Treatment of Periodontally Compromised Teeth using Adjunctive Orthodontic Therapy: A Multidisciplinary Approach

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CASE REPORT

ABSTRACT

Periodontal disease and its sequelae often lead to an unesthetic appearance and functional problems which may be also associated with restorative problems. Adult orthodontic therapy has a role in providing a complete rehabilitation in terms of both appearance and function with a satisfactory long-term prognosis, if the patient is reasonably motivated and responds well to the initial periodontal therapy. In this article, we have shown two case reports to aptly describe the benefits of adjunctive orthodontic treatment for restoration of esthetics as well as function in a compromised patient.

Keywords: Periodontics, Esthetics, Multidisciplinary treatment, Compromised teeth.


INTRODUCTION

Today with more and more emphasis on multidisciplinary approach for the complete rehabilitation of patients we are seeing an ever increase in periodontally compromised patients requiring adjunctive orthodontic treatment. The long-term successful outcome of orthodontic treatment in these patients is influenced by the patient’s periodontal status before, during and after active orthodontic therapy, which also includes post-treatment maintenance by the patient. Periodontal pathogenesis is a multifactorial etiologic process and it is imperative for us to recognize the clinical forms of inflammatory periodontal diseases. Cooperation between different specialties in dentistry is extremely important in establishing diagnosis as well as in treatment planning. The most commonly encountered problems in periodontally compromised patients are migration, extrusion, flaring of teeth or missing teeth which may further cause tipping of adjacent teeth. It is important for the clinician to differentiate between what is possible in an adult and to what extent the problem can be corrected.

Different types of tooth movements generate different force distributions. The force magnitude is often the only parameter to be considered by the operating clinician while treating periodontally compromised teeth. One of the most debatable movements in these patients is intrusion of teeth. Extrusion of teeth due to severe periodontal damage of teeth can be corrected by aligning them using light orthodontic forces. This may be called as “intrusion” but not “true intrusion”.1

The two case reports discussed here describe the benefits of using adjunctive orthodontic therapy, for unesthetic appearance due to extruded anterior teeth as a result of severe periodontal damage. The treatment outcome revealed a reduction in clinical crown length and better bone support of the intruded teeth and good esthetics.

CASE REPORTS

Case 1

A female aged 24 years, complained of migration of upper front teeth for the past 2 years. She complained of discoloration, mobility and compromised esthetics due to extrusion and slanting of left upper central incisor and extruded right upper central incisor. On examination, the patient was in good health and had no history of any medical problems. She had a history of trauma at 9 years of age in maxillary right central incisor and root canal treatment had been done for the same. On clinical examination (Fig. 1A), brownish discoloration was seen in that
tooth. Marginal and papillary gingival inflammation was seen in relation to maxillary central incisors and left lateral incisor. Grade II mobility was observed in the central incisors.

On periodontal examination, the maxillary central incisors were extruded and found to have deep pockets mesially and distally. A probing depth of 6 mm, 5 mm and 5 mm was found in relation with right central, left central and left lateral respectively. There was no evident pus discharge, though bleeding on probing was present.

Radiographic examination (Fig. 1B) revealed localized severe bone loss with deep angular bony defect associated with distal aspect of left central incisor and mesial aspect of right central incisor, horizontal bone loss in relation to left lateral and periodontal widening in relation to right central incisor. Periapical radiolucency was also seen in relation to the right lateral incisor.

The patient was advised root canal treatment in relation to the right lateral incisor followed by periodontal therapy. Initial treatment consisted of scaling, root planing and surgical curettage in relation to the centrals and left lateral incisors, followed by adjunctive orthodontic therapy. After the active periodontal treatment, 6 weeks of healing time was advised before commencement of orthodontic treatment. The probing pocket depth reduced to 4 mm in relation to mesial of right central incisor and 3 mm in relation to distal of left central and lateral incisors. No evidence of periodontal inflammation and bleeding on probing was observed.

Adjunctive orthodontic treatment was done using Begg appliance. The teeth were aligned using 0.014 NiTi wire sectionally engaged onto a 0.016 inch SS arch wire. The force levels were kept to a minimum so as to prevent further periodontal damage. It took 14 months to complete the orthodontic treatment where in the extrusion, axial inclination and the spacing were reasonably corrected (Fig. 1C).

Mobility reduced to grade I. Lingual bonded retainer was given to provide permanent retention until the completion of healing and new bone formation. Radiographic examination revealed good bone support in relation to the anteriors. The angular bony defect had considerably reduced. Periodontal widening was still evident in relation to right central incisor due to the orthodontic movement (Fig. 1D).

Case 2
A female aged 22 years reported with a complaint of migration and mobility of her front upper teeth. She had a history of pregnancy gingivitis 18 months back which was not treated. She was in good health and had no medical ailment.

On examination, teeth showed discoloration due to fluorosis (Fig. 2A). The central incisors were proclined, extruded and were rotated mesiolabially (Fig. 2C). An unesthetic black triangular space due to papillary recession was seen between the central incisors. Blunt papilla was observed between the centrals and left central and lateral incisors due to loss of contact. Grade II mobility and gingival recession (Fig. 2A) was observed in central incisors. Cementoenamel junction was exposed labially and lingually. Probing pocket depth was 3 mm in relation with the central incisors but loss of attachment was 5 mm on the distal and palatal surfaces and 3 mm on mesial and labial surfaces of all the incisors. No evidence of pus discharge.
Radiographic finding showed furcation involvement with angular bone defects in relation to maxillary and mandibular right first molar. Angular bone defects were also seen in right upper and lower second premolars (Fig 2E). Horizontal bone loss in relation to all the maxillary incisors and widening of periodontal ligament space in relation to the central incisors was seen. The periodontal treatment included scaling and root planning. Around 4 weeks of good oral hygiene maintenance and frequent recalls were followed by the orthodontic treatment.

