

Original Article

Assessment of Effect of Orthodontic Treatment on Gingival Health: A Clinical Study

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ABSTRACT:

Background: Orthodontic treatment has been reported to be associated with certain risks and complications of the oral tissues. Hence; we planned the present study to assess the effect of orthodontic treatment on the gingival health. **Materials & methods:** We planned the present study to evaluate the effect of orthodontic treatment on the gingival health. A total of 38 patients, scheduled to undergo fixed orthodontic treatment were included in the present study. Patients were recalled after every twenty days for follow-up. Both the clinical and radiographic follow-up record of all the patients was obtained. This included evaluation of the periodontal status: visible plaque and visible inflammation. All the data were recorded and compiled in Microsoft excel sheet. **Results:** Significant increase in visible plaque, visible inflammation and gingival recession occurred after finishing of fixed orthodontic treatment. **Conclusion:** Orthodontic treatment is significantly associated in increased destruction of the periodontal structures. **Key words:** Gingival health, Orthodontic treatment, Periodontitis

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INTRODUCTION

Orthodontic treatment certifies proper alignment of the teeth and progresses the occlusal and jaw relationship. This not only helps in better mastication, speech, and facial aesthetics, but also contributes to general and oral health, thereby improving the quality of life. Orthodontic treatment, like any other treatment modalities, 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.¹⁻³

Many periodontal patients may present with pathological tooth migration or other deformities where orthodontics may represent an important part of their treatment. Both periodontists and orthodontists should understand the results of one's work on the other's and cooperate in clinical practice to deliver the best possible treatment to their patients.⁴⁻⁶

Hence; we planned the present study to assess the effect of orthodontic treatment on the gingival health.

MATERIALS & METHODS

The present study included evaluation of the effect of orthodontic treatment on the gingival health. Ethical approval was obtained from the ethical committee, and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 38 patients, scheduled to undergo fixed orthodontic treatment were included in the present study. We obtained complete demographic and clinical details of all the patients before the starting of the study. Inclusion criteria for the present study included:

- Patients less than 18 years of age,
- Patients planned to undergo fixed orthodontic treatment,
- Patients with absence of development anomalies of the oral region.

Patients were recalled after every twenty days for follow-up. Both the clinical and radiographic follow-up record of all the patients was obtained. This included evaluation of the periodontal status: visible plaque, visible inflammation and gingival recession. The scoring of these parameters was done based on criteria described previously in the literature.^{7,8} All the data were recorded

and compiled in Microsoft excel sheet. Analysis of all the records was done on SPSS software. Student t test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

A total of 38 patients scheduled to undergo orthodontic treatment were included in the present study. Mean age of the patients of the present study was 14.2 years. Among these 38 patients, 20 were males while the remaining 18 were females. 20 patients in the present study had Angle class II malocclusion while 10 and 8 patients had Angle Class I and Class III malocclusion respectively. Mean value for visible plaque before and after the treatment was 2.95 and 5.94 respectively. Mean value of visible inflammation before and after the treatment was 2.86 and 10.52 respectively. Mean value of gingival recession before and after the treatment was 0.09 and 0.34 respectively. Significant results were obtained while comparing the visible plaque, visible inflammation and gingival recession before and after the fixed orthodontic treatment.

Table 1: Clinical and demographic details

Parameter		Number
Mean age (years)		14.2
Gender	Male	20
	Female	18
Angle classification	Class I	10
	Class II	20
	Class III	8

Graph 1: Descriptive values of subjects

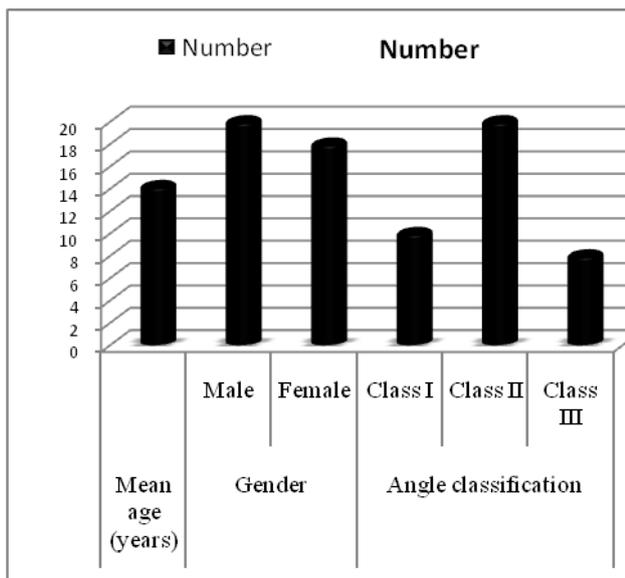


Table 2: Comparison of gingival health before and after the treatment

Parameter		Before treatment	After treatment	P-value
Mean	Visible plaque	2.95	5.42	0.02*
Mean	Visible inflammation	2.86	10.52	0.01*
Mean	Gingival recession	0.09	0.34	0.01*

*: Significant

DISCUSSION

Many patients seek orthodontic treatment for esthetic improvement. These patients mostly present with mal-alignment of the anterior teeth. The positive effects of orthodontic treatment on their appearance and self-esteem are easy to envision.⁷ The most commonly reported adverse effects of orthodontic treatment can be both local and systemic. This includes, tooth discolorations, decalcification, root resorption, periodontal complications, psychological disturbances, gastrointestinal complications, allergic reactions, infective endocarditis, and chronic fatigue syndrome. It has been shown that orthodontic forces represent a physical agent capable of inducing an inflammatory reaction in the periodontium. This reaction is necessary for orthodontic tooth movement. One of the challenges of orthodontics is to finish the orthodontic treatment with the least effects on the root and periodontium.⁸⁻¹⁰ Hence; we planned the present study to assess the effect of orthodontic treatment on the gingival health.

In the present study, we observed significant increase in the visible plaque, visible inflammation and gingival recession after finishing of fixed orthodontic treatment. Melsen B et al assessed changes in prevalence and severity of gingival recession of mandibular incisors during orthodontic treatment of adults in whom the incisors had been moved labially and to identify parameters that could predict recession. Pretreatment overjet, overbite, degree of crowding, presence of tooth rotation, canine relationship, vertical face height, and position of the mandibular incisor to A-pogonion and mandibular lines were registered on study casts and lateral head films. Pretreatment gingival recession, width of keratinized gingiva, gingival biotype, gingival inflammation, and visible plaque accumulation were recorded, as was post treatment gingival recession. Labial movement was determined by measuring pre-treatment and post treatment casts. No significant increase in the mean gingival recession was observed during treatment. The prevalence of gingival recession greater than 0.1 mm increased from 21% before treatment to 35% after (P < .05). Only 2.8% of the subjects developed recession greater than 2 mm, and 5% of the pre-existing gingival recessions improved. The presence of baseline recession (P < .001), gingival biotype (P < .0179), and gingival inflammation (P < .003) were identified as possible predictors of recession. None of the orthodontic variables was significantly associated with recession. Gingival

recession of mandibular incisors did not significantly increase during orthodontic treatment.¹¹

Boke F et al evaluated the relationship between orthodontic treatment and gingival health. Patients' folders were analyzed according to their age, treatment time, and the type of orthodontic treatment. Intra-oral photographs were analyzed, and the presence or absence of visible plaque, visible inflammation, and gingival recession were recorded, and incisor inclinations analyzed on lateral cephalometric films, before and after orthodontic treatment. No statistically significant difference was found in patients treated with functional appliances before and after treatment. In patients treated with fixed orthodontic appliances, visible plaque, visible inflammation, and gingival recession showed significant increases after treatment, gingival biotype did not show any significant difference. Positive correlation was found between lower incisor position and gingival recession in patients treated with fixed appliance and extraction. And also cuspids were the teeth with the highest prevalence of gingival recession. Considering the relationship between orthodontic treatment and gingival health, cooperation among patients, orthodontists, and periodontists is important.¹² Vasconcelos G et al assessed the prevalence and severity of vestibular gingival recession of mandibular incisors after orthodontic treatment and to evaluate possible contributing factors. Intraoral color slides were used for the evaluation of gingival recessions (based on Miller classification), presence of visible plaque, and gingival inflammation. Cephalometric radiographs were used to assess the sagittal intermaxillary relation, mandibular and intermaxillary angles, and the position of the lower incisors. A control group was drawn from the same pool of 588 patients. The prevalence of gingival recessions after orthodontic treatment was 10.3%. Most (8.6%) were classified as Miller Class I, and 1.7% were classified as Miller Class II. Gingival recession was predominantly found on central incisors. Reduction of the sagittal intermaxillary angle and retroclination of the lower incisors was correlated with the development of a more severe gingival recession. The present study indicated that vestibular gingival recession of mandibular incisors after orthodontic treatment is of minor prevalence and severity.¹³

CONCLUSION

Under the light of above mentioned data, it can be inferred that orthodontic treatment is significantly associated in increased destruction of the periodontal

structures. Therefore proper and strict oral hygiene maintenance instructions should be given to the patients by the orthodontists to avoid the deleterious effect of orthodontic treatment on the periodontium and other tooth supporting structures.

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