

ORIGINAL ARTICLE

ETIOLOGY AND SEVERITY OF DIFFERENT GRADES OF GINGIVAL RESSION IN ADULT POPULATION

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ABSTRACT

Background: Gingival recession is the most common and undesirable condition of the gingiva and its prevalence increases with age.

Materials and methods: The study was a cross-sectional study conducted on the patients of gingival recession who visited dental OPD. The pre-tested semi-structured questionnaire was utilized which included questions regarding oral hygiene habits (i.e. frequency of brushing, method of brushing, type of toothbrush used, age of toothbrush). Periodontal evaluation included Gingival score, Plaque score, Gingival recession, Clinical attachment loss and measurement of width of attached gingival.

Results: Of 244 subjects 112 (45.9%) had Millers class I recession, 64 (26.2%) class II recession, 38 (15.6%) class III recession, 30 (12.3%) class IV recession. Statistical analysis revealed that the correlation between both toothbrush type and brushing method with gingival recession was significantly associated ($p < 0.05$). The correlation association between age, dental plaque, gingival inflammation, clinical attachment loss, width of attached gingiva and gingival recession was found to be statistically significant ($p < 0.05$).

Conclusion: The most frequent affected teeth with gingival recession were the 1st and 2nd molars of maxilla followed by mandibular incisors. Horizontal brushing method, usage of medium type toothbrush and tooth brushing once daily were found to be more associated with gingival recession.

Keywords: Gingival Recession, molars, maxilla, mandibular incisors

INTRODUCTION

Gingival recession is the most common and undesirable condition of the gingiva and its prevalence increases with age. It is characterized by displacement of gingival margin apically from cement-enamel junction (CEJ) and exposure of root surface to the oral environment.^{1,2} Gingival recession, either localized or generalized, is one of the clinical features of periodontal disease and is not considered as periodontal diagnosis itself. Gingival recession may be associated with the clinical problems such as root surface hypersensitivity, root caries, cervical root abrasions, erosions, plaque retention and aesthetic concern. For a patient, gingival recession usually creates an aesthetic problem, especially when such problem affects the anterior teeth, and anxiety about tooth loss due to progressing destruction.

The aetiology of gingival recession is multifactorial. Several factors may play a role in gingival recession development, such as excessive or inadequate teeth brushing, destructive periodontal disease, tooth malposition, alveolar bone dehiscence, high muscle attachment, frenum pull and occlusal trauma.³ Other causative factors that have been reported are iatrogenic factors (orthodontic, or prosthetic treatment, and etc.)⁴ and smoking. However, bacterial plaque is of equal impor-

tance in the aetiology of gingival recession.⁵ Positive association between recession and increasing age^{5,6} and good oral hygiene^{5,7} tend to implicate further the significant and primary role of tooth brushing in the aetiology of recession, while recognizing that tooth brushing itself is associated with a number of potentially confounding variables such as pressure, time, bristle type and the dentifrice used.

An adequate mucogingival complex, in which the mucogingival tissues can sustain their biomorphological integrity and maintain an enduring attachment to the teeth and the underlying soft tissue, is always essential. When a mucogingival problem occurs, there are basically two ways in which it presents itself. First, as a close disruption of the mucogingival complex resulting in pocket formation. Second, as an open disruption of the mucogingival complex resulting in gingival clefts and gingival recession.

Hence, there appears to be a need for further study of possible causative factors and severity of gingival recession based on Miller's classification. Therefore, the present study aimed at assessing the aetiology and severity of different grades of gingival recession among adult population.

MATERIALS AND METHOD

The study was conducted on the patients who visited Department of Periodontology in Mahatma Gandhi Dental College, Jaipur. The study consisted of participants who had gingival recession. All examinations were performed by the author of the article. Questionnaire and clinical parameters were recorded for each subject. An intraoral examination was also performed by a single investigator to decrease subjective error. All the subjects were examined in artificial light, with the use of the probe, mirror.

Questionnaire: A pre-tested semi-structured questionnaire was prepared and the data of the all the participants were filled before undergoing clinical examination. The questionnaire included questions regarding oral hygiene habits (i.e. frequency of brushing, method of brushing, type of toothbrush used, age of toothbrush) and also about treatment of recession.

Inclusion criteria: Inclusion criteria were Patient having minimum of 20 teeth present; minimum of 2 teeth with gingival recession; and clinical attachment loss of more than ≥ 2 mm

Exclusion criteria: Those patients were excluded who were having Recession in Third molars; Pregnant /lactating women; who have visited dentist/had undergone any dental treatment in last 6 months; and with systemic disease.

Clinical examination: The subjects in the study were clinically examined for periodontal conditions. Periodontal evaluation included Gingival score, Plaque score, Gingival recession, Clinical attachment loss and measurement of width of attached gingiva. Presence or absence of supragingival plaque was recorded after applying disclosing agent on tooth. The area was then evaluated by assessing the plaque and calculus accumulation on each tooth. In cases that CEJ was covered by calculus or hidden by restoration or loss due to caries or wear lesions, the location of such junction was estimated on the basis of adjacent teeth. Plaque was scored in a range of 0-3 using the plaque index of Silness and L  e⁸(PLI). Gingival score was assessed using the gingival index of L  e and Silness (GI). Gingival recession was classified according to Miller's classification(1985)⁹. Gingival recession was measured from cement-enamel junction (CEJ) to gingival margin using a William's probe in the midbuccal surfaces of all teeth. Width of attached gingiva was measured from base of pocket to mucogingival junction. Then, the tooth mal-alignment was observed by viewing the teeth from occlusal Plane. The position of each tooth was classified in all participants according to its relation to the regular curve of the arch as either correctly, labially or lingually positioned.

Ethics: All participants were informed about the study procedure to which they would be submitted and those participants who gave their voluntary informed consent were included in the study.

Statistical analysis: Data was collected and related clinical parameters were calculated. The Pearson correlation was used to analyze correlation between gingival recession and clinical parameters using the statistical package of SPSS 16.0 version. A P value less than 5% ($P < 0.05$) was considered to be statistically significant.

RESULT

Gingival recession was observed in 101 females (41.4%) and 143 males (58.6%). Of 244 subjects 112 (45.9%) had Millers class I recession, 64 (26.2%) class II recession, 38 (15.6%) class III recession, 30 (12.3%) class IV recession. The most frequent affected teeth with gingival recession were molars followed by the incisors. (Table 1)

Table 1: Distribution of Grades of gingival recession by tooth type (n=244)

Type of Teeth	Grades of gingival recession			
	Class I	Class II	Class III	Class IV
Anterior	39	22	18	16
Premolars	31	18	9	4
Molars	42	24	11	10
Total	112	64	38	30

Table 2 Oral hygiene aid used by studied sample

Oral hygiene aid		Frequency (%)
Aid to clean teeth	Brush	110 (45.1)
	Finger	53 (21.7)
	Neem twig	81 (33.2)
Method of Brushing	Horizontal	199 (81.6)
	Vertical	34 (13.9)
	Circular	11 (4.5)
Material used	Paste	91 (37.3)
	Powder	68 (27.9)
	Unknown	85 (34.8)
Frequency of brushing	Twice	236 (96.7)
	One	8 (3.3)
Type of bristle	Medium bristle	81 (33.2)
	Soft bristle	31 (12.7)
	Unknown	132 (54.1)

Aid used to clean teeth, type of tooth brush used and horizontal brushing method and usage of medium type of toothbrush were found to be more injurious to gingiva leading to gingival recession and poor oral hygiene (Table 2). Statistical analysis revealed that the correlation between both toothbrush type and brushing method with gingival recession was significantly associated. ($P < 0.001$)

Dental plaque, gingival inflammation and clinical attachment loss appeared to be the most frequent precipitating aetiological factors (Fig.3). The correlation association between dental plaque, gingival inflammation, clinical attachment loss and gingival recession was found to be statistically significant. (Table 3)

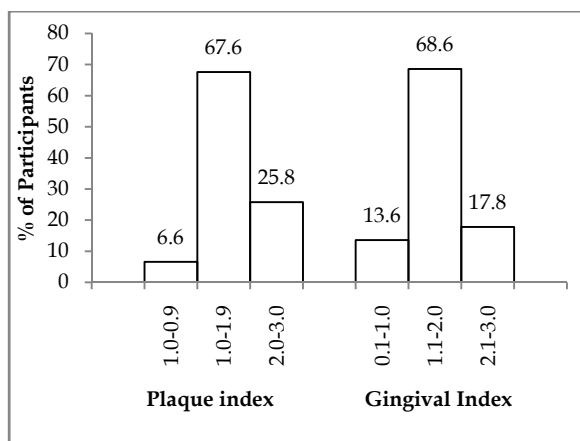


Figure 3: Plaque index and Gingival index of sample studied

Table 4: Association between Plaque index, Gingival index, CAL and Width of attached gingiva with Gingival recession

Clinical parameters	Gingival Recession	
	r Value	P value
Age	0.81	0.001
Plaque index	0.45	0.001
Gingival index	0.41	0.001
Clinical attachment loss	0.24	0.001
Width of attached gingival	0.06	0.34

DISCUSSION

The present study included 244 subject, 143 (58.6%) males and 101 (41.4%) females who showed gingival recession. This finding is in agreement with the findings in a study conducted by Hosangan C et al¹⁰ which also showed males exhibited greater levels of recession than females (P < 0.001). The findings of our study differ from another study done by Kozłowska et al.¹¹ which showed 74% of females and 28% of males showed gingival recession, respectively. In the present study, the most frequent affected teeth with gingival recession were the maxillary 1st and 2nd molars followed by the mandibular incisors. Checchi et al.¹² showed that canines of both jaws were the most frequent teeth affected by gingival recession. Muller et al.¹³ found that 1st and 2nd molars of both jaws were the most frequently teeth affected by gingival recession. However, Murray¹⁴ showed that the most frequent teeth with gingival recession were mandibular incisors followed by 1st maxillary molars, 1st mandibular molars, premolars of both jaws, 2nd maxillary molars, 2nd mandibular molars and canines. These differences could be attributed to several factors such as the heterogeneity samples, the difference in attitude of the samples to the value of oral hygiene and the need for a regular dental follow-up, the different criteria used by several examiners (clinical examination-questionnaire) in order to collect data, and the origin of the sample collected (dental hospital, private practice, etc.).

Also the present study showed that patients who applied horizontal method (81.6%) of tooth brushing had more gingival recession than those who used vertical (13.9%) or circular methods (4.5%). The same finding was recorded for patients who used medium bristle toothbrushes and brushed their teeth once daily. Similar findings made in previous studies reported that too vigorous, forceful and excessive use of medium bristle toothbrushes in horizontal direction could cause abrasions of the gingiva. Those studies showed that gingival recession was correlated with frequency, duration, and technique of tooth brushing (especially horizontal scrub technique).^{15,16}

Studies reported that frequency and hardness of toothbrushes,^{15,17,8} duration and technique of tooth brushing (especially horizontal scrub technique)^{16,19} and trauma from tooth brushing^{2,15,18-20-22} were associated with gingival recession. In other studies, the use of excessive brushing force has been shown to be a major cause of gingival abrasion²² and the frequency of tooth brush changing had significant influence on the number of sites with gingival recession. A study by Mumghamba et al.²³ showed that tooth cleaning practices were not significantly associated with gingival recession while no significant differences were observed for toothbrush type and frequency of tooth brushing. A systematic review by Rajapakse et al.¹⁹ showed that only 2 out of 17 studies concluded that there appeared to be no relationship between tooth brushing frequency and gingival recession while 8 studies reported a positive association between tooth brushing frequency and gingival recession. Other potential risk factors were duration of tooth brushing, brushing force, and frequency of changing the tooth brush, brush hardness and tooth brush technique.

Regarding dental plaque, gingival inflammation and pocket depth, this study showed significant association with gingival recession (P value 0.01). They suggested that localized inflammatory process causes the breakdown of connective tissue. Proliferation of epithelial cells into the connective tissue brings about a subsidence of the epithelial surface which is manifested clinically as gingival recession. Some studies showed that gingival recession was associated with a high level of dental plaque and calculus and gingival bleeding on probing^{17,18,23,24}. Similarly, the results of a study by Goutoudi et al.²⁵ revealed that gingival margin recession was associated with both high inflammatory and plaque scores. One study²⁶ showed a negative correlation between dental plaque on the buccal tooth aspect and gingival recession. The majority of the patients of the present study (67.16%) showed subgingival calculus while only 32.84% showed supra-gingival calculus. Those findings (although the difference was not statistically significant) were in agreement with other studies which reported that calculus plays an important role in the etiology of gingival recession. Those studies^{20,21,27,28,29} showed that the presence of supra-gingival calculus had the most significant association with localized and generalized gingival recession.

It is important to highlight that the aim of the present study was not only to find out the aetiological factors of gingival recession but to review the association between these factors and gingival recession. It is also apparent that aetiological factors vary across countries and cultures and must be taken into consideration when looking at the epidemiological data relative to gingival recession. According to the present study, factors causing gingival recession were tooth brushing method, type of toothbrush, frequency of tooth brushing, oral hygiene, gingival inflammation.

CONCLUSION

Majority of the participants showed Miller's class I gingival recession and its overall prevalence was greater in males than in females. The most frequent affected teeth with gingival recession were the 1st and 2nd molars of maxilla followed by mandibular incisors. Horizontal brushing method, usage of medium type toothbrush and tooth brushing once daily were found to be more associated with gingival recession. The correlation association between dental plaque, gingival inflammation and gingival recession was found to be statistically significant. Therefore, more effort should be made to make patient aware of these dental conditions and to educate the patients regarding oral hygiene practices for the prevention of such conditions.

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