Adjunct orthodontic treatment was done using preadjusted edgewise appliance. A 0.014 inch NiTi was used for initial alignment for minimal orthodontic force followed by 0.014 inch SS wire. Right maxillary first molar was not included in orthodontic treatment due to reduced periodontal support. The anchorage was derived from the second molar in the maxillary right quadrant. A good alignment (Fig. 2F) was achieved in 9 months and fixed lingual bonded retainer was given for retention. Acceptable esthetics was achieved by this adjunctive therapy.

**DISCUSSION**

The goal of orthodontic treatment is not only to improve facial esthetics and function but also to address the health of supporting structures and how teeth are placed in them. The inter-relationship between orthodontics and periodontics often resembles symbiosis. In many cases, periodontal health is improved by orthodontic tooth movement, whereas orthodontic tooth movement is often facilitated by periodontal therapy.

Elongated and spaced incisors are common problems in patients suffering from severe periodontal disease. Intrusion
increased periodontal breakdown. Orthodontic treatment of adults may not be associated with generalized attachment loss was very low. They concluded that even though the bone loss is more the risk of severe periodontal disease. Adult orthodontic patients are more likely to present with periodontal pockets than adolescents. Mean bone loss in adults not undergoing orthodontic therapy was found to be 0.07 to 0.11 mm. Bone loss for the average orthodontic patient was found to be 0.31 mm suggesting that adults have an increase in periodontal breakdown compared to adolescents. The gingiva moves in the same direction as that of tooth intrusion but it moves only by about 60%. Gingival sulcus gets deepened by about 40% of tooth intrusion.

The intrusion of periodontally damaged teeth is considered a logical approach in clinical practice. The concept has, however, been highly debatable among the clinicians. Bringing the teeth closer to the palatal bone may convert suprabony pockets to infrabony defects, thereby enhancing potential for reattachment of periodontium, if inflammation of the overlying tissue could be controlled. However, the outcome of this approach is highly dependent on the oral hygiene maintenance. Melsen et al (1989) found that incisor intrusion in adult patients with marginal bone loss had a beneficial effect where the post treatment radiographs showed positive bone remodeling. They also reported that a new connective tissue attachment can be formed during the intrusion of periodontally involved teeth, if gingival inflammation is eliminated and root surfaces are adequately scaled.

Since orthodontic movement of teeth into inflamed infrabony pockets may create an additional periodontal destruction, and because infrabony pockets are frequently found in teeth that have been tipped or elongated as a result of periodontal disease. It is essential that periodontal treatment with elimination of the plaque induced lesion be performed before the initiation of orthodontic treatment. Maintenance of excellent oral hygiene during the course of treatment is equally important.

Vardimon et al (2001) found that orthodontic tooth movement is a stimulating factor of bone apposition. Conversion in repair pattern was seen which supported the link between tooth movement and enhanced bone deposition. Clinical implication suggests incorporation of orthodontic tooth movement in regenerative therapy. Nelson and Artun (1997) found a close relation between age and cumulative loss of attachment. Adult orthodontic patients are more likely to present with periodontal pockets than adolescents. Mean bone loss in adults not undergoing orthodontic therapy was found to be 0.07 to 0.11 mm. Bone loss for the average orthodontic patient was found to be 0.31 mm suggesting that adults have an increase rate of periodontal breakdown. On further analysis, they found that even though the bone loss is more the risk of severe generalized attachment loss was very low. They concluded that orthodontic treatment of adults may not be associated with increased periodontal breakdown.

The finding that resorption comprised only the periodontal side of the alveolar bone indicates that a cone-shaped bone defect is created along with the intrusion, which according to some authors is conducive for reattachment procedure. Nanda et al (1996) studied the extent of root resorption due to intrusion. Results indicated that intrusion with low forces can be effective in reducing overbite while causing only a negligible amount of apical root resorption. McFadden et al (1989) found an average root shortening of 1.8 mm per tooth irrespective of the amount of intrusion.

Schwarz postulated that forces of about 25 gm/cm² equal to blood pressure of PDL terminal capillaries should be optimal for tooth movement, while larger forces would block PDL blood flow, leading to tissue necrosis at compressed areas. Hence, necrosis caused is not due to the direct destructive effect of large orthodontic force but rather to stagnation of blood supply to the area. Due to the low force of 10 to 25 gm that was used in the patients there were no detrimental effects in the pulp.

CONCLUSION

Intrusion constitutes a reliable therapeutic method in orthodontic treatment of adult patients with heavy periodontal condition. It can be concluded that intrusion of teeth with a reduced periodontium should only be carried out in patients with a healthy periodontium without pathologically increased pockets. In both patients, the treatment proved beneficial on the periodontal condition of the patients when judged at the clinical and radiographic levels. Acceptable esthetic was achieved which had a positive effect on their confidence levels. The treatment outcome also proved to be a good motivational factor to maintain good oral hygiene.

REFERENCES