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## **Evaluation of prevalence and predisposing factors of gingival recession in non-professional college students in pulwama district, Jammu & Kashmir: A cross-sectional study**

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### **Abstract**

**Introduction:** Gingival recession is a common esthetic and undesirable problem that causes distress among individuals of all ages throughout the world. Identifying and diagnosing such a common clinical entity at an early stage, especially in young population groups, help them to restrict its progression through preventive methods.

**Aim:** To evaluate the prevalence of gingival recession and role of various predisposing factors in non professional college students in Pulwama district.

**Materials and Methods:** A cross-sectional study was carried out on a sample of 1079 non-professional college students. The subjects were interviewed for personal habits and examined for intraoral distribution of gingival recession and its various predisposing factors. The data obtained were statistically analyzed using Chi-square test and Phi and Cramer's V coefficient.

**Results:** The prevalence of gingival recession was 24.29% of the studied population. The prevalence of gingival recession is higher in males (68.7%) than in females (31.3%). There was a significant association ( $P < 0.05$ ) between gingival recession and width of attached gingiva, tooth malposition, type of frenal attachments, simplified oral hygiene index, type of brush, and fremitus test.

**Conclusion:** The prevalence of gingival recession was higher in males than in females with varying predisposing factors. Emphasis should be made on awareness of various periodontal problems and preventive methods to avoid future tooth loss in younger adults.

**Keywords:** Etiology, gingival recession, predisposing factors, prevalence, young adults

### **Introduction**

Gingival recession implies the loss of periodontal connective tissue fibers along with root cementum and alveolar bone [1]. It is of two types, one due to periodontitis and the other primarily related to the mechanical factors, especially brushing of teeth [2], resulting in an unaesthetic appearance, root hypersensitivity, and root caries [3]. Risk factors which have been postulated to play a role in the etiology of gingival recession include tooth malposition, path of eruption, tooth shape, profile and position in the arch, alveolar bone dehiscence, muscle attachment and frenal pull, periodontal disease and treatment, iatrogenic restorative or operative treatment, improper oral hygiene methods, orthodontic treatment and other self-inflicted injuries (e.g. oral piercing) [4]. The most important factor increasing the risk of gingival recession is thin gingival biotype [5].

Prevention and control of gingival recession at an early age help to prevent tooth loss in future. It depends largely on a precise and periodic survey of prevalence and risk factors that contribute to the condition. A number of studies have been carried out on the prevalence and predisposing factors of gingival recession in young adults among different populations of the world [6-9] However, representative information about the prevalence and predisposing factors of gingival recession in young Indian population is not found in the literature.

Many of the non-professional college students in India, though educated, due to the lack of awareness of oral problems and their consequences are failing to take care of their oral health. Among various non-professional and professional courses in India, the highest population of students is found in non-professional colleges. Hence, this study aims to evaluate the

prevalence of gingival recession and its predisposing factors in non-professional college students.

### Materials & Methods

A cross-sectional survey was carried out in Pulwama district from November 2015 to March 2015. The study was reviewed and approved by the Institutional Ethical Committee. Official permission was obtained from the institution authorities where the study was conducted. Written informed consent was taken from every participant prior to the study. The sample size was estimated at eight hundred and was rounded to one thousand. All the available students who agreed to participate in the study gave a sample size of 1079 subjects in the age group between 17 and 22 years.

### Inclusion and exclusion criteria

Systemically, healthy subjects who are willing to participate were examined. Subjects who are smokers, undergoing orthodontic/periodontal treatment, and fixed prostheses were excluded in this study as these could be the causative factors for gingival recession.

A simple random sampling method was employed to select two non-professional colleges and students. A maximum of 30–40 subjects was examined each day. Adequate numbers of instrument sets were carried to the survey and proper sterilization and infection control measures were taken.

Data collection was done using a structured questionnaire and clinical examination. Questionnaire consisted of demographic details and oral hygiene practices. A trained single examiner clinically examined all the participants with the help of an assistant to record the findings. All the subjects were examined under adequate illumination using front surface mouth mirror, curved sharp sickle explorer (standard explorer), and William's graduated periodontal probe (Type III Examination).

Gingival recession was recorded according to the Miller Jr. classification of marginal tissue recession [10]. Oral hygiene status was recorded by using the simplified oral hygiene index (OHI-S) according to Greene and Vermillion [11]. Further, the tooth malalignment was observed by viewing the teeth from the occlusal plane, and the position of each tooth was classified according to its relation to the regular curve of the arch whether correctly positioned or labially placed and lingually placed, crowded, over erupted, or rotated in all subjects. The maxillary and mandibular labial frenal attachments were examined and recorded according to Mirko *et al.* classification [12]. Tension test was carried out to confirm the adequacy of the width of the attached gingiva [13]. Trauma from occlusion was assessed by performing fremitus test [14, 15] After clinical examination, all the participants were instructed with appropriate oral hygiene practices.

Statistical analysis was performed for the collected data using Chi-square test and Phi and Cramer's V Coefficient. Data were entered and analyzed using SPSS Statistics version 22.0, IBM United States Software.

### Results

Among 1079 subjects, males were 643 and females were 436. Most of them brush their teeth with medium (537) and soft

(398) bristles.

Gingival recession was observed in 262 (24.28%) of 1079 engineering students. Among subjects with gingival recession, 180 (68.7%) were males and 82 (31.3%) were females. The prevalence of recession is higher in males and this difference is statistically significant ( $P < 0.05$ ) [Table 1]

**Table 1:** Distribution of study participants according to recession

Gender	Gingival recession	Normal gingiva
Male	180	463
Female	82	354

The percentage of gingival recession was higher in the mandible (58.9%) than in the maxilla (41.1%). Furthermore, teeth most frequently associated with gingival recession were the mandibular central incisors (12.9%) and mandibular lateral incisors (12.3%). The decreasing order of gingival recession (Sextant wise) was observed as follows: Mandibular anteriors (32.4%), maxillary anteriors (17.2%), mandibular right posteriors (13.5%), mandibular left posteriors (13%), maxillary right posteriors (12.6%), and maxillary left posteriors (11.3%) (Table 2a) and (Table 2b).

**Table 2a:** Intraoral distribution of gingival recession

Teeth	Percentage	Teeth	Percentage
17	2.4	47	2.6
16	4.6	46	4.8
15	2.4	45	3.0
14	2.3	44	3.1
13	3.6	43	4.2
12	2.8	42	6.0
11	2.5	41	6.4
21	2.4	31	6.5
22	2.9	32	6.3
23	3.0	33	3.6
24	2.5	34	2.3
25	2.3	35	2.6
26	4.5	36	4.8
27	2.3	37	3.3

**Table 2b:** Sextant wise distribution.

Area	Percentage
Mandibular Anteriors	32.4
Maxillary anteriors	17.2
Maxillary right posteriors	12.6
Maxillary left posteriors	11.3
Mandibular right posteriors	13.5
Mandibular left posteriors	13

There was a significant association between gingival recession and width of attached gingiva, tooth malposition, type of frenal attachments and (OHI-S) index, type of brush, and fremitus ( $P < 0.05$ ) Table 3. But there was no statistical significant association between the method of brushing and gingival recession ( $P > 0.05$ ). Among all the predisposing factors mentioned above, the following is the decreasing order of association which is based on Phi and Cramer's V Coefficient value: Width of attached gingiva, tooth malposition, type of brush, OHI-S index, frenal attachment, fremitus, and method of brushing.

**Table 3:** Various predisposing factors associated with gingival recession

Parameters	Without Recession	With Recession	X <sup>2</sup> ,p, df	Phi & Cramers value
Type of brush				
Hard	74	70	66.65 <0.05 2	0.249
Medium	449	88		
Soft	308	90		
Methods of brushing				
Horizontal	582	189	6.277 >0.05 3	0.05
Vertical	80	23		
Horizontal & Vertical	135	43		
Circular	20	7		
Width of attached gingiva				
Adequate	811	131	4.13 <0.05 2	0.619
Inadequate	6	131		
Tooth malposition				
Buccaly inclined	6	64	1.74 <0.05 2	0.402
Lingually inclined	6	11		
Crowded	11	19		
Overerupted	0	1		
Rotated	7	15		
Normal	787	152		
Fremitus test				
Positive	35	46	56.9 <0.05 1	0.072
Negative	796	202		
Frenal attachments				
Gingival	25	15	21.3 <0.05 2	0.073
Mucosal	780	231		
Papillary	10	15		
Papillapenetrating	02	1		
Frenal attachments				
Good	109	9	23.75 <0.05 1	0.191
Fair	695	243		
Poor	13	10		

## Discussion

Gingival recession is a result of apical migration of gingival tissues. It may be localized to a single tooth or a group of teeth or may be generalized throughout the mouth. Often recession is a result of a combination of various predisposing factors. The concept of multiple predisposing factors in the etiology of the gingival recession was supported by the parallel longitudinal studies conducted by L oe *et al.* [16]

Data from the present study showed a prevalence of gingival recession in 24.29% of the total study population, and these findings are consistent with the previous studies conducted by Checchi *et al.*, [7] Slutzkey and Levin, [17] and Nguyen-Hieu *et al.* [9] confirming that gingival recession is not much common in young adults although its frequency increases with age. The prevalence of gingival recession is high in males than females, which is in agreement with the study conducted by Arowojolu [18] Toker and Ozdemir. [19] Gender differences in the prevalence of gingival recession could be attributed due to the fact that females visit dentists more frequently and maintain good oral hygiene than males [8].

Gingival recession can be localized or generalized and can be associated with one or more surfaces [20]. The proportion of affected teeth in the current study was higher in the mandible (58.9%) than in the maxilla (41.1%) as observed in previous investigations conducted by Marini *et al.* [21] and Toker and Ozdemir [19]. The larger occurrence of gingival recessions in the mandibular teeth is probably related to the characteristics of the keratinized mucosa, which is wider and thicker in the maxilla than in the mandible, as a strong correlation has been observed between the quantity and quality of gingival tissue [22]. The given findings were in consistent with Akpata and Jackson [6] who reported that gingival recession to be more

common in mandibular anterior teeth, which in the young individuals usually are the first to show destructive periodontal disease.

With increasing age, periodontal disease as well as buccal recession shows a more generalized pattern. Furthermore, teeth most frequently associated with gingival recession were the mandibular central incisors (12.9%) and mandibular lateral incisors (12.3%). Higher frequency of gingival recessions on the mandibular incisors has been primarily associated to poor oral hygiene [23] The intraoral distribution pattern of gingival recessions has been related to different etiologic factors such as oral hygiene, thickness of the keratinized gingiva, prominent roots, thin labial alveolar bone, malpositioning of teeth, frenal attachments, and brushing force [7, 24-26]

In the current study, the usage of hard and medium toothbrushes and horizontal tooth-brushing showed a significant ( $P < 0.05$ ) association with gingival recession, which was similar to observations made in previous studies conducted by Kozłowska *et al.*, [27] Toker and Ozdemir, [19] and Chrysanthakopoulos [8] It could be explained by the fact that too vigorous and forceful use of hard and medium stiff-bristled brushes in a horizontal direction can cause minor lacerations, or abrasions of the gingiva with the resultant cleavage and detachment of gingiva along with the resorption of the underlying alveolar plate, which might lead to gingival recession in future [28].

In the present study, there is a significant ( $P < 0.05$ ) association between the adequacy of the attached gingiva, which was similar to the findings of Stoner and Mazdyasna [29] and Nguyen-Hieu *et al.* [9] But in contrary, Wennstr om [30] proposed that lack of an adequate zone of attached gingiva did

not result in the increased incidence of gingival recession.

Another interesting observation was that there was a significant association between malaligned teeth and gingival recession ( $P < 0.05$ ). It was found that among all the types of tooth malalignments, labially placed teeth (24.42%) showed a higher percentage of gingival recession which is in accordance to the findings of Arowojolu,<sup>[2]</sup> Nguyen-Hieu *et al.*,<sup>[9]</sup> and Chrysanthakopoulos<sup>[8]</sup> This could be attributed to a thin buccal plate or even absence of it when a tooth was tilted buccally. Usually, tooth malpositions, including rotation and lingual inclination, are associated with soft debris retention and calculus because of difficult access during tooth-brushing, which might lead to gingival inflammation and recession<sup>[9]</sup>.

Fremitus test was considered for measuring the trauma from an occlusion in the present study. There was a significant ( $P < 0.05$ ) association between trauma from occlusion and gingival recession which is in accordance to the findings of Ustun *et al.*<sup>[31]</sup> and Kundapur *et al.*<sup>[32]</sup> Furthermore, Jin, and Cao<sup>[33]</sup> have also reported that teeth with significant fremitus had more attachment loss and less osseous support. Deep overbite and reduced over jet with retroclination of upper anterior teeth can result in direct trauma to the labial gingiva of the lower anterior teeth or the palatal margin of upper anterior teeth which might result in indentations in the gingiva and further gingival recession<sup>[34]</sup>.

There is a significant association between type of frenal attachment and prevalence of gingival recession ( $P < 0.05$ ) which is in accordance with a study conducted by Toker and Ozdemir<sup>[19]</sup> and Mathur *et al.*<sup>[35]</sup> This might be due to impeding access for plaque removal or by causing a direct pull on the marginal gingiva<sup>[36]</sup> In contrast to our findings, studies conducted by Tenenbaum<sup>[37]</sup> and Nguyen-Hieu *et al.*<sup>[9]</sup> proposed that gingival recession is not associated with the high frenal attachment.

According to our study, the prevalence of gingival recession is significant ( $P < 0.05$ ) in subjects with good oral hygiene which is in agreement with the studies conducted by Løe *et al.*,<sup>[38]</sup> Källestål *et al.*,<sup>[39]</sup> and Chrysanthakopoulos,<sup>[8]</sup> who reported that the frequency of gingival recession is higher in subjects with an excellent oral hygiene. This could be attributed to the vigorous tooth-brushing by the subjects in an attempt to maintain good oral health<sup>[25]</sup>. In fact, according to Kassab and Cohen<sup>[40]</sup> and Daprile *et al.*,<sup>[41]</sup> gingival recession more frequently occurred in patients having good rather than poor oral hygiene. However, some authors like Susin *et al.*,<sup>[42]</sup> Sarfati *et al.*<sup>[43]</sup> and Chrysanthakopoulos<sup>[8]</sup> indicated that dental plaque, gingival inflammation, and calculus were significantly associated with root surface exposure.

### Limitations

Although the present study has comprehensively assessed the prevalence and the predisposing factors in non-professional college students, it would have been more beneficial if it was conducted in other non-professional and professional college students.

### Recommendations

These preliminary results can be used as a reference for further studies in a larger population, and they can be used to motivate young individuals in the prevention of periodontal diseases. Adequate awareness and education in oral hygiene maintenance at the community level will help in the prevention of gingival recession.

### Conclusion

The data from this study showed the prevalence of gingival recession in young adults and also confirm that gingival recession has a multifactorial etiology.

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