A Customized Appliance for Molar Uprighting and Space Regaining

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A djunctive orthodontic treatment is defined as tooth movement carried out to facilitate other dental procedures that may be required to control disease, restore function, or enhance appearance. As an example, an adult patient with a missing first molar is commonly treated by uprighting the adjacent second molar for eventual prosthetic replacement.1-5

Differential diagnosis, force selection, and appliance design are key factors in successful molar uprighting.6 Although early mechanics tended to cause molar extrusion or premolar intrusion, more recently developed springs can upright molars without these undesirable side effects.7,8

The need for simpler appliances to manage relatively limited adjunctive-orthodontic cases cannot be overemphasized. This article presents a quick and esthetic option for second-molar uprighting with a custom-designed space regainer.

Fig. 1 A. 25-year-old male patient with mesially tipped upper right second molar before treatment. B. After removