ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 7, Issue – 2, April – 2024, Page No. : 133 - 137

Evaluation of fraenum shape and attachment variations in a heterogeneous population – A cross sectional study

[1]Dr. Amit Mani, Professor, Department of Periodontology, RDC, Pravara Institute of Medical Sciences, Loni.

[2]Dr. Shivani Sachdeva, Professor, Department of Periodontology, RDC, Pravara Institute of Medical Sciences, Loni.

[3]Dr. Anjali Pandit, Post graduate student, Department of Periodontology, RDC, Pravara Institute of Medical Sciences, Loni.

[4]Dr. ShwetaVikhe, Post graduate student, Department of Periodontology, RDC, Pravara Institute of Medical Sciences, Loni.

[5]Dr.VandanaTripathi, Associate Professor, Department of Pedodontic and Preventive Dentistry, Government Dental College, Mumbai.

Corresponding Author: Dr. Anjali Pandit, Post graduate student, Department of Periodontology, RDC, Pravara Institute of Medical Sciences, Loni.

Citation of this Article: Dr. Amit Mani, Dr. Shivani Sachdeva, Dr. Anjali Pandit, Dr. ShwetaVikhe, Dr. Vandana Tripathi, "Evaluation of fraenum shape and attachment variations in a heterogeneous population – A cross sectional study", IJDSIR- April – 2024, Volume –7, Issue - 2, P. No. 133 – 137.

Type of Publication: Review Article

Conflicts of Interest: Nil

Abstract

Background: Frenal attachments are thin folds of mucous membrane with enclosed muscle fibers that attach the lips to the alveolar mucosa and underlying periosteum. The frenum receives very little attention from the dentist during the patient's oral examination in terms of determining its morphology and attachment. An aberrant fraenum has been observed to either indicate the presence of a syndrome or to significantly worsen mucogingival issues and prevalence.

Aim: The aim of the study is to evaluate of fraenum shape and attachment variations in a heterogeneous population.

Material and methods: the present study enrolled 300 patients comprising both males and females within the age group of 18-35 years who visited the OPD of Rural Dental College, Pravara Institute of Medical Sciences, Loni, Maharashtra. The Frenal attachments were recorded according to classification given by Mirco et al in 1974. The statistical analysis was carried out and chi square test was done.

Results: In the population, mucosal, gingival, papillary, and papilla penetrating types of Frenal attachment were present in approximately51.48%, 52.05%, 54.7%, 15.38% of cases in males, and 48.52%, 47.92%, 45.3, 84.62% in females respectively**.** Presence of diastema was seen in 36.7% in males and 63.3% in females.

Conclusion: Gingival type of Frenal attachment is more common among mucosal, gingival, papillary, pailla penetrating in the population. Diastema is more common in females with papilla penetrating type of Frenal attachment.

Keywords: Frenal attachments, diastema, mucogingival problems.

Introduction

Frenal attachments are thin folds of mucous membrane with enclosed muscle fibers that attach the lips to the alveolar mucosa and underlying periosteum. It has been seen that an abnormal fraenum can be an indicator of a syndrome or can cause severe mucogingival problems and prevalence.[1]

Their primary function is to provide stability of the upper and lower lip and the tongue.[1] Labial Frenal attachments are thin folds of mucous membrane with enclosed muscle fibers originating from orbicularisoris muscle of upper lip that attach at the lips to the alveolar mucosa and underlying periosteum.[2]

When tension is applied to the fraenum, abnormal or aberrant frena are visually observed to see the movement of the papillary tip or blanching caused by ischemia of the region.

Difficulty in brushing, diastema, loss of papilla, recession, malalignment of teeth and retention(in case of dentures)are related to papillary and papilla penetrating type of frena which leads to psychological disturbances to the individual.

A fraenum can be problematic if strain from lip movement pulls the gingival border away from the tooth, or if the tissue prevents the closure of a diastema during orthodontic treatment.

There are various syndromes associated with relatively specific Frenal abnormalities, ranging from multiple, hyperplastic, hypoplastic, or an absence of frena which includes Ehlers-Danlos syndrome, Infantile hypertrophic pyloric stenosis, Holoprosencephaly, Ellis-van Creveld syndrome, and Oro-facial-digital syndrome.[3]

Depending upon the extension of attachment of fibers, frena have been classified as:[4]

Mucosal – when the Frenal fibers are attached up to mucogingival junction

Gingival – when fibres are inserted within attached gingiva

Papillary – when fibres are extending into inter dental papilla;

Papilla penetrating – when the Frenal fibres cross the alveolar process and extend up to palatine papilla.

Frenal attachments are also classified by Sewer in 1971 as follows [5]

1. Simple fraenum,
2. Persistent tectolabial fraenum,
3. Simple fraenum with appendix,
4. Simple fraenum with nodule,
5. Double fraenum,
6. Frenum with nichum,
7. Bifid fraenum

Materials and Methods

The present observational study enrolled 300 patients comprising both males and females within the age group of 18-35 years who visited the OPD of Rural Dental College, Pravara Institute of Medical Sciences, Loni, Maharashtra.

The patients who have had any congenital / developmental defects, trauma/injuries in the premaxillary region, history of prior orthognathic /frenal surgeries, with one or both central incisors missing and under any medication known to affect the gingiva were excluded from the study.

Patients having congenital or developmental problems, premaxillary trauma or traumas, a history of past Frenal or orthognathic surgery, missing one or both central incisors, or who were taking any medications that were known to impact the gingiva were excluded from the study.

Results

Table 1: Gender wise Distribution

Gender	Frequency	Percentage
Male	153	51
Female	147	49
Total	300	100

Table 2: Extent of Frenal attachment in percentage

Extent of Frenal attachment	Frequency	Percentage
Mucosal	99	33
Gingival	146	48.7
Papillary	42	14
Papilla penetrating	13	4.3
Total	300	100

Table 3: Frequency of Diastema

Diastema	Frequency	Percentage
Present	49	16.3
Absent	251	83.7
Total	300	100

Table 4: Gender wise distribution of different types of Frenal attachments:

Type		Male	Female	Total
Mucosal	Count	52	47	99
	%	51.48	48.52	100
Gingival	Count	76	70	146
	%	52.05	47.95	100
Papillary	Count	23	19	42
	%	54.7	45.3	100
Papilla penetrating	Count	2	11	13
	%	15.38	84.62	100
Total	Count	155	145	300
	%	51.6	48.4	100

Table 5: Gender wise distribution of diastema

Type		Male	Female	Total
Present	Count	18	31	49
	%within diastema	36.7	63.3	100
Absent	Count	131	120	251
	%within diastema	52.2	47.8	100
Total	Count	149	151	300
	%within diastema	49.7	50.3	100

Results

About 300 patients were examined for the type of Frenal attachment. The data analysis of 300 patients was performed.

Table 1 provides the gender distribution which shows that about 51% of the study population were males and 49% were females.

Table 2 exhibits the extent of Frenal attachment in terms of percentage. It was found that about48.7%33%42%4.3% had gingival, mucosal, papillary, papilla penetrating type of Frenal attachment respectively in the study population.

Table 3 exhibits the frequency of Diastema It was found that only 13.8% of the study population showed midline diastema.

Table 4 reveals gender wise distribution of different types of Frenal attachments. About 48.2%, 47.95%, 45.3% of male population showed mucosal, gingival, papillary Frenal attachments while 84.62% showed papilla penetrating type. Chi Square value was found to

be 6.9936 and p value 0.07. The result is not significant at $p<0.05$.

Table 5 showed presence of diastema was seen in 63.3% of female population and 36.7% in male population. Chi Square value was found to be 9.398 and p value 0.024 which indicated statistically significant differences in Frenal attachments amongst both the gender. The chi-square statistic is 3.9179. The p- value is 0.04775. The result is significant at $p<0.05$ among both gender.

Discussion:

The study's limitations are its cross-sectional methodology, smaller sample size, and potential for population variation to skew the results.

In the present study, it was found that a majority of study population exhibited gingival type of Frenal attachment followed by mucosal type. However, most of the female population showed papilla penetrating type of Frenal attachment and the presence of diastema was also more prevalent amongst females. These findings are in accordance to the finding sof Jind al et al., 2016 and Mirko et al. [4,6]

During development, the failure of the fraenum to migrate apically has been implicated as the causative factor in the persistence of the midline diastema. It may be caused by the insertion of the labial fraenum into the notch in the alveolar bone so that a band of heavy fibrous tissue lies between the central incisors.[7]

The aberrant Frenal attachments may cause problems in speech, mastication, esthetics, and maintenance of oral hygiene constituting a periodontal problem. If the labial Frenal attachment is inserted at or near the gingival margin, it interferes with toothbrushing and encourages plaque formation by pulling or averting the gingival margin. [3]

