

Prevalence Of Maxillary and Mandibular Frenal Attachment and Its Association with Age, Gender and Oral Hygiene Status Among Dental Patients in Tumkur

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Abstract:

Background: Frenal attachments are folds of mucous membrane that connect the lips to the alveolar mucosa and underlying periosteum. Aberrant positioning of the maxillary and mandibular frenum may contribute to mucogingival problems, midline diastema, plaque accumulation, gingival recession and recurrence following treatment. Early identification of the type of frenal attachment may therefore help prevent complications.

Aim: To assess the prevalence of maxillary and mandibular frenal attachments and their association with age, gender and oral hygiene status among patients attending the dental outpatient section of Sri Siddhartha Dental College and Hospital, Tumkur.

Material and Methods: A cross-sectional clinical examination was performed among 100 patients aged 20–60 years. Patients with trauma or injury in the maxillary or mandibular region, congenital or developmental anomalies, and previous or ongoing orthodontic treatment were excluded. Maxillary and mandibular labial frenal attachments were assessed using Placek Mirko's and Sewerin's classifications. Oral Hygiene Index-Simplified (OHI-S), Gingival Index (GI), bleeding on probing (BOP), diastema and gingival recession were also recorded.

Results: In the maxilla, mucosal attachment was most prevalent (60%), followed by gingival (28%), papillary (10%) and papillary penetrating (2%) attachments. In the mandible, mucosal attachment was most prevalent (53%), followed by gingival (46%) and papillary (1%) attachments. By Sewerin's classification, normal frenum was the most common maxillary type (58%). A statistically significant association was observed between maxillary frenal attachment and OHI-S ($p=0.0001$), whereas the corresponding mandibular association was not statistically significant ($p=0.09$). No statistically significant association with age was observed for either maxillary ($p=0.73$) or mandibular ($p=0.42$) frenal attachment.

Conclusion: Frenal attachment morphology showed considerable variation in both arches. Mucosal attachment was the most prevalent attachment type, while normal frenum was the most frequent morphology under Sewerin's classification. Maxillary frenal attachment showed a significant association with oral hygiene status, emphasizing the importance of careful clinical assessment and maintenance of oral hygiene in patients with aberrant frenal attachments.

Keywords: Frenal attachment; labial frenum; Placek Mirko classification; Sewerin classification; oral hygiene; OHI-S; gingival recession

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I. Introduction

Frenal attachments are folds of mucous membrane that connect the lips to the alveolar mucosa and underlying periosteum. The position and morphology of the maxillary and mandibular labial frenum vary considerably among individuals. Aberrant frenal positioning may have clinical implications, particularly when the attachment encroaches on the gingival tissues.¹

Frenal attachments that encroach on the gingiva may contribute to tissue distension, plaque accumulation and accelerated gingival recession, and may be associated with recurrence following treatment. Identification of the type and position of frenal attachment is therefore relevant during routine periodontal and dental examination.^{1,2}

Placek Mirko's classification (1974) categorizes frenal attachments into mucosal, gingival, papillary and papillary penetrating types.⁸ Sewerin's classification (1971) describes morphological variations including normal frenum, frenum with nodule, frenum with appendix, bifid frenum, persistent tectolabial frenum, double frenum and wider frenum.⁹

II. Aim

To assess the prevalence of maxillary and mandibular frenal attachments and their association with age, gender and oral hygiene status among patients visiting the dental outpatient section of Dental College, Tumkur.

III. Materials and Methods

Study design and participants

The study was conducted among 100 patients attending the dental outpatient section of Sri Siddhartha Dental College and Hospital, Tumkur. Participants were in the age group of 20–60 years.

Inclusion criteria

All patients in the age group of 20–60 years were included.

Exclusion criteria

- Patients with trauma or injuries in the maxillary and mandibular region.
- Patients with any congenital or developmental anomaly.
- Patients with a past history of orthodontic treatment or those undergoing current orthodontic treatment.

