ORIGINAL ARTICLE

Assessment of Various Oral Hygiene Practices Leading to Gingival Recession

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OBJECTIVE: To determine association between gingival recession and various oral hygiene practices.

METHODOLOGY: This cross-sectional study was conducted at Rawal Dental College, Rawal Institute of Health Sciences Islamabad, from June 2022 to August 2022. The data were collected from 169 periodontally healthy patients aged between 18 years to 50 years with the help of a questionnaire. Pre-defined structured questionnaire was modified. Questionnaire included demographic details, oral hygiene maintenance practices and history of use of prosthesis and orthodontic treatment. After interviewing every patient, periodontal examination was carried out on the dental chair using William's probe to check the gingival recession. Data was recorded and evaluated using SPSS version 26.0.

RESULTS: Out of 169 subjects examined, the frequency of gingival recession was higher in females (56%) as compared to males (43%). The molars and premolars were the teeth most frequently affected as compared to anteriors. Use of horizontal tooth brushing method (48.5%), medium type of toothbrush (55.6%) and brushing once daily (46.2%) for 2 minutes showed the most common causative factors for the gingival recession.

CONCLUSIONS: Results of this study clearly showed that the cause of gingival recession is multiple, and its manifestation is always the result of more than one factor operating together. The use of medium type of toothbrush, cleaning teeth once a day, and horizontal brushing technique were found to be most closely related to gingival recession.

KEYWORDS: Gingival recession, oral hygiene, tooth brushing, Cementoenamel junction

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INTRODUCTION

Gingival recession is defined as the apical migration of gingival margin resulting in the exposure of root surface circumferentially 1-3 mm coronal to cementoenamel junction (CEJ).[1,2] Despite its position, the receded gingiva may be healthy or inflamed. Gingival recession is limited to a single tooth, a group of teeth, or it might affect the entire mouth.

Gingival recession is more common as people age; the frequency ranges from 8% in young children to 100% beyond age 50.[3] This has caused some researchers to speculate that gingival recession may be a physiological process associated with ageing, but there hasn't been any strong evidence to support this theory.[4] The steady apical shifting is mostly due to recurrent small direct damage to the gingiva and the cumulative effect of a modest pathologic environment.[5] The causes of gingival recession are multifaceted that includes traumatic events, poor oral hygiene, destructive periodontal disease, and anatomical variables.[6] The most significant risk factors associated with gingival recession includes faulty

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tooth brushing technique, vigorous oral hygiene practices, and presence of dental bio film.[7,8] A healthy periodontium may exhibit gingival recession or it may be a symptom of periodontal disease.[9] It is referred to be an abnormal state of periodontal tissue and is not regarded as a disease in and of itself. Even patients with good oral hygiene can experience it and is associated with the frequency and time duration of brushing of teeth, shape and form of the toothbrush bristles, aggressive brushing of teeth, and improper flossing.[10]

The facial marginal gingiva is primarily affected. Those patients who have clinically healthy gingiva with little bacterial plaque, and having good oral hygiene are more likely to have this form of recession.[11]

Recession can lead to a number of issues, including thermal and tactile sensitivity, periodontal pocketing, cervical abrasion, tooth wear, erosion, root caries, and gingival bleeding.[12] Gingival recession becomes aesthetically more problematic when it touches the anterior teeth.[13]

Gingival recession shows as a wedge-shaped cervical lesion on the surfaces of buccal or facial of individual teeth with good oral hygiene, however, patients with poor oral hygiene, can affect any tooth surface.[14]

Objective of the study is to determine association between gingival recession and various oral hygiene practices. This study will help to find out causes of gingival recession. There is a lack of consensus on whether gingival recession is associated with good oral hygiene and various oral hygiene practices or not. In our region i.e., Pakistan, we have not found any related study. So, our study can make patients aware of its multifactorial complication to avoid the occurrence by avoiding the etiology of gingival recession.

METHODOLOGY

This Cross-Sectional study was held in Periodontology department at Rawal Dental College, Rawal Institute of Health Sciences, Islamabad during June 2022-August 2022. Ethical approval was sought from Institutional Review Board (RIHS/IRB/D/23/005). An informed patient consent was taken.

