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ORIGINAL ARTICLE

Assessment of gingival recession in patients with fixed orthodontic appliances.

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ABSTARCT… Objective: To assess the gingival recession in patients with fixed orthodontic appliances. **Study Design:** Descriptive Cross Sectional study. **Setting:** Department of Orthodontic, Liaquat University of Medical and Health Science Jamshoro and Department of Orthodontic, Civil Hospital Hyderabad. **Period:** 05-01-2021 to 04-06-2021. **Material & Methods:** A total of 183 patients aged 18–35 have been included in this descriptive cross-sectional research study. After the history was taken, the study participants went through a clinical examination, but for those patients with ongoing fixed orthodontic treatment, at least three to six months of orthodontic treatment have been completed. Gingival recession was assessed using Millers' classification and oral hygiene index. **Results:** The average age of 183 individuals was 22.75+2.29 years. Women outnumbered men 65.5% to 35.5%. According to the oral hygiene index, 28.4% of patients scored exceptional (0-0), 39.3% acceptable (0-0.6), 25.7% fair (0.7-1.8), and 6.6% bad (1.9-3.0). Marginal gingival tissue recession categorization showed that 66.6% of patients had no recession, 21.8% had class I, 10.9% had class II, 0.5% had class III, and 0% had class IV. According to oral hygienic index, marginal tissue recession categorization was significant (p=0.001). At 0.035 significance level, marginal tissue recession and oral hygiene score were positively linked (r=183). **Conclusion:** Most of the cases with fixed orthodontic appliances had no gingival tissue recession, only few cases seen class I and class II. However, this mild gingival tissue recession was significantly associated to oral hygienic index.

Key words: Fixed Orthodontic Treatment, Gingival Recession, Millers' Classification.

INTRODUCTION

Nowadays, more demands of orthodontic treatments have been noticed among different age groups in all societies.[1] the effectiveness and success of orthodontic treatment rest on the response of the periodontal tissue.[2] During orthodontic movements such as vestibular inclination, labial movement, rotation of incisors and extrusion, might influence on soft tissue, which is cause to gingival inflammation, clinical attachment loss and gingival recession.[3]

Important factors for initiating of gingival recession include gingival inflammation that may be triggered by bacterial plaque buildup and also by some mechanical factors like brushing, dental trauma. Surrounded by the demesne of indirect or prompting elements, we can latch the behind: cortical bone thickness, quantity of keratinized gingiva, orthodontic movement and root prominence.[4] And there are various factors which initiate gingival recession, that is, mispositioning of teeth, destructive periodontal disease, tooth brushing trauma, dehiscence of alveolar bone, frenal pull, slightly marginal and thin tissues that cover non-vascularized root surface, and also many other factors contributed and idiopathic factors correlated to reconstructive, conservative periodontology and prosthetic treatments.[5]

Some studies revealed that fixed orthodontic appliance treatment has been exposed to initiation damaging impacts on periodontium, gingivitis progressing to the bone loss and plaque accumulation source resulting from difficulty to maintain oral hygiene when there is bracket and band. Consequently, the detachment of fixed appliances after the therapy, might be

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chance of the inflammation can be resolve. But lengthy procedure of fixed orthodontic treatment can cause gingival recession. There are various studies have exhibited irreversible recession triggered by fixed orthodontic therapy.[6-7] Gingival recession remained a long-term challenge associated with orthodontic therapy. Various studies reported that 1.3% to 10% of treated cases revealed irreversible gingival recession can be caused by fixed orthodontic treatment.[8] According to some studies which publicized in 2013, reported ambiguous effect on periodontium after the orthodontic treatment. Although, gingival recession can cause poor esthetics, dentine hypersensivity, periodontal support loss, also difficult to keep proper oral hygiene, trouble in repair of periodontal supportive tissue and high frequency of susceptibility to caries.[9-10]

Another study states that 35% of orthodontic treated patients revealed gingival recession out of 50 samples, because of some orthodontic movements of labial or lingual mandibular incisors tooth movement, whereas 6% had an improved width of keratinized gingival successive to lingual positioning of the incisors.[1] Slutzkey and Levin reported that majority of young adult in age range18-22 years, resulted 23 percent of gingival recession more than twice in orthodontic treated subjects as compare in non- orthodonticaly treated patients which is revealed only 11 percent.[11] Slutzkey& Levin in 2008 and Thomson in 2002 compare the result of orthodontic treated patients with non-orthodontic treated patients and results shown that the change of gingival recession in patients treated over 5-years before as compared to intact controls.[12] Earlier researches did not consider the tooth movement's difficult effect when assessing black triangles (or open gingival embrasure). Latest publication has conveyed that the during orthodontic treatment movement of teeth could similarly affect the incidence of black triangles.[13]

Careful maintenance of oral hygiene and periodic gingival health consultation for the gingival recession is essential for orthodontic patients. As gingival health may be affected by fixed orthodontic treatment, due to its long duration and certain effects on gingival health which can develop gingival recession, there is a need to find out possible effects of treatment so the purpose of present study is to evaluate gingival recession in patients with fixed appliances. This may beneficial for orthodontic patient management and good prognosis of related gingival recession.

MATERIAL & METHODS

This descriptive cross sectional study with non probability convenience sampling was undertaken at orthodontic Department LUMHS Jamshoro and orthodontic department of Liaquat hospital Hyderabad from January 2021 to June 2021. The sample size calculated was 183; raosoft online calculator was used for sample size estimating using the margin of error 5%, at confidence interval 95%.

Inclusion Criteria

- Treatments of full-mouth fixed orthodontic appliances
- At least 3 to 6 months of orthodontic treatment has been completed.
- Both gender
- Aged between 18 – 35
- Patients who consented prior to clinical investigation.

Exclusion Criteria

- Missing first molars, molar bands.
- Pregnant women.
- Orthognathic surgery
- Patient with any systemic diseases.
- Habit of smoking and betel nuts.

Procedure

The study was undertaken following approval from the ethical review committee of Liaquat University Hospital in Hyderabad (LUMHS/REC/-732). One hundred eighty-three orthodontic patients were selected after an oral examination. The written consent was obtained from the selected patients, and the principal investigator took their histories. The study participants went through a clinical examination, which included an examination of gingival recession by Millers' classification and oral hygiene index, after which the patients were aware of gingival health and

gingival recession, which is associated with orthodontic treatment. Severity and absence/ presence of gingival recession in an individual (or in a section of a population) were assessed. Presence of GR, like gingival margin's apical migration in terms of CEJ line, was assessed as per Miller's classification (as class I to class IV)[14], using William's periodontal probe. The lower and upper anterior teeth were evaluated. The oral hygiene status was measured by the John C. Greene and Jack R. Vermillion oral hygiene index, which comprises the combined calculus index and debris index. Both of these indices are based on twelve numerical determinations representative of the magnitude of calculus or debris present on the lingual and buccal surfaces of dental arch segments.

Data Analysis Procedure

The data was analysed using the statistical package for social sciences (SPSS) version 20. Quantitative variables such as age and gingival recession were expressed in frequencies and percentages. A chi-square test was applied to check the association between qualitative variables. A P value ≤ 0.05 was considered statistically significant.

RESULTS

Total 183 patients were studied; males were 35.5% and females were majority 64.5%, as shown in Figure-1.

Mean age of participants was 22.75±2.29 years. Minimum age was 18 years and maximum were 35 years. Table-I

According to oral hygiene index, 28.4% patients had score excellent (score 0-0), 39.3% patients had score good (score 0-0.6) and 25.7% had score fair (score 0.7-1.8), 6.6% was scored poor (score 1.9-3.0). Table-II

According to marginal gingival tissue recession classification, most of the patients around 66.6% of the cases had no recession, while 21.8% had class I, 10.9% had class II and 0.5% had class III, however 0% had shown only in class IV, as shown in Figure-2.

In this study marginal tissue recession classification was statistically significant according to oral hygienic index (p=0.001). Table-III

There was a positive correlation between marginal tissue recession and oral hygienic index (r=183) at significance level of 0.035, as mentioned in Figure-3.

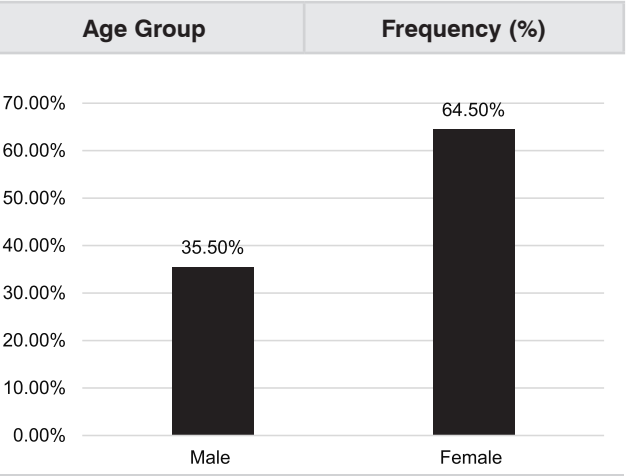

Figure-1. Patient's distribution according to gender n=183

18-25 years	129 (70.5%)
26-35 years	54 (29.5%)
Total	183 (100.0%)
Mean+SD	22.752±.29 years
Minimum	18 years
Maximum	35 years

Table-I. Patient's distribution according to gender

Oral Hygiene Score	Frequency (%)
Excellent (score 0-0)	52 (28.4%)
Good (score 0-0.6)	72 (39.3%)
Fair (score 0.7–1.8)	47 (25.7%)
Poor (score 1.9–3.0)	12 (6.6%)
Total	183 (100.0%)

Table-II. Patient's distribution according to oral hygienic index

Classification of Recession	Oral hygienic index				P-Value
	0	1	2	3	
Normal	48(26.2%)	39(21.3%)	28(15.3%)	7(3.8%)	0.001
class 1	3(1.6%)	25(13.7%)	10(5.5%)	2(1.1%)	
class 2	1(0.5%)	08(4.4%)	08(4.4%)	3(1.6%)	
class 3	0	0	1(0.5%)	0	
class 4	0	0	0	0	
Total	52	72	47	12	

Table-III. Gingival recession according to oral hygienic index

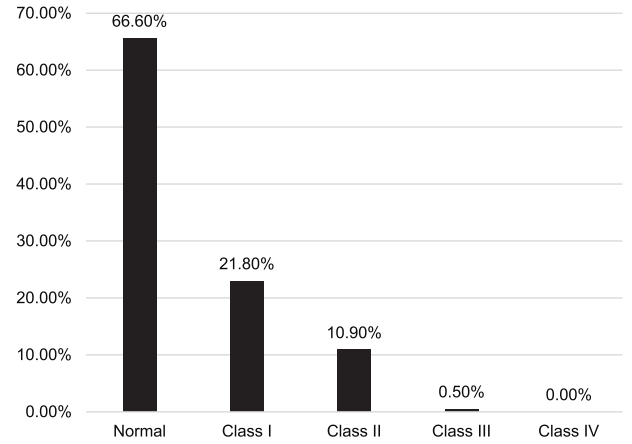

Figure-2. Patient's distribution according to gingival recession

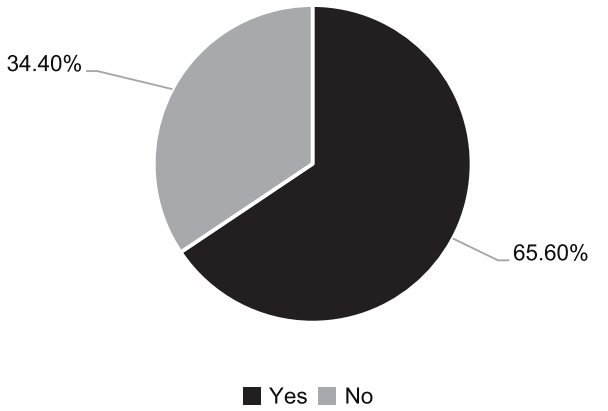

Figure-3. Patient's distribution according to marginal tissue recession

DISCUSSION

One study result showed that not only orthodontic brackets impact gingival and periodontal health, but similarly, orthodontic bands also have a harmful impact on oral health. Most young patients undergo fixed orthodontic treatment, but most of them have experienced plaque-induced gingival and periodontal problems. It is also revealed that nearly all fixed orthodontic patients develop gingival problems at some point throughout their orthodontic treatment because most of the patients don't know how to maintain good oral hygiene throughout orthodontic treatment. The current study focuses on comparing the association between gingival health and fixed orthodontic therapy in teenagers and young adult individuals.[15]

In this study, the mean age of patients was 22.75+2.29 years, while the study by Boke F[16] reported that the average chronological age of the group was 13.37 ± 2.06 years. This mean age difference from other studies may be due to age selection criteria. In this study, females were the majority (64.5%) and males were 35.5%. However, inconsistently, Boke F demonstrated that there was a difference between the male and female ratios. Consistently, Akkaya M[17] reported that the average age of the young adult group is 22.36±2.82 years. On the other hand, in a national study by Shar MK[18], the mean age of the patients was 21.03±4.684 years; males were 23% and females were 77%. Khan KH[19] reported that the mean age of the patients was 21.3Â±3.45 years, and of the total 50 patients, 23 (46%) were males and 27 (54%) were females. Corradi-Dias L & colleagues, in contrast, discovered inconsistencies in their findings, as 25 out of 46 subjects were females and 21 subjects were boys. This gender disparity could be attributed to climatic and cultural differences among worldwide populations.[20]

In this study, according to the oral hygienic index, 28.4% of patients had a score of 0-0, 39.3% had a score of 0-0.6, 25.7% had a score of 0.7–1.8, 6.6% had a score of 1.9–3.0, and according to gingival recession, most of the cases had 66.6% had no recession, while 21.8% had class I, 10.9% had class II, 0.5% had class III, and 0% were seen

in class IV. However, class III students who may already have thinner gingiva are more susceptible to recession. Although their aetiology is not clearly understood, the occurrence of gingival recessions may be associated with orthodontic treatment related to poor oral hygiene.

However, in the study of Alanazi M[21], the distance between the gingival margin and incisal edge (cast crown length) of the facial aspects of anterior teeth pre-orthodontic and post-orthodontic treatment on study cast models was assessed as related to gingival margin alterations. In the present study, gingival recession was evaluated by Miller's classification using William's periodontal probe, and oral hygiene status was measured using the oral hygiene index.

The present study demonstrated that orthodontically treated patients developed gingival recession, which was mildly initiated on the facial aspects of all studied teeth. Our results seem to be in disagreement with the results of Allais Melsen[22], and Yared KF[23], who revealed that gingival recessions developed in ten percent of the examined teeth ($P < 0.001$). There was no association between probing pocket depth and gingival and plaque bleeding indexes and the recession, or total amount of labial displacement in statistics ($P > .05$). On the central mandibular incisors, the association of recession was negative with facial gingival line thickness and height of keratinized gingiva, although they found that there is an association between orthodontic treatment of anterior teeth and an increased risk of gingival recessions.[24] Consistently, Aziz T[25] concluded that there were no significant changes in the incidence of gingival recession or orthodontic treatment of anterior teeth. These differences may be attributed to the discrepancy in the inclusion criteria of our study group compared to the other groups and the assessment of subjects with malocclusion in Class III who may already have thinner gingiva that makes them more susceptible to recessions. Also, our selected samples were treated with fixed appliances and molar bands, which favor plaque accumulation that leads to prolonged gingival inflammation. However, plaque accumulation around the retainer that promotes the receding of gums is not fully understood.

In this study, the marginal tissue recession classification was statistically significant according to the oral hygienic index ($p = 0.001$). However, Cantekin K[26] reported that the PI score among young dental subjects undertaking orthodontic treatment implies that orthodontic subjects must adhere to very strict oral hygiene practices. Receding gums is a frequent problem that begins in young adults and worsens over time, leading to tooth movement and eventually tooth loss. It has an etiology, prevalence, and correlated factors, as well as treatment alternatives, that orthodontists must be conscious of in order to provide patients with the best treatment options.

According to some studies, the loss of bone attachment around teeth along with the pocket depth is noticed in radiographs of patients enduring fixed orthodontic treatment. They detailed that plaque is the main cause of all harmful effects that impact gingival health, but the amputation of plaque and maintaining good oral hygiene is a big task in the presence of fixed orthodontic appliances.[27]

To avoid a deterioration of the medical problem, the causative agents must be recognized and eradicated as soon as possible. The patient must be counseled on the proper usage of soft toothbrushes as well as brushing methods. Gingival graft (connective tissue or free gingival graft), directed tissue regeneration, sensitive restoration, and orthodontic therapies are all options for reducing the recession of the gingiva.[28]

CONCLUSION

It was concluded that most of the cases with fixed orthodontic appliances had no marginal tissue recession; only a few cases were seen in classes I and II. However, this mild gingival tissue recession was significantly related to the oral hygiene index. This was a small sample size and a single-centre study. However, studies with a larger group of patients and multicenter studies are suggested in a conclusive manner.

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No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
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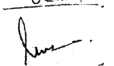
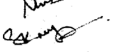
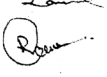
2	Munawar Ali Baloch	Literature search.	
3	Shikoh Naz	References.	
4	Saima Asim	Discussion.	
5	Rida Batool	Result	
6	Munir Ahmed Banglani	Supervision, COncept, Ideas.