Any interference in allocation of the continuous band of connective tissue of can lead to midline diastema and also interferes with the growth of anterior portion of the maxilla. In these cases, fraenum retains its maturational arrest. Therefore, papillary and papillary penetrating varieties are regarded as pathological in the permanent dentition.[8]

Abnormal or aberrant frena are detected visually, by applying tension over it to see the movement of papillary tip or blanching produced due to ischemia of the region. Clinically, papillary and papilla penetrating frena are considered as pathological and have been found to be associated with loss of papilla, recession, diastema, difficulty in brushing, malalignment of teeth and it may also prejudice the denture fit or retention leading to psychological disturbances to the individual.[9]

In addition to abnormal oral frena observed in syndromic conditions, anomalous frena are encountered without other associated phenotypic features of genetic or chromosomal states. For example ankylosis of superior labial frena may show a familiar pattern of occurrence [1]

Aberrant Frenal attachments may be seen after orthognathic surgeries. Problems are probably caused by errors in the surgical technique. The design of the soft tissue incisions is critical, vertical incisions in the area of Osteotomy will predictably create periodontal problems.[10]

Three surgical techniques are effective in removal of Frenal attachment.

1. The simple excision technique
2. The Z-plasty technique
3. A localized vestibuleplasty with secondary epithelialisation.

The first two techniques are effective when the mucosal and fibrous tissue band is relatively narrow; the third

technique is often preferred when the Frenal attachment has a wide base.[11]

When the fraenum is excessively closely linked to the gingival margin, it can lead to diastema, gingival recession, bone loss from the muscular strain, and impaired lip mobility, especially when speaking and smiling.[12]

Conclusion

The gingival type of Frenal attachment is more prevalent as compared to mucosal, papillary and papilla penetrating types. In comparison to mucosal, papillary, and papilla penetrating type varieties of Frenal attachment, the gingival type is more common. It can be concluded that the kind of Frenal attachment changes with population ethnicity and that diastema is more common in females with papilla penetrating Frenal attachment. The goal of the current study is to emphasise how crucial it is to identify aberrant fraenum as soon as possible in order to stop the development of mucogingival and improve aesthetics.

References

1. Mintz SM, Siegel MA, Seider PJ. An overview of oral frena and their association with multiple syndromes and nonsyndromic conditions. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2005;99:321–4.
2. Kotlow LA. Oral diagnosis of abnormal frenum attachments in neonates and infants: Evaluation and treatment of maxillary frenum using the Erbium YAG Laser. J Pediatr Dent Care. 2004c;10:11–4.
3. Priyanka M, Sruthi R, Ramakrishnan T,EmmadiP, Ambalavanan N. An over view of frenal attachments .J Indian Soc Periodontol. 2013;17:12–15
4. Mirko P, Miroslav S, Lubor M. Significance of the labial frenum attachment in periodontal disease in man. Part I. Classification and epidemiology of the labial frenum attachment. J Periodontol. 1974;45:891–4.
5. Sewerin I. Prevalence of variations and anomalies of the upper labial frenum. Acta Odontol Sc and.1971;29:487–496
6. Jindal V, Kaur R, Goel A, Mahajan A, Mahajan N, Mahajan A. Variations in the frenal morphology in the diverse population: a clinical study. J Indian Soc Periodontol.2016 May-Jun;20(3):320–323
7. Kaimenyi JT. Occurrence of mid line diastema and frenum attachments amongst schoolchildrenin Nairobi,Kenya.IndianJDentRes.1998;9:67–71
8. VargheseT, Kalburgi V, Dodani K, Parihar A Nagpa N. Various morphological variations in attachment of maxillary labial frenum: an observational study. J Res Adv Dent.2018;8(1):189–192
9. Anubha N, Chaubey KK, Arora VK, Narula IS. Frenectomy combined with a laterally displaced pedicle graft. Indian J Dent Sci. 2010;2:47–51.
10. Panula K, Finne K, Oikarinen K. Incidence of complications and problems related to orthognathic surgery: A review of 655 patients. J Oral MaxillofacSurg. 2001;59:1128–36.
11. Priyanka M, Sruthi R, Ramakrishnan T, Emmadi P, Ambalavanan N. An overview of frenal attachments. Journal of Indian society of Periodontology. 2013 Jan;17(1):12.
12. Rajani ER, Biswas PP, Emmatty R. Prevalence of variations in morphology and attachment of maxillary labial frenum in various skeletal patterns-A crosssectional study J Indian Soc Periodontol. 2018;22:257– 62.