

Gingival enlargement in different age groups during fixed Orthodontic treatment

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Abstract:

Background: During fixed orthodontic therapy, adolescents tend to have higher chances of gingivitis and gingival enlargement (GE) compared to adults. A cross sectional study was undertaken to evaluate the above hypothesis, by assessing GE in patients of different age groups receiving fixed orthodontic therapy.

Materials & Methods: Patients undergoing orthodontic treatment were selected by simple random sampling from the King Khalid University College of Dentistry out patient's clinic of preventive dental sciences division to form the study group. Participant's were divided into three age groups and GE was graded as 0, 1 and 2 as per the classification of the American Academy of Periodontology. Data were analyzed by using IBM SPSS version 16.0 (Statistical Package for Social Services, Chicago, IL, USA) and descriptive statistics were obtained. Differences in proportions were compared using the Chi-square test and the significance level was set at $p \leq 0.05$.

Results: 62.3% (n=33) were males and 37.7% (n=20) were females. Group 1 had 21 patients (39.7%); Group 2 had 24 patients (45.3%) and Group 3 had 8 patients (15.1%). The highest frequency (48%) of GE was observed among the Group 1 age group (10-19 years). Differences in frequency of GE according to age groups were found to be statistically significant ($p=0.046$). Differences in GE according to the frequency of practicing oral hygiene measures were statistically significant ($p<0.001$).

Conclusion: Highest frequency of GE was observed among the adolescents. The patients who practiced oral hygiene measures

more than three times daily did not have any GE. On the other hand, those who brushed and flossed only once daily had the highest percentage of grade 2 GE.

Key Words: Gingival enlargement, fixed orthodontic treatment, adolescents

Introduction

Malocclusion is the third most common oral health problem in the world, and is often associated with inadequate oral hygiene, periodontal disease, TMJ disease, speech problems, mouth breathing and many more complications.¹ Orthodontic treatment often can correct these complications or at least prevent them from progressing; by ensuring proper alignment of the teeth and achieving harmonious occlusal and jaw relationships.² However, in addition to benefits, orthodontic treatment has the potential to cause side effects.³

Occurrence of gingivitis, periodontitis, gingival recession and the formation of gingival pockets during or after the orthodontic treatment has been consistently reported in many studies.⁴ Almost all fixed orthodontic appliance patients have increased plaque retention that results in moderate gingivitis and varying degrees of gingival enlargement (GE).^{5,6} GE during orthodontic treatment can lead to pseudo pocketing, where there is no attachment loss, but the hyperplasia results in an artificially deep "pocket" that resolves with resolution of the hyperplasia. It has been suggested that a shift to more anaerobic flora occurs where pseudopockets are present.⁷ Different species of anaerobic bacteria like *Bacterioides intermedius*, *Spirochetes*, *B.forsythus*, *T.denticola*, *P.nigrescens*, *C.rectus* and fusiform bacteria increase more frequently in the dental plaque of patients undergoing orthodontic treatment.⁷

Majority of orthodontic treatments are performed on adolescents, an age at which patients tend to be less compliant with treatment and less attentive to oral hygiene measures.⁸ As a result, adolescents tend to have higher chances of gingivitis and GE compared to adults. The present study was undertaken to evaluate the above hypothesis and a cross sectional study was done to assess

Table 1: Description of study sample

Variables	Method of detection	Results
Sex		
• Male	33	62.3
• Female	20	37.7
Age Group		
• 10-19 years	21	39.7
• 20-25 years	24	45.3
• >26 years	8	15.1
Grade		
• 0	13	24.5
• 1	15	28.3
• 2	25	47.2
Frequency of brushing & flossing		
• Once daily	20	37.7
• Twice daily	23	43.4
• Three times daily	5	9.4
• > 3 times daily	5	9.4
Duration of treatment		
• 1-6 months	11	20.8
• 7-12 months	14	26.4
• 13-18 months	15	28.3
• > 18 months	13	24.5

GE in patients of different age groups receiving fixed orthodontic therapy.

Materials and Methods

Patients undergoing orthodontic treatment were selected by simple random sampling from the King Khalid University College of Dentistry out patient's clinic of preventive dental sciences division (Periodontics and orthodontics) to form the study group. Participant's gingival enlargement was graded as 0, 1 and 2 as per the classification of the American Academy of Periodontology.⁹ Patients within the ages ranging from 10-19 years constituted Group 1; patients between the ages 20-25 formed Group 2 and Group 3 constituted patients ageing above 26 years.

Participation was voluntary and verbal consent was obtained from the participants after informing them the objective of the study. Healthy subjects without any drug usage during the treatment period formed the inclusion criteria. The study was carried out in Periodontics clinics after obtaining the ethical clearance from the college ethical committee. The clinical examination and grading of GE for all the participants was done by the same periodontist. Data were analyzed by using IBM SPSS

version 16.0 (Statistical Package for Social Services, Chicago, IL, USA) and descriptive statistics were obtained. Differences in proportions were compared using the Chi-square test and the significance level was set at $p \leq 0.05$.

Results

62.3% (n=33) were males and 37.7% (n=20) were females. Group 1 had 21 patients (39.7%); Group 2 had 24 patients (45.3%) and Group 3 had 8 patients (15.1%). The results are summarized in Table 1.

The highest frequency (48%) of GE was observed among the Group 1 age group (10-19 years), as evidenced in Table 2. Differences in frequency of GE according to age groups were found to be statistically significant ($p=0.046$). However, differences in frequency of practice of oral hygiene measures and treatment duration were not statistically significant for the age groups.

As summarized in Table 3, the patients who practiced oral hygiene measures more than three times daily did not have any gingival enlargement. On the other hand, those who brushed and flossed only once daily had the highest percentage of grade 2GE (28.3%, n=15). Differences in GE according to the frequency of practicing oral hygiene measures were statistically significant ($p<0.001$). On the other hand, differences in GE were not statistically significant for treatment duration.

Discussion

The insertion of fixed orthodontic appliances is associated with greater plaque build-up due to the difficulty in cleaning teeth especially in the areas between brackets and the gingival margins.¹⁰ Plaque, if not removed, can lead to several adverse conditions such as the occurrence of gingivitis, GE, enamel decalcification and white spots and loss of attachment (in severe cases).¹¹⁻¹⁴ Oral hygiene instructions (OHI) are administered at the start of the orthodontic treatment in order to educate the patient on methods to maintain a good standard of oral hygiene to help prevent plaque build-up during the treatment period.¹⁰ Compliance with OHI is essential for patients in all age groups, but it is critical during adolescence, as patient behaviour, personality, and self-image are formed during this phase.^{15,16}

Adolescence is the transitional period between childhood and adulthood. World Health Organization identifies the period of adolescence as being between 10 and 19 years old.¹⁷ Orthodontists consider adolescence as a favourable period for treatment commencement due to the fact that

by this age, permanent tooth eruption is complete even as craniofacial growth is still progressing. This offers advantages in terms of tooth movement and correction of malocclusion while maintaining favourable facial growth.¹⁵ However, these advantages can be outweighed by complications arising due to lack of patient cooperation and less compliance with OHI.⁸ Adolescents tend to have higher levels of supra-gingival plaque accumulations and higher rates of gingivitis and GE.¹⁸ The present study was undertaken to evaluate the above hypothesis and a cross

Differences in frequency of GE according to age groups were found to be statistically significant ($p=0.046$). Among the Group 3 (above 26 years) patients, only 16% ($n=4$) had grade 2 GE. This finding is in agreement with Boyd et al,¹⁸ who reported that, better oral hygiene in adults has been attributed to their greater commitment towards orthodontic treatment because their decision for treatment is not influenced by external influences (parents or peers). The clinical crowns in adults are longer than that in adolescents, making plaque removal easier and they would

Table 2: Study variables according to age groups of participants

	Group 1		Group 2		Group 3		P Value
Variables	n	%	n	%	n	%	
Grade							
• 0	2	14.4	8	61.5	3	23.1	0.046
• 1	7	46.7	7	46.7	1	6.7	
• 2	12	48.0	9	36.0	4	16.0	
Frequency of brushing & flossing							
• Once daily	11	55.0	6	30.0	3	15.0	0.139
• Twice daily	9	39.1	10	43.5	4	17.4	
• Three times daily	0	0.0	5	100	0	0.0	
• > 3 times daily	1	20.0	3	60.0	1	20.0	
Duration of treatment							
• 1-6 months	5	45.5	4	36.4	2	18.2	0.262
• 7-12 months	3	21.4	9	64.3	2	14.3	
• 13-18 months	4	26.7	7	46.7	4	26.7	
• > 18 months	9	69.3	4	30.8	0	0.0	

sectional study was done to assess GE in patients of different age groups receiving fixed orthodontic therapy. Majority of the patients belonged to the age group of 10-19 years in our study group. This is in agreement with the fact that adolescence is the period associated with the greatest orthodontic treatment rates.^{16,19} The highest frequency (48%) of GE was observed among the Group 1

have surpassed the pubertal growth period that adolescents pass through and which is associated with changes in hormonal levels, potentially contributing to gingival inflammation in some cases.^{18,20}

The patients who practiced oral hygiene measures more than three times daily did not have any GE (Table 3). On the other hand, those who brushed and flossed only once

Table 3: Study variables according to the grade of gingival enlargement

	0		1		2		P Value
Variables	n	%	n	%	n	%	
Frequency of brushing & flossing							
• Once daily	1	1.8	4	7.5	15	28.3	<0.001
• Twice daily	4	7.5	10	18.9	9	17	
• Three times daily	3	5.6	1	1.8	1	1.8	
• > 3 times daily	5	9.4	0	0.0	0	0.0	
Duration of treatment							
• 1-6 months	4	4.5	2	3.7	5	9.4	0.482
• 7-12 months	3	5.6	2	3.7	9	17	
• 13-18 months	3	5.6	7	13.2	5	9.4	
• > 18 months	3	5.6	4	7.5	6	11.3	

age group (10-19 years), as evidenced in Table 2.

daily had the highest percentage of grade 2 GE (28.3%,

n=15). Statistically significant differences were observed in GE and the frequency of brushing and flossing ($p < 0.001$). This finding was also in agreement with the literature stating that increased oral hygiene awareness and improved brushing and flossing decrease the plaque retention and enhance the gingival health during treatment with fixed orthodontic appliances.²¹

Conclusion

Highest frequency of GE was observed among the adolescents. The patients who practiced oral hygiene measures more than three times daily did not have any GE. On the other hand, those who brushed and flossed only once daily had the highest percentage of grade 2 GE.

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