



Orthodontic treatment and gingival health

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Abstract

Background: The aim of the current research was to assess the relationship between orthodontic treatment and gingival health.

Material and methods: There were 100 participants in the study, including 30 boys and 70 girls. Based on the patients' ages, length of treatment, and kind of orthodontic care, the researchers examined their medical records. They also looked at intraoral pictures, noted whether or not there was obvious plaque, inflammation, or gingival recession, and assessed the incisor angles on lateral cephalometric films before and after the orthodontic therapy.

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: The average levels of visible plaque and visible inflammation increased significantly while receiving orthodontic treatment, it was determined. As a result, patients should have excellent periodontal health before beginning orthodontic treatment, and they should keep it up during it. Additionally, a direct association between gingival recession and lower incisor retraction was discovered. Therefore, in order to avoid negative side effects, lower incisor inclination shift should be assessed with more controlled prospective investigations throughout orthodontic treatment. Patients, orthodontists, and periodontists should collaborate during orthodontic therapy in light of the connection between orthodontic treatment and gingival health.

Keywords: Gingival health, orthodontic treatment.

Introduction

Periodontic-orthodontic interrelationship has been subject to a lot of investigation until today, and it is a still controversial issue.¹ Malocclusion has been shown to affect periodontal health and one of the objectives of orthodontic treatment is to promote better dental health and prolong the life of dentition. Orthodontic treatment contributes to better oral hygiene by correcting dental irregularities and reduces or eliminates occlusal trauma.² 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 centred in the alveolar housing and occluding correctly may promote a healthier periodontium.³

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.⁴ 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.⁵

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

Material and methods

100 participants in all met the requirements to be included in this study. Patients whose records were incomplete were disqualified. This study involved participants who were under the age of 18. People who had orthognathic surgery, cleft lip and palate, or were on medication were not included in the study. On intra-oral photos, the periodontal condition, including visible plaque, visible inflammation, gingival biotype, and gingival recession, was evaluated. Pre- and post-treatment intraoral pictures of the buccal side of anterior teeth were utilised in the study to evaluate gingival biotype.

To establish whether the gingival biotype was thin or thick, the researchers visually examined the gingival texture and capillary transparency. The recording was ruled unintelligible if the gingiva in the frontal view was hidden by the lower lip or if the pictures were blurry. One skilled periodontist and one skilled orthodontist each analysed cephalometric films and intraoral clinical pictures. Examiners evaluated the parameters in 30 patients initially, then remeasured them in the same patients ten days later to test for interexaminer consistency: There was considerable agreement between tests. The statistical software SPSS Base 15.0 was used to enter the data from all variables. The Mann-Whitney U-test was used to examine significant differences between groups in terms of median values, while the Student's t-test was employed to examine differences in arithmetic means. The Fisher's exact test or Pearson's Chi-square were used to analyse nominal variables.

Results

A total of 100 patients (70 girls and 30 boys) fulfilled the criteria to be included in the study. The average chronological age of the group was 12.29 ± 3.08 years. In total 60 patients had been treated with fixed orthodontic appliances (20 of these with extraction and 40 of these without extraction) and 40 patients had been treated with functional appliances.

Table 1: gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Males	30	30%
Females	70	70%
Total	100	100%

Table 2: orthodontic treatment

Orthodontic treatment	Number of subjects	Percentage
Fixed orthodontic treatment	60	60%
Functional appliances	40	40%
Total	100	100%

Although gender difference of the patients did not show any statistically differences among the treatment groups, age and treatment time showed statistically differences.

In patients treated with fixed orthodontic appliances, the mean value of visible plaque, visible inflammation, and gingival recession were 2.95 ± 6.77 , 2.76 ± 6.23 , and 0.11 ± 0.45 before treatment, respectively. All these parameters showed significant increases after treatment, and they were 5.94 ± 9.07 , 17.76 ± 18.75 , and 0.47 ± 1.12 , respectively. No statistically significant difference was found in patients treated with functional appliances before and after treatment. Similarly, gingival biotype did not show any significant differences before and after orthodontic treatment. None of these parameters showed significant change between girls and boys.

Of 60 patients, which had been treated with fixed orthodontic appliances; 40 of them had been treated without extraction and 20 of them with extraction. In both groups visible plaque, visible inflammation and gingival recession parameters showed statistically significant increases during orthodontic treatment. In the nonextraction group, the mean value of visible plaque, visible inflammation, and gingival recession were 3.22 ± 7.57 , 2.88 ± 6.52 , 0.12 ± 0.44 before treatment and 5.37 ± 9.26 , 18.22 ± 20.07 , 0.44 ± 0.97 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, 4500 teeth (750 mandibular incisor, 750 maxillary incisor, 375 mandibular cuspid, 375 maxillarycuspid, 750 mandibular bicuspid, 750 maxillary bicuspid, 375 mandibular first molar and 375 maxillary first molar) in nonextraction group and 1200 teeth (240 mandibular incisor, 240 maxillary incisor, 120 mandibular cuspid, 120 maxillarycuspid, 120 mandibular bicuspid, 120 maxillary bicuspid, 120 mandibular first molar and 120 maxillary first molar) in extraction group (totally 5700 teeth) were evaluated in respect to gingival recession. In patients treated with extraction and nonextraction groups,

gingival recession was found in 10(0.83%) teeth before treatment and 30(2.5%) teeth after treatment, and 25 teeth (0.55%) before treatment and 75 teeth (1.66%) after treatment, respectively. When the data were analyzed according to the tooth type, the cuspids were the most affected teeth.

Discussion

Orthodontic treatment not only corrects the abnormal alignment dentition but also helps to correct the dentoskeletal relationship. This in turn leads to improvement in mastication, speech, and facial esthetics. These further results in a better quality of life. Certain risks and unwanted results accompany orthodontic therapy just similar to any other treatment modality. In contrast with surgical and nonsurgical modalities, the risk and complication linked to orthodontic treatment are significantly lower.⁶⁻⁸ However, both local and systemic complications are frequently associated with orthodontic treatment. A few of them may be in the form of discoloration of teeth/tooth, decalcifications, resorption of root, complications with the periodontal structures supporting the tooth, psychological disturbances, etc., One of the most common complications of orthodontic therapy may be in the form of gingival enlargement (GE) which may predispose to the development of pseudopockets and loss of attachment. These things may severely affect the quality of the patient's life if the anterior region is involved.⁹ Hence, the present study was undertaken for assessing the effect of fixed orthodontic treatment on gingival health.

Zanatta et al.¹⁰ 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

The average levels of visible plaque and visible inflammation increased significantly while receiving orthodontic treatment, it was determined. As a result, patients should have excellent periodontal health before beginning orthodontic treatment, and they should keep it up during it. Additionally, a direct association between gingival recession and lower incisor retraction was discovered. Therefore, in order to avoid negative side effects, lower incisor inclination shift should be assessed with more controlled prospective investigations throughout orthodontic treatment. Patients, orthodontists, and periodontists should collaborate during orthodontic therapy in light of the connection between orthodontic treatment and gingival health.

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