

Effect of Periodontal Treatment of Patient with Orthodontic Fix Appliance- long Term Follow-up, Case Report

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Abstract

The chronic gingival inflammation caused by the accumulation of plaque around orthodontic brackets can lead to several different outcomes, such as gingival recession, attachment loss and inflammatory hyperplasia. We report a periodontal clinical management, over a period of 4 years, of a young female patient with gingival enlargement.

The orthodontic appliances often inhibits proper oral hygiene maintenance by the patient and therefore greater plaque accumulation. The development and severity of gingivitis will may depend from quantity and quality of dental plaque, immune response, morphological differences in the periodontium, etc. Gingival enlargement is one of the most tissue problems associated with fixed orthodontic appliances. Gingivectomy procedure followed up by pocket elimination and the recontouring of the diseased gingiva after 4 years, remains with no gingival sings.

The importance of appropriate periodontal treatment and plaque control interval for the patient is crucial to prevent destructive alveolar bone loss.

Case Report (J Int Dent Med Res 2020; 13(2): 351-354)

Keywords: Periodontal treatment, orthodontic fix appliance, long term follow-up.

Received date: 15 December 2019

Accept date: 10 February 2020

Introduction

Gingival inflammation is usually attributed to bacterial-induced gingivitis. The modification of plaque -induced gingivitis can occur by local or systemic factors. Epidemiologic data have shown plaque-induced gingivitis to be prevalent at all ages in dentate populations¹⁻⁷.

The plaque-induced gingivitis progresses to more established forms of this disease, clinical signs and symptoms become obvious. Plaque-induced gingivitis begins at the gingival margin and may spread throughout the remaining gingival unit. The common clinical signs of plaque-induced gingivitis involve erythema, edema, bleeding, tenderness, and enlargement^{8,9}.

The severity of plaque-induced gingivitis can be influenced by factors that modify the inflammatory status of gingiva. The local factors include tooth anatomic factors, dental

restorations and appliances, root fractures and cervical root resorption¹⁰.

Systemic factors include: Sex steroid hormones: puberty, menstrual cycle, pregnancy, oral contraceptives; Hyperglycemia; Leukemia; Smoking and Malnutrition¹¹.

Gingival overgrowth is a very common condition in the orthodontic population that is characterized by gingival enlargement possibly resulting in pseudo-pocketing with or without attachment loss¹².

Placement of an orthodontic appliance in a patient's mouth is often associated with alterations in the oral hygiene habits and periodontal health. The appliances attached for the orthodontic treatment inhibits proper oral hygiene maintenance by the patient and therefore greater plaque accumulation^{13, 14, 15}. As plaque accumulates, the subgingival microflora changes from a more benign Gram-positive cocci culture to a pathogenic Gram-negative rod and spirochete culture¹⁶.

Non-surgical therapy eliminates microbial film, reduce inflammation of the periodontium and leads to clinical changes. Pseudo pockets created by the hyperplastic inflammatory changes in the gingival tissue need to be

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corrected with soft tissue gingivectomy.

This report presents the periodontal clinical management, over a period of 4 years, of a young female patient with gingival enlargement. The patient gave written informed consent and the case had been reviewed and approved by the University Dentistry Clinical Center of Kosovo Joint Ethics Committee.

Case Report

A case of a 15-year-old-female presenting with maxillary chronic inflammatory gingival enlargement associated with prolonged orthodontic therapy. The assessment of the patient history involved chief complaint, social and family history, dental history, oral hygiene habits, smoking history and medical history and medications. Clinical examination revealed redness and swelling of the gingiva and increased tendency to bleeding. The periodontal parameters were obtained prior to intervention. In radiography of the patient was not recognized alveolar bone loss(Figure 1,2).



Figure 1. Preoperative view, gingival hyperplasia prior to periodontal surgery.



Figure 2. Postoperative view after 7 days.

Periodontal pocket management was followed with supra/subgingival debridement and oral hygiene instruction. After the re-evaluation, the pocket elimination was performed with external bevel scalpel gingivectomy combined with Low Level Laser Therapy (LLLT). Prior to surgery, patient was asked to rinse with a Chlorhexidine gluconate oral rinse for 30 seconds. Local anesthetics was administrated. The bleeding points on the buccal surfaces of the upper anterior teeth marked the base of pockets. A postoperative dressing was applied.

No recurrence of gingival enlargement at the end of 4 years follow-up was observed.

The patient was in supportive periodontal care and appeared for follow-up appointments at 1 week, 1 month, 6 months, 1 year and 3 years after surgery.

Re-evaluation of the clinical response to surgical therapy showed decrease in probing pocket depth, gingival index with significantly improvement after 4 years post operatively.

Non-surgical management of gingival enlargement has shown effects in reducing gingival enlargement by eliminating its inflammatory component. Gingival overgrowth was managed by adjunctive antimicrobial oral rinses with chlorhexidine gluconate. All this procedure reduced the risk of postoperative infection and the risk of recurrence.

Due to mild gingival enlargement the gingivectomy procedure was followed up by resection of the excess tissue, pocket elimination and restoration of tissue contour and function.

There was no recurrence of the gingival enlargement in the maxillary anterior sextant (Figure 3), and the re-contouring of the diseased gingiva after 4 years, remains with no gingival signs.



Figure 3. After 4 years periodontal follow up case presentation.

Discussion

Orthodontic treatment with fixed appliances with brackets and archwires creates plaque retention sites and thus increases a patient's risk of developing tooth decay and plaque-induced gingivitis. In addition, the majority of patients undergoing orthodontic treatment are teenagers. This may also enhance the risk of poor compliance regarding plaque control and prevention¹⁷.

Gingival inflammation and gingival bleeding will increase in children at pubertal age as a result of the hormone changes that occur during puberty¹⁸.

The effects seen clinically following the insertion of orthodontic appliances into the oral cavity can contribute to chronic infection, inflammatory hyperplasia, attachment loss and gingival recession. The accumulation of microorganisms around teeth can cause gingival redness, bleeding, and edema; changes in gingival morphology; reduced tissue adaptation to the teeth; an increase in the flow of gingival crevicular fluid; and other clinical signs of inflammation¹⁹.

With gingivectomy the surgical excision of unsupported gingival tissue to the level where it is attached, creates a new gingival margin apical in position to the old. Anatomical crown becomes exposed and pseudopockets are also eliminated, creating a better environment for periodontal health^{20,21}. Before receiving orthodontic treatment, the periodontal health of the patient should be the highest possible level and this has to be maintained during the treatment^{22,23}.

Therefore, determining the appropriate plaque control interval for the patient is crucial to prevent destructive alveolar bone loss. Enlarged gingival tissue harbors dentobacterial plaque, and the deeper pseudo-pocket acts as a reservoir for retention of subgingival plaque. Pseudo-pockets or gingival overgrowth or enlargement of the gingival margin and papilla, are exacerbated by poor oral hygiene. Constant periodontal care is necessary²⁴.

The location and shape of the gingival margins of the maxillary anterior teeth plays an important role in maximizing the esthetic appearance of those teeth and contributes significantly to the esthetics of a smile^{25,26,27}.

Conclusions

The successful outcomes of orthodontic treatment are influenced by the patient's periodontal status before, during, and after active orthodontic therapy. Control of gingival inflammation is essential for the primary prevention of periodontitis. Increased inflammation should be reduced to a minimum before fixed appliances are placed. Imperative for maintaining periodontal health is patient motivation and oral hygiene practices, followed up by interdisciplinary specialist cooperation.

Declaration of Interest

The authors report no conflict of interest and the article is not funded or supported by any research grant.

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