A Case History Report on Use of Orthodontic Intrusion in a Partially Edentulous Patient

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This case history report highlights the possibilities and limitations of orthodontic molar intrusion using temporary anchorage devices (TADs) in the prosthodontic management of patients with compromised interarch distance. Int J Prosthodont 2018;31:540–542. doi: 10.11607/ijp.5380

Diverse adjunctive orthodontic, endodontic, and periodontic interventions may be recruited into routine prosthodontic strategies to ensure optimal treatment outcomes.1 Teeth are frequently orthodontically uprighted, extruded, or intruded, although the latter is regarded as particularly challenging. The recent incorporation of temporary anchorage devices (TADs) has advanced the scope and facility of teeth intrusion. This case history report illustrates the TAD technique’s scope for routine management of extruded teeth resulting from long-standing partial edentulism2 and serves to acknowledge the possibilities and limitations of orthodontic molar intrusions when limited interarch space is present.

Case History Report

A healthy 49-year-old female presented for treatment with missing mandibular molars and significantly overerupted opposing maxillary molars (Fig 1).

The following treatment options for acquiring adequate interarch space for placement of an implant-supported fixed prosthesis were presented to the patient, along with the advantages and disadvantages of each approach:

- Intrusion with orthodontic treatment using TADs followed by periodontal surgery
- Maximum molar height reduction accompanied by devitalization and alveoloplasty
- No prosthodontic intervention and accepting a shortened dental arch outcome

The patient chose the second option first, but after initial teeth reduction and before the devitalization of maxillary molars, changed her mind and chose the first option. The following treatment sequence was undertaken.

Orthodontic Phase

Four TADs (Dual Top Rocky Mountain Orthodontics, 1.4 × 8 mm) total were placed in the maxillary buccal dentoalveolar posterior bony area on both sides. TADs were loaded 1 month later using a closing elastic chain (E-chain, TP Orthodontic) on each side (Fig 2). Edgewise treatment was applied to the remaining maxillary teeth to move the molars with torque control to gain an adequate occlusal relationship with mandibular implants.

Apically positioned flap surgery (APF) was performed to remove accumulated gingival tissue generated during intrusion. This was done twice: at 10 months and at 18 months after the beginning of orthodontic treatment (Fig 3).

Prosthodontic Interventions

At 1 month after orthodontic treatment completion (21 months after implant placement), provisional crown restorations were placed and assessed in terms of occlusal considerations and access for hygiene maintenance. Eleven months later, final restorations using porcelain-fused metal crowns were placed and cemented (Fig 4). Cone beam computed tomography (CBCT) following orthodontic intrusion revealed root resorption and root proximity to other anatomical structures (Fig 5).

An 18-month period of preprosthetic orthodontic treatment with TADs and two periodontal surgicap procedures led to successful intrusion of the maxillary molars. Adequate space for placement of implants to support a fixed mandibular molar replacement prosthesis was achieved.
Discussion

Conventional treatment for similar situations necessitates reduction of maximal molar height, tooth devitalization, and alveoloplasty, which can result in significant damage to teeth and periodontal tissues. Use of TADs ensured a successful treatment outcome for this patient while preserving these tissues. Molar intrusion is one of the most difficult procedures to execute but is now made easier with TADs. However, difficulties are still encountered, such as controlling the forces of magnitude and direction.

CBCT evaluation revealed root apex resorption and proximity to other anatomical structures. Although it seems easy to achieve intrusion using TADs, teeth can be moved in an unpredicted direction due to molar root morphology and the surrounding bone configuration, with the risk of root resorption.3

Daimaruya et al4 reported that the root apices of intruded premolars penetrated the bony floor of the nasal cavity and that the nasal floor membrane was lifted into the nasal cavity. They also confirmed the effect of molar intrusion on the tooth root and the adjacent maxillary sinus floor in their animal experiments.

Since intrusion with TADs can be achieved in a relatively short period of time, pseudopockets and inflammation are likely to happen due to the attachment level of the tooth migrating rapidly in an apical direction.5 Thus, it is necessary to have definitive periodontal treatments after the intrusion.

Conclusion

Prior to prosthodontic intervention, the intrusion of extruded molars by orthodontic treatment with TADs can be successfully carried out without damaging existing teeth or bone structure. However, the accompanying risks of root resorption and resultant proximity to other structures should not be overlooked.
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References