Clinical examination

Clinical examination was performed by raising the lip in upward/downward and outward directions to visualize the type of frenal attachment. Both maxillary and mandibular labial frenal attachments were examined using Placek Mirko's and Sewerin's classifications. OHI-S, Gingival Index, bleeding on probing, diastema and gingival recession were additionally recorded.

Statistical analysis

Data was analyzed using the statistical package **SPSS 26.0** (SPSS Inc., Chicago, IL) and level of significance was set at **P<0.05**. Descriptive statistics was performed to assess the mean and standard deviation of the respective groups. Normality of the data was assessed by Shapiro wilk test. Inferential statistics to find out the difference Between the group was done by One-way Anova test followed by BONFEERONI TEST Posthoc test. Chi square test was used for categorical variables association.

IV. Result

A total of 100 participants were evaluated. The distribution of maxillary and mandibular frenal attachment types according to Placek Mirko's classification is presented below.

Table no 1

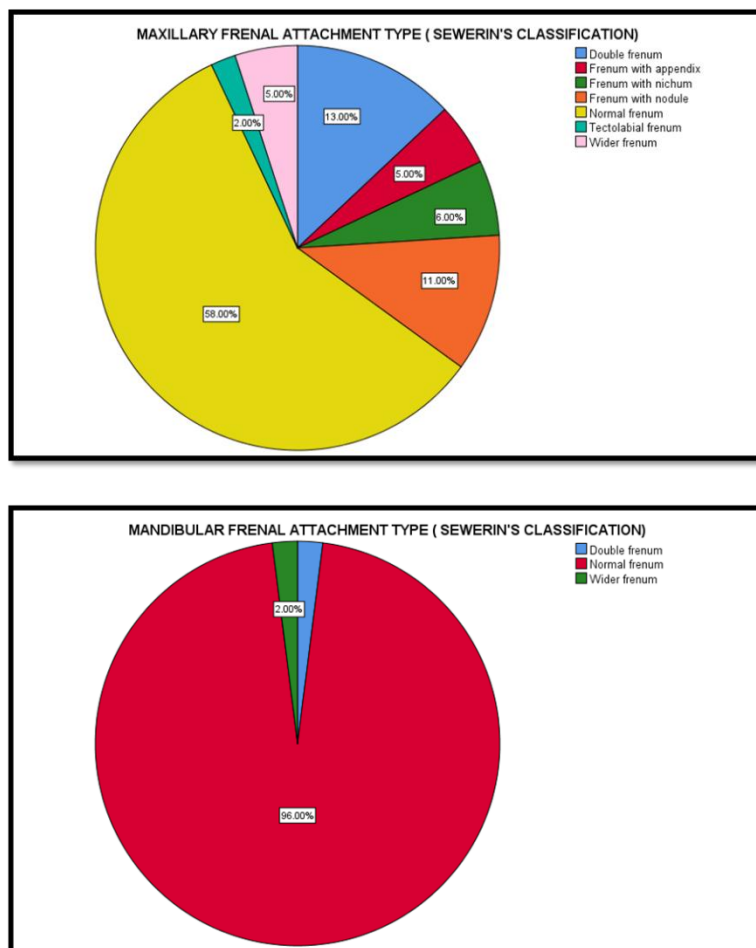
Maxillary attachment	Frequency	Percent
Gingival	28	28.0%
Mucosal	60	60.0%
Papillary	10	10.0%
Papillary penetrating	2	2.0%
Total	100	100.0%

Table no 2

Mandibular attachment	Frequency	Percent
Gingival	46	46.0%
Mucosal	53	53.0%
Papillary	1	1.0%
Total	100	100.0%

Sewerin's classification

According to Sewerin's classification, the maxillary sample was dominated by normal frenum (58%), followed by double frenum (13%), frenum with nodule (11%), frenum with nichum (6%), frenum with appendix (5%), wider frenum (5%) and tectolabial frenum (2%). For the mandible, normal frenum constituted 96%, while double frenum and wider frenum each constituted 2%.



Association with age

Table no 3

		AGE CATEGORY		Total
		20-40	41-60	
MAXILLARY FRENAL ATTACHMENT TYPE (PLACEK MIRKO'S CLASSIFICATION)	Gingival	20	8	28
	Mucosal	36	24	60
	Papillary	6	4	10
	Papillary penetrating	1	1	2
Total		63	37	100
Chi square test		1.27		
P Value		0.73		

Chi-square = 1.27; p = 0.73, indicating no statistically significant association between age category and maxillary frenal attachment.

Table no 4

		AGE CATEGORY		Total
		20-40	41-60	
MANDIBULAR FRENAL ATTACHMENT TYPE (PLACEK MIRKO'S CLASSIFICATION)	Gingival	29	17	46
	Mucosal	34	19	53
	Papillary	0	1	1
Total		63	37	100
Chi square test		1.73		
P Value		0.42		

Chi-square = 1.73; $p = 0.42$, indicating no statistically significant association between age category and mandibular frenal attachment.

Association with oral hygiene status

The relationship between Placek Mirko's classification and OHI-S was evaluated separately for the maxilla and mandible.

Table no 5

MAXILLARY FRENAL ATTACHMENT TYPE	Mean	N	Std. Deviation
Gingival		28	
Mucosal	.868	60	.1918
Papillary		10	
Papillary penetrating	2.250	2	1.0607
Total		100	
P Value	0.0001*		

Maxillary frenal attachment and OHI-S: $p = 0.0001$, indicating a statistically significant difference in OHI-S scores among the attachment groups.

Table no 6

	Mean	N	Std. Deviation
Gingival	.878	46	.1943
Mucosal	1.021	53	.4550
Papillary	.600	1	.
Total	.951	100	.3636
P VALUE	0.09		

Mandibular frenal attachment and OHI-S: $p = 0.09$, indicating no statistically significant difference among the attachment groups.

The relationship between Sewerin's classification and OHI-S was evaluated separately for the maxilla and mandible.

Table no 7

	Mean	N	Std. Deviation
Double frenum	.800	13	.2121
Frenum with appendix	.880	5	.1095
Frenum with nichum	1.083	6	.2041
Frenum with nodule	1.082	11	.3945
Normal frenum	.907	58	.3083
Tectolabial frenum	2.250	2	1.0607
Wider frenum	.960	5	.1517
Total	.951	100	.3636
P Value	0.0001*		

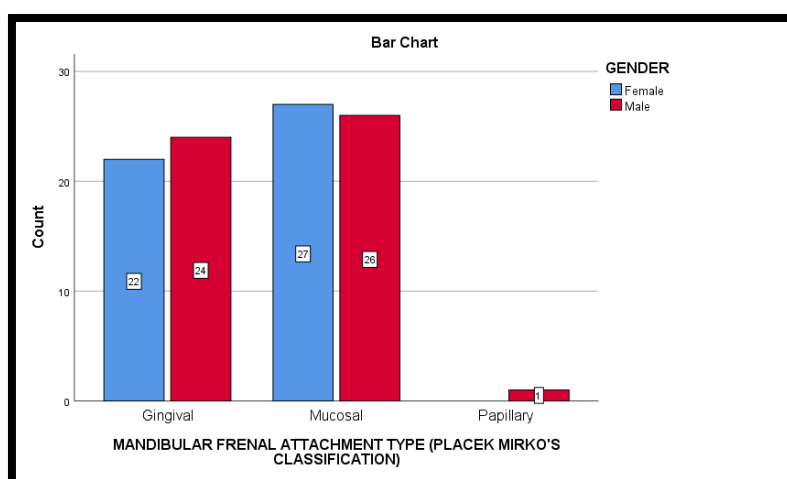
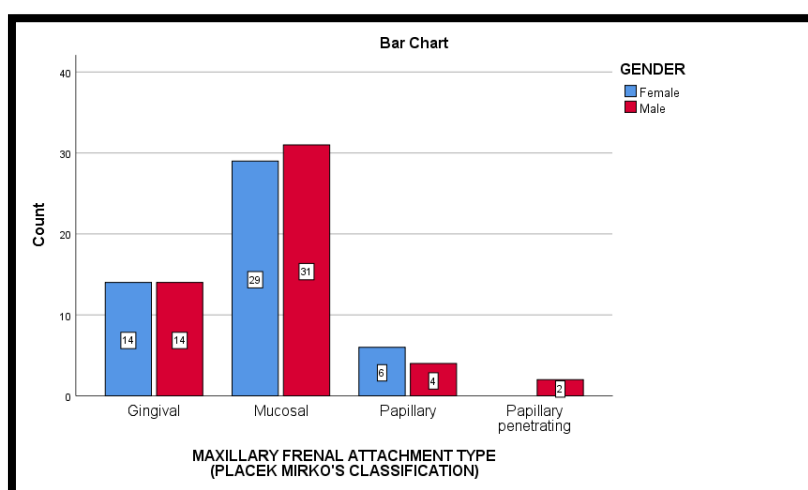
The P-value of 0.0001 indicates a statistically significant difference in OHIS scores among the different maxillary frenum attachment types