Sample size was calculated by using WHO formula at confidence interval of 95% and margin of error 5% and was estimated to be 169. Sampling technique was Non-probability convenience sampling.

Pre-defined structured questionnaire[15] was modified and the validity of added Questions were checked using Cronbach's alpha which came out to be 0.69. The questionnaire contained basic questions regarding demographic details, oral hygiene maintenance practices and history of use of prosthesis and orthodontic treatment. It also included the periodontal examination score.

Inclusion criteria includes both male and female patients of age group 18-50 years with gingival recession in periodontally healthy gums maintaining good oral hygiene. Patients were divided into three groups, first group was from 18 to 24 years, second 25 to 30 years, and third 31 to 50 years.

While patients with systemic disorders such as diabetes, Hypertension, Hepatitis B&C, asthma, HIV, blood disorders, cancers and cardiovascular disorders, patients with inflamed gums, gingivitis or periodontitis, patients who use tobacco in any form and pregnant and lactating women were excluded from the study.

The Authors filled out the questionnaire themselves by asking details from the patients.

After filling out the questionnaire, each patient was examined on a dental chair clinically in periodontology department using William periodontal probe colour coded at 1-, 2-, 3-, 5-, 7-, 8-, 9-, and 10-mm. Bleeding on probing was checked by using above mentioned periodontal probe. Patients with no bleeding on probing were chosen as healthy patients and selected for study.

Gingival recession was measured in the mid-facial buccal surfaces of all teeth, except for the third molars and entered the data in constructed sheet. Linear measurements were obtained from the Cementoenamel Junction (CEJ) up to the gingival margin in teeth showing gingival recession in order to estimate the vertical (apico-coronal) height of recession following class I and II of Miller`s classification with soft tissue loss only. Areas wherever the CEJ was covered by debris like calculus, unseen by a restoration, or absent due to dental decay, the location of the CEJ was assessed on the basis of neighboring teeth.

Analysis was performed using SPSS version 26.0. Data was presented using descriptive statistics.

Chi square test (p-value<5%) was carried out to compare each variable in the questionnaires.

Multiple linear regression analysis was carried out to find the gingival recession among teeth in different quadrants.

RESULTS

All the study patients (169) fulfilling the inclusion criteria were recruited from the OPD, those who gave consent to participate were referred to periodontology department where they were examined. Among them half of the patients were students (47.3%) while rest of them have different occupations as shown in table 1. Demographic data (Table 1) for research participants displays more females than males (56.2% vs 43.8%).

The prevalence of gingival recession was 43.8% in males and 56.2% in females. The difference was statistically

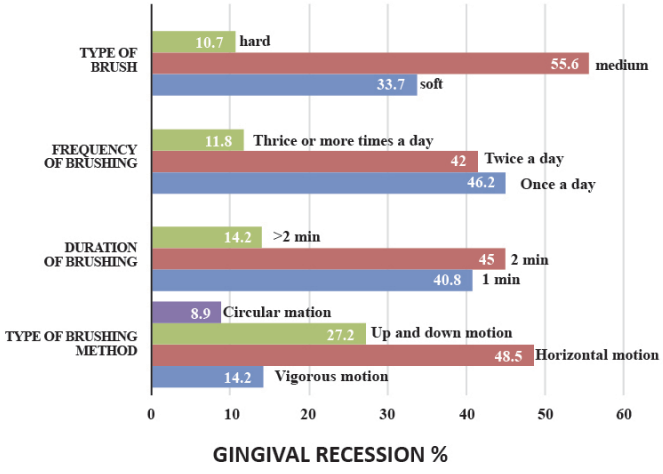
significant (p=0.008). The prevalence of gingival recession varied significantly p=0.005 between the age groups of 18 to 24 years, 25 to 30 years, and 31 to 50 years at 52.1%, 32.0%, and 16.0%, respectively (Table 1).

Table 1: Demographic characteristics of study participants in relation to gingival recession

Variable	N(169)	Percentage maximum recession score %	P-Value
Do you use dental floss?			
Yes	87	51.5	0.771
No	82	48.5	
Do you use interdental brush?			
Yes	34	20.1	0.988
No	135	79.9	
Do you use toothpick?			
Yes	94	55.6	0.453
No	75	44.4	
Do you use Miswak?			
Yes	33	19.5	0.200
No	136	80.5	
Do you wear braces?			
Yes	40	23.7	0.959
No	129	76.3	
Are you a partial denture wearer?			
Yes	33	19.5	0.735
No	136	80.5	

Results showed that gingival recession did not vary based on the level of education or occupation. The p-value was not statistically significant regarding gingival recession prevalence based on the two variables. Gingival recession was observed to be more exacerbated by the brushing technique used, duration and frequency of brushing and usage of medium type of toothbrush. (Figure 1)

Figure 1: Distribution of gingival recession in relevance to toothbrush types, method of tooth brushing, frequency and duration of bushing.



Horizontal technique was practiced by 48.5% of patients whereas 'up and down motion' was observed to be the second most commonly practiced technique (27.2%). The medium type of toothbrush was used by majority participants (55.6%) with recession. Patients who brushed once a day (46.2%) showed higher gingival recession as compare to those who brushed twice a day or more.

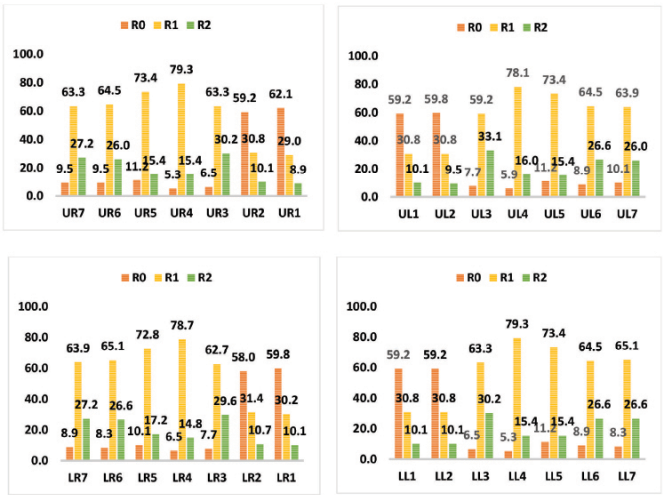
About 45% of individuals with gingival recession brushed their teeth for about 2 minutes. Statistical analysis revealed all 169 participants had gingival recession which almost affects all teeth. Most of the teeth showed recession up to 1mm (59.2%) (Table 2). Figure 2 showed frequency distribution of the clinical scoring variables on buccal surfaces displaying an increase in prevalence starting from the incisors to the second molar affecting both arches.

Table 2: Maximum recession scores of study participants

Maximum Recession score (any tooth) (mm)	Number of participants with this maximum score
1	100 (59.2%)
2	52 (30.8%)
3	17 (10.15)

Use of several mechanical aids such as dental flossing, interdental brush, toothpick and Miswak were not related to gingival recession and were not statistically significantly associated with gingival recession (P>0.05). There was no evidence that the presence of fixed or removable

Figure 2: Percentage of gingival recession on buccal surfaces Recession score, R0=0mm, R1=1mm, R2=>2mm



Where UR=upper right, UL=upper left, LR=lower right, LL=lower left teeth

partial dentures contributed to gingival recession (P>0.05). The possibility that orthodontic treatment by itself can induce gingival recession (Table 3) was also unsupported (P>0.05).

Table 3: Distribution of gingival recession due to use of several cleaning aids

Variable	N(169)	Percentage maximum recession score %	p-Value
Age			
18--25	88	52.1	
26--35	54	32.0	
36--50	27	16.0	0.05*
Gender			
Male	74	43.8	0.008*
Female	95	56.2	
Occupation			
Self employed	4	2.4	
Manager	1	0.6	
Other white collar	45	26.6	0.323
Manual worker	11	6.5	
House person	28	16.6	
Student	80	47.3	
Education			
Primary level	18	10.7	
Secondary level	47	27.8	
Graduate level	94	55.6	0.759
Postgraduate	10	5.9	

DISCUSSION

Gingival recession is a widespread, unfavourable condition that affects people of all ages. Patients find it disturbing because it causes aesthetic, psychological, and functional issues.

The goal of the current research was to determine the association between gingival recession and likely cause of gingival recession using various oral hygiene practices.

Gingival recession was present in 74 (43.8%) males and 95 (56.2%) females. With respect to the age groups about 41% gingival recession was recorded in patients aged 18 to 24 years, about 38% in 25 to 30 years age group and about 21% in 31-50 years old patients. So, current study reported higher recession in youngsters particularly females which is, in agreement with a study by Kozlowska M el al.[13] The study reported that 31.7% of females and 24.3% of males had gingival recession, a finding that could be explained by the fact that females and youngsters are more inspired to practice good oral hygiene than males and elder ones, leading to more frequent tooth brushing.[16]

The results of this study showed that molars and premolars are the teeth most frequently affected as compared to anteriors in accordance with other studies.[17-20] Previous research revealed that the mandibular anterior teeth, mandibular premolars, first molars, maxillary canines and first premolars[19,21] were the teeth that experienced recessions the most frequently. According to research by Checchi et al.[18], the canines of both jaws were the teeth most frequently affected by gingival recession. However according to Muller et al.[19], gingival recession mostly affects the first and second molars in both jaws. Murray[20] and Romano F et al.[22] found that the mandibular incisors, first mandibular molars, first maxillary molars, premolars of both jaws, second mandibular molars, second maxillary molars, and canines were the teeth most frequently affected by gingival recession. One study reported gingival recession to be least common in maxillary incisors.[23] Based on all these results, there seems to be lack of consensus on most frequently involved teeth regarding gingival recession. Future studies should try to do conduct review and help in establishing consensus on this matter.

According to the findings of the current study, patients who brushed their teeth horizontally had more gingival recession as compare to those who used Bass technique or circular approach. While patients who practiced medium and hard toothbrushes and brushes their teeth once a day reported the same result. Similar findings from other studies suggested that excessive, aggressive, and vigorous usage of medium to hard toothbrushes in horizontal direction may result in gingival abrasions.[13,24,25] These investigations demonstrated that technique, frequency, and duration of tooth brushing were all associated to gingival recession.[26] It is significant to note that several studies have discovered connections among various etiological factors of the gingival recession because the cause of gingival recession is multifactorial than a single factor.[27] These findings might provide an explanation for why gingival recession develops in people who practice adequate dental hygiene. In contrast to the above-mentioned findings, some studies found no significant associations between gingival recession and toothbrush type and frequency.[28] In a comprehensive review by Rajapakse et al.[29], only 2 researches out of 17 stated that there is no relationship between brushing of teeth, frequency and gingival recession, whereas 8 studies reported an association between the two. The mentioned findings demonstrate the necessity of educating patients on proper tooth-brushing techniques and additional treatments such as dental floss, interproximal brushes, and mouth washes for the prevention of gingival recession.

According to study by Vehkalahti M[16], education attainable had an impact on the occurrence of gingival recession. While studies by Susin C et al.[30], Chrysanthakopoulos NA[31] and Lorenzo AR et al.[32], elaborated that there was no significant evidence of association between these variables, and this is, in agreement with this study which also showed that education level of education has no significant effect on the gingival recession. The existence of such an association may be explained by the fact that mostly educated people understand the usefulness and

importance of preventive dentistry, oral hygiene and practicing good oral hygiene, make use of the tools at their disposal to control dental plaque, but neglecting regular dental check-up may, unfortunately, develop gingival recession.

In this study, gingival recession was accessed with each variable such as gender, age, education, occupation, types of brushing techniques, frequency and duration of brushing, injudicious use of floss, interdental brush, orthodontic treatment and presence of prosthesis may damage the interdental gingiva that may lead to gingival recession. Statistical significance was also calculated for each variable. The following are some of the study's limitations: There are possibly many additional contributing variables that have not been examined in this study, such as smoking, malocclusion, bruxism, diet, occlusal trauma, thin gingiva, old periodontal treatment, and medical conditions (diabetes, hypertension, etc.) that could be considered as factors associated with gingival recession but were excluded from the study.

CONCLUSION

Although teeth brushing is highly necessary for gingival health but wrong method or rough bristles can seriously cause significant damage. Recession is one of the possible manifestations of this type of injury. This study concluded that multiple factors cause gingival recession and often act together. The youngsters, females and patients using of medium type of toothbrush, cleaning teeth once a day, and horizontal brushing technique were found to be most closely related to gingival recession.

CONFLICT OF INTEREST

No conflict of interest to declare

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