-35 years old with a mean ± standard deviation of 28.71 ± 4.22. The study included 170 (%) male and 90 (%) female subjects (Figure 1). The results showed the most prevalent insertion was the gingival type (52.3%), followed by mucosal (35.38%), papillary (8.07%) and least frequent papillary penetrating (4.23%) respectively (Figure 2).

There was a significant relation between frenal attachments and age. The gingival type of frenum was predominant in both genders. Regarding gender and insertion site, male showed higher gingival, mucosal and papillary frenal attachments respectively while female recorded higher papillary penetrating frenal type. Statistical analysis found significant differences between males and females in relation to all attachments (Table 1).

DISCUSSION

The frenal attachment level and types is an important aspect of clinical examination as there may be difficulty in maintenance of oral hygiene and cause a periodontal problem. Thus the correct assessment should be done for all the oral examination to avoid ill effects such as gingival recession and midline diastema.

Aberrant frenal attachment has a detrimental effect on periodontal tissue and facial esthetics. When there is frenal pull, the sulcus dilates, which allows the accumulation of bacterial plaque leading to periodontal problems such as gingival recession and interferes with oral hygiene maintenance since it makes it difficult to perform hygiene of that area. Abnormal frenum tends to retract the gingival margin and help in diastema development, also interferes with the mobility of the lip.

The magnitude of frenal attachments of 260 patients were examined in the present study. The present study was based on the Placek et al classification of frenal attachments which has been mostly used among children and adults in other studies too. Present study observed the prevalence of gingival type followed by mucosal type of frenum. In similar studies, gingival type was most predominant. However few studies

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**Figure 1: Gender distribution of frenal attachment**

There was a significant relation between frenal attachments and age. The gingival type of frenum was predominant in both genders. Regarding gender and insertion site, male showed higher gingival, mucosal and papillary frenal attachments respectively while female recorded higher papillary penetrating frenal type. Statistical analysis found significant differences between males and females in relation to all attachments (Table 1).

**Table 1: Association between different types of frenal attachment and gender**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Types of frenal attachment</th>
<th></th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gingival</td>
<td>Mucosal</td>
<td>Papillary</td>
</tr>
<tr>
<td>Male</td>
<td>98 (37.7%)</td>
<td>57 (21.9%)</td>
<td>14 (5.4%)</td>
</tr>
<tr>
<td>Female</td>
<td>38 (14.6%)</td>
<td>35 (13.5%)</td>
<td>7 (2.7%)</td>
</tr>
</tbody>
</table>

**Table 2: Association between different types of frenal attachment and OHI-S**

<table>
<thead>
<tr>
<th>OHI-S</th>
<th>Types of frenal attachment in percentage</th>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gingival</td>
<td>Mucosal</td>
<td>Papillary</td>
</tr>
<tr>
<td>Fair</td>
<td>117 (45%)</td>
<td>74 (28.4%)</td>
<td>26 (6.2%)</td>
</tr>
<tr>
<td>Poor</td>
<td>19 (7.3%)</td>
<td>18 (6.9%)</td>
<td>5 (1.9%)</td>
</tr>
</tbody>
</table>
conducted in Nepal showed the prevalence of mucosal type.\textsuperscript{5,12-14} The reason may be due to the variation in age group, race and ethnicity within the population. In a study done by Mirko et al.\textsuperscript{5} it was proposed that different type of frenal attachment also influences the periodontal status. Except mucosal all the other types demonstrated lower periodontal resistance in persons with pathological alterations.\textsuperscript{15}

In the present study show the prevalence of gingival type of frenal attachment followed by mucosal type. Regarding the association between the frenal attachment type and gender, the gingival, mucosal and papillary frenal type was more common in males while in females the papillary penetrating frenal attachment was more common. These findings are in accordance to the finding’s other studies.\textsuperscript{15,16}

Good oral hygiene is the reflection of total health care. The present study clearly shows the difference in the maxillary frenal attachment and its relation with oral hygiene status suggesting the implementation and reinforcement of the oral hygiene measures. The identification of local anatomic factors such as aberrant frenum may also assist the early treatment before any adverse effects are observed. The result of the present study was similar to the study done by Divater et al. where it also showed strong association between maxillary labial frenal attachment with oral hygiene status. However, in contrast to our findings, the study performed by Divater et al. could not show any significant association between gender and frenal attachment.\textsuperscript{6} In the study done by Addy et al., it was shown that the plaque and gingivitis in the mandibular arch were mostly unaffected by the mandibular labial frenum. However, the maxillary labial frenum appeared to have an impact in the persistence of plaque and the severity of gingivitis.\textsuperscript{10} Thus, the present study attempts to bring awareness into the importance of early diagnosis of abnormal frenum to avert the periodontal as well as orthodontic problems.

The limitation of this study is a small sample size, limited age group that was carried out in localized region of Nepal and, so the results of the study cannot be generalized. The influence of other etiological factors on oral hygiene status was also not determined.

CONCLUSION

It can be concluded that the maxillary labial frenum has variation in morphology and attachment level and there is a need of careful assessment of this structure during intra oral examination. Thus, we need to assess the impact that an untreated aberrant insertion may have on the person’s whole development. Likewise, it is recommended to encourage the dental professionals to inspect variations of this structure may have to conduct optimal treatments whenever necessary.

ACKNOWLEDGEMENT

The authors would like to thank all the participants of the study.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

REFERENCES: