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# Assessment of effect of fixed orthodontic treatment on gingival health: An observational study

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**Abstract**---Aims: Evaluation of effect of fixed orthodontic treatment on gingival health. Materials & methods: 50 patients within the age group of 15 to 25 years who were scheduled to undergo fixed orthodontic treatment were included in the present study. Clinical examination of all the patients was carried out. Intra-oral and extra-oral radiographs were obtained and photographic records were noted in separate Performa. Presence or absence of gingival recession was recorded separately. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Results: Mean visible plaque score before and after treatment was 1.46 and 2.85 respectively. Mean visible inflammation value before and after treatment was 2.46 and 12.45 respectively. Significant degradation of gingival health was seen

following fixed orthodontic treatment. Conclusion: Fixed orthodontic treatment is associated with increase in plaque accumulation, inflammation and gingival recession.

**Keywords**---Gingival, Orthodontic treatment, Plaque.

## **Introduction**

Orthodontic treatment ensures proper alignment of the teeth and improves the occlusal and jaw relationship. This not only aids in better mastication, speech, and facial aesthetics, but also contributes to general and oral health, thereby improving the quality of life. Like any other treatment modalities, orthodontic treatment, in addition to its benefits, has also associated risks and complications. However, the risk and complication associated with treatment are reported to be considerably lower compared to other surgical or nonsurgical interventions. The optimum balance between the status of health and level of disease in periodontics can only be established by proper plaque control and this requires adequate inputs both from the patient's point of view and professional cleaning.<sup>1-3</sup>

Orthodontic treatment contributes to better oral hygiene by correcting dental irregularities and reduces (or eliminates) occlusal trauma. Due to these reasons, it has been suggested that orthodontic treatment leads to an improved periodontal status. It seems reasonable that straighter teeth are easier to clean, and perhaps having all teeth centered in the alveolar housing and occluding correctly may promote a healthier periodontium.<sup>3-5</sup> Hence; the present study was undertaken for assessing the effect of fixed orthodontic treatment on gingival health.

## **Materials & Methods**

The current study was conducted for evaluating the effect of fixed orthodontic treatment on gingival health. 50 systemically healthy patients within the age group of 15 to 25 years who were indicated for fixed orthodontic treatment were included in the present study. Clinical examination of all the patients was carried out. Intra-oral and extra-oral radiographs were obtained and photographic records were noted in separate Performa.

Complete intra-oral examination of all the subjects was carried out. Recording of periodontal parameters Plaque index (Silness and Loe, 1964)<sup>12</sup>, Gingival index (Loe and Silness, 1963)<sup>13</sup> was carried out. Presence or absence of gingival recession was recorded and actual Gingival recession was measured in millimetre (mm) from Cemento Enamel Junction (CEJ) to the base of Periodontal pocket with the help of UNC 15 probe and was classified into Miller's<sup>14</sup> Class I, II, III and IV. All teeth with or without gingival recession were included for the study. Teeth with severe gingival recession extending to or beyond the mucogingival junction (Miller's Class II and III and IV)<sup>14</sup> pre-treatment were excluded from the study. Teeth without gingival recession pre-treatment were observed for development of gingival recession during the course of treatment. All the results were recorded in

Microsoft excel sheet and the obtained mean values were analysed by SPSS software.

## Results

In the present study, 50 patients were enrolled. Mean age of the subjects was 22.5 years. Out of 50 subjects, 29 were males and 21 were females. Mean Plaque index score before and after treatment was 3.96 and 5.12 respectively. Mean Gingival index indicating gingival inflammation before and after treatment was 2.46 and 12.45 respectively. Mean gingival recession before and after treatment was 0.08 and 0.26 respectively. Significant degradation of gingival health was seen following fixed orthodontic treatment.

Table 1  
Demographic data

Variable	Number
Number	50
Mean age (years)	22.5
Males (n)	29
Females (n)	21

Table 2  
Comparison of plaque, inflammation and gingival recession values

Variable		Fixed orthodontic treatment	p-value
Visible plaque value (Plaque index)	Before treatment	1.86	0.000*
	After treatment	2.82	
Visible inflammation value(Gingival Index)	Before treatment	1.46	0.000*
	After treatment	2.85	
Gingival recession score	Before treatment	0.08	0.000*
	After treatment	0.26	

\*: Significant

## Discussion

Orthodontic treatment can improve facial esthetics and mastication through the alignment of teeth. However, dental caries, tooth discoloration, and gingival hyperplasia have been reported as complications of this treatment. It is difficult to maintain oral hygiene because of the presence of orthodontic appliances, bands, and elastics. These conditions may lead to plaque accumulation and changes in the composition and type of oral bacteria. On the contrary, a systematic review indicated that there is a positive relationship between malocclusion and periodontitis. However, it was also reported that there was no reliable evidence suggesting a positive effect of orthodontic treatment on periodontal health. Some authors have reported that plaque and bleeding indexes improve after orthodontic treatment.<sup>6-9</sup> Hence; the present study was undertaken for assessing the effect of fixed orthodontic treatment on gingival health.

In the present study, 50 patients were enrolled. Mean age of the subjects was 22.5 years. Out of 50 subjects, 29 were males and 21 were females. Mean visible plaque score before and after treatment was 1.46 and 2.85 respectively. Mean visible inflammation value before and after treatment was 2.46 and 12.45 respectively. Cerroni S et al evaluated whether there is updated scientific evidence on the relationship between fixed orthodontic therapy and periodontal health. The inclusion criteria were: RCTs, cohort studies, cross-sectional studies and case-control studies only in English language; only studies on humans, with a minimum sample size of 20 patients and no restriction in terms of patient ages; orthodontic fixed appliances placed into the buccal tooth surface; standardization and training in oral hygiene; Periodontal Index (PI), Gingival Index (GI), Bleeding on Probing (BOP), Pocket Probing Depth (PPD), at least at baseline (before appliance was placed) and after follow up (with a minimum period of 3 months). Studies were selected by abstract and title; then, inclusion and exclusion criteria were applied. The studies that satisfied the inclusion criteria were evaluated and classified as having low, moderate or high methodology quality. Fifty-five records were reviewed on the basis of title and abstract. After full-text reading, 47 full texts were excluded, and 3 articles were classified as having low methodological quality and 5 as having moderate methodological quality. The present systematic analysis suggests that there is moderate scientific evidence that a fixed appliance influences periodontal status; no article reported a high score.<sup>10</sup>

Mean gingival recession score before and after treatment was 0.08 and 0.26 respectively. Significant degradation of gingival health was seen following fixed orthodontic treatment. In 2011, Liu et al., examined changes in periodontal tissues during orthodontic treatment in two groups of young subjects. In the study, periodontal examination (PI, GI, and PPD) was performed before and 1 - 3 months after appliance placement in group A; in group B, periodontal parameters were measured before and 1, 3, and 6 months after appliance removal. The results showed a significant increase in PI and GI, no changes in PPD after the first 3 months of therapy and a decrease in PI, GI, and PPD 6 months after appliance removal. However, at the end of orthodontic therapy, periodontal parameters were higher than those at baseline. The authors concluded that a fixed orthodontic appliance promotes dental plaque accumulation and gingival inflammation, but this observation might be affected by the short-term evaluation period. However, orthodontic appliances seemed to have no permanent effects on periodontal status.<sup>11</sup>

## **Conclusion**

Fixed orthodontic treatment is associated with increase in plaque accumulation, inflammation and gingival recession. Therefore; among patients undergoing fixed orthodontic treatment, regular oral prophylaxis should be done.

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