Table no 8

	Mean	N	Std. Deviation
Double frenum	.900	2	.1414
Normal frenum	.953	96	.3696
Wider frenum	.900	2	.2828
Total	.951	100	.3636
P Value	0.96		

Mandibular frenal attachment and OHI-S: $p = 0.96$, indicating no statistically significant difference among the attachment groups.

Association with gender



Mucosal frenal attachment was found to be higher in females compared to males

Association with Clinical parameters

		Frequency	Percent
Gingival Index	0	11	11.0
	1	78	78.0
	2	11	11.0
	Total	100	100.0

		Frequency	Percent
BOP	Absent	88	88.0
	Present	12	12.0
	Total	100	100.0

		Frequency	Percent
Diastema	Absent	89	89.0
	Present	11	11.0
	Total	100	100.0

		Frequency	Percent
Gingival Recession	Absent	89	89.0
	Present	11	11.0
	Total	100	100.0

V. Discussion

The present study evaluated the prevalence of maxillary and mandibular frenal attachment and its association with age, gender and oral hygiene status. A higher prevalence of mucosal frenal attachment was found in the maxilla (60%), which is in agreement with the study by Dahal et al. (2022). In the mandible, mucosal frenal attachment was also more prevalent (53%), in agreement with Rijal et al. (2024), who reported mucosal attachment in 59% followed by gingival attachment in 40%.

Using Sewerin's classification, normal frenum was the most prevalent morphology in the present study, with 58 cases (58.0%), followed by double frenum with 13 cases (13.0%) and frenum with nodule with 11 cases (11.0%). These findings were described as being in agreement with Rijal et al. (2024), who reported normal frenum as the most prevalent maxillary morphological variation (60.80%), followed by frenum with nodule (26.60%).

The present study also examined the relationship between frenal attachment and oral hygiene status. A statistically significant difference in OHI-S was observed among the maxillary frenal attachment groups ($p = 0.0001$), whereas the mandibular association was not statistically significant ($p = 0.09$). The higher mean OHI-S values were observed in the papillary and papillary penetrating maxillary attachment groups, although the papillary penetrating group contained only two participants.

Regarding clinical parameters, 78 participants (78.0%) had Gingival Index score 1, indicating mild gingival inflammation. Bleeding on probing was absent in 88 participants (88.0%). Diastema was absent in 89 participants (89.0%), and gingival recession was absent in 89 participants (89.0%). These observations were reported as being in alignment with findings from Rijal et al. (2024)

VI. Conclusion

The morphology and attachment of the labial frenum in the maxilla and mandible exhibit considerable variation. In the present study, mucosal attachment followed by gingival attachment was more prevalent in both the maxilla and mandible. Normal frenum and frenum with a nodule were the most frequently encountered morphological types according to Sewerin's classification.

A statistically significant association was observed between maxillary frenal attachment and oral hygiene status, while no statistically significant association was observed between age and frenal attachment.

These findings highlight the importance of maintaining good oral hygiene, particularly in patients with high or aberrant frenal attachments, including papillary and papillary penetrating attachments. Comprehensive clinical examination and careful evaluation of frenum position during routine dental practice may help reduce periodontal problems associated with high frenal attachment.

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