

Original Research

Orthodontic treatment and gingival health

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ABSTRACT:

Abstract

Background: The current study was carried out to determine how orthodontic therapy and gingival health are related. **Material and methods:** The study involved 100 people, comprising 40 boys as well as 60 girls. The researchers looked at the patients' medical records and took note of their ages, length of treatment, and type of orthodontic therapy. The incisor angles on the lateral cephalometric films were evaluated both before and after the orthodontic therapy, and they also looked at intraoral photographs, noted whether or not there was visible plaque, inflammation, or gingival recession. **Results:** Patients treated with functional appliances both before and after treatment did not show any appreciable differences, according to the study. However, there was a considerable rise in visible plaque, inflammation, and gingival recession in patients who received fixed orthodontic gear after treatment. The gingival biotype did not significantly differ from one another. In patients who got fixed appliances and extractions, the study discovered a strong link between the position of the lower incisors and gingival recession. Additionally, among all teeth, cuspids exhibited the highest rate of gingival recession. **Conclusion:** It was found that throughout orthodontic treatment, the average levels of visible plaque and visible inflammation dramatically increased. Therefore, before starting orthodontic treatment, patients should have great periodontal health, and they should maintain it throughout the process. Additionally, a link was found between lower incisor retraction and gingival recession. Thus, during orthodontic treatment, lower incisor inclination shift should be evaluated with more controlled prospective research in order to prevent adverse effects. Given the link between orthodontic therapy and gingival health, patients, orthodontists, and periodontists should work together during orthodontic therapy.

Keywords: Gingival health, orthodontic treatment.

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INTRODUCTION

Restorative and periodontal needs may be the requirements of an adult patient receiving orthodontic treatment, and hence, it necessitates a multidisciplinary interaction for better treatment outcome. The role of an orthodontist may become of prime importance in patients suffering from pathologic tooth migrations and other related abnormalities. Orthodontic treatment can initiate improvement in dental esthetics by multiple

means such as correcting the erroneous position of jaws, correcting the abnormalities of teeth, and also by facilitating an environment for better gingival health.¹⁻³

It must be emphasized that the prime components of fixed orthodontic treatments decrease the self-cleansing ability of the tongue and the cheeks leading to an increase in production of bacterial plaque and thereby changing the qualitative and quantitative

profile of the microbial flora. This change in the bacterial flora may just be a transitory effect and depends entirely on the status of oral hygiene maintenance. A reduction in the occlusal trauma and ease of plaque removal may be facilitated by aligning the teeth.⁴⁻⁶

Although, orthodontic treatment improves dental and skeletal problems, placement of an orthodontic appliance in a patient's mouth is often associated with alterations in the oral hygiene habits and periodontal health.⁷ Orthodontic appliances, as well as mechanical procedures, are prone to evoke local soft tissue responses in the gingiva. The proximity of orthodontic appliances to the gingival sulcus, plaque accumulation, and the impediments they pose to oral hygiene habits further complicate the process of efficient salutary orthodontic care.⁸

The aim of this retrospective study was to evaluate the relationship between orthodontic therapy and gingival health.

Material and methods

In total, 100 volunteers were eligible to take part in this study. Patients with incomplete records were not eligible. Participants in this study who were under the age of 18 were included. The study excluded participants who had undergone orthognathic surgery, had cleft lip and palate, or were taking medication. The periodontal health, including gingival biotype, gingival recession, visible plaque, and visible inflammation, was assessed on intraoral photographs. The study included intraoral photographs of the buccal side of anterior teeth taken prior to and following treatment to assess gingival biotype. The gingival texture and capillary transparency were visually inspected to determine if the gingival biotype was thin or thick. If the lower lip obscured the gingiva in the frontal view or the images were hazy, the recording was deemed incomprehensible. Cephalometric films and intraoral clinical images were examined by a trained periodontist and an expert orthodontist, respectively. To test for interexaminer consistency, examiners tested the parameters again in the same patients ten days after the initial evaluation of 30 patients: There was a lot of consistency between testing. The data from all variables were entered using the statistical program SPSS Base 15.0.

While the Student's t-test was used to look at differences in arithmetic means, the Mann-Whitney U-test was used to look at significant differences between groups in terms of median values. To analyse nominal variables, the Fisher's exact test or Pearson's Chi-square were employed.

Results

A total of 100 patients (60 girls and 40 boys) fulfilled the criteria to be included in the study. The average chronological age of the group was 13.65 years. In total 79 patients had been treated with fixed orthodontic appliances (11 of these with extraction and 68 of these

without extraction) and 21 patients had been treated with functional appliances.

Table 1: gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Males	40	40%
Females	60	60%
Total	100	100%

Table 2: orthodontic treatment

Orthodontic treatment	Number of subjects	Percentage
Fixed orthodontic treatment	79	79%
Functional appliances	21	21%
Total	100	100%

Although there were no statistically significant differences in the therapy groups according to patient gender, there were in the treatment groups according to patient age and length of treatment.

In patients treated with fixed orthodontic appliances, the mean value of visible plaque, visible inflammation, and gingival recession were 2.63 ± 5.77 , 2.41 ± 5.23 , and 0.67 ± 0.21 before treatment, respectively. All these parameters showed significant increases after treatment, and they were 4.84 ± 10.21 , 14.36 ± 16.45 , and 0.83 ± 1.47 , respectively. Patients treated with functional appliances both before and after treatment did not show any statistically significant differences. Similar to this, there were no discernible variations between gingival biotype before and after orthodontic treatment. These variables did not significantly differ between boys and girls.

Of 79 patients, which had been treated with fixed orthodontic appliances; 68 of them had been treated without extraction and 11 of them with extraction. In both groups visible plaque, visible inflammation and gingival recession parameters showed statistically significant increases during orthodontic treatment. In the non-extraction group, the mean value of visible plaque, visible inflammation, and gingival recession were 2.12 ± 6.74 , 1.23 ± 5.21 , 0.83 ± 0.67 before treatment and 4.17 ± 8.77 , 16.44 ± 19.73 , 0.99 ± 0.66 after treatment, respectively. In the extraction group, the mean value of visible plaque, visible inflammation, and gingival recession were 2.07 ± 3.48 , 2.44 ± 5.23 , 0.07 ± 0.33 before treatment and 7.57 ± 8.45 , 16.36 ± 14.15 , 0.57 ± 1.54 after treatment, respectively.

Gingival recession was also evaluated on tooth groups (incisors, cuspids, bicuspid and molars). For this purpose, 600 teeth (100 mandibular incisor, 100 maxillary incisor, 50 mandibular cuspid, 50 maxillary cuspid, 100 mandibular bicuspid, 100 maxillary bicuspid, 50 mandibular first molar and 50 maxillary first molar) in non-extraction group and 250 teeth (50 mandibular incisor, 50 maxillary incisor, 25

mandibular cuspid, 25 maxillary cuspid, 25 mandibular bicuspid, 25 maxillary bicuspid, 25 mandibular first molar and 25 maxillary first molar) in extraction group (totally 850 teeth) were evaluated in respect to gingival recession. In patients treated with extraction and non-extraction groups, gingival recession was found in 20 teeth before treatment and 9 teeth after treatment, and 25 teeth before treatment and 19 teeth after treatment, respectively. When the data were analysed according to the tooth type, the cuspids were the most affected teeth.

Discussion

Young patients referred for orthodontic treatment often suffer from plaque related gingivitis. Many dentists are reluctant to refer adult patients for orthodontic treatment if they have suffered, or are suffering from, obvious signs of periodontal disease such as chronic periodontitis. Most humans suffer from periodontal disease at some time in their lives. The severity of the disease varies widely. Nearly all fixed orthodontic appliance patients will get gingivitis at some point during their treatment.⁹ Gingival enlargement and inflammation are often transient and resolves within weeks of debond.¹⁰ It has been suggested that the contemporary use of bonded rather than banded orthodontic appliances bonds may result in less gingivitis.¹¹ Fixed orthodontic appliances cause an increase in all bacterial counts⁴ around the bracket and band's ecosystem.¹² There is a decrease in facultative anaerobes and an increase in anaerobic rods, spirochaetes and other motile organisms. Adolescents have certainly been shown to suffer worse gingivitis than adults during orthodontic treatment. Interceptive treatment such as the correction of lower incisors in cross-bite has been found to improve periodontal health.¹³

Hence, the present study was undertaken for assessing the effect of fixed orthodontic treatment on gingival health.

Boke et al¹⁴ evaluated the relationship between orthodontic treatment and gingival health. A total of 251 patients among whom 177 were girls and 74 were boys, recruited from the records pool of the Department of Orthodontics, Faculty of Dentistry, University of Gazi, were included in the study. Patients' treatments have been completed by postgraduate students during the period between 2006 and 2012. 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.

Zanatta et al.¹⁵ investigated the presence of any association between GE, periodontal conditions, and sociodemographic variables in patients receiving fixed orthodontic treatment. A total of 330 patients were evaluated who were receiving fixed orthodontic treatment for at least 6-month duration. Their samples were evaluated by a single calibrated examiner to calculate plaque and gingival indexes, probing pocket depth, clinical attachment loss, and GE. Oral interviews were carried out to investigate socioeconomic background, duration of orthodontic treatment, and use of dental floss. An increase in the prevalence of GE was attributed to the presence of gingival bleeding and excess resin around brackets. Higher levels of anterior GE in patients receiving orthodontic treatment were shown to have an association with proximal anterior gingival bleeding and excess resin around brackets.

Conclusion

It was found that throughout orthodontic treatment, the average levels of visible plaque and visible inflammation dramatically increased. Therefore, before starting orthodontic treatment, patients should have great periodontal health, and they should maintain it throughout the process. Additionally, a link was found between lower incisor retraction and gingival recession. Thus, during orthodontic treatment, lower incisor inclination shift should be evaluated with more controlled prospective research in order to prevent adverse effects. Given the link between orthodontic therapy and gingival health, patients, orthodontists, and periodontists should work together during orthodontic therapy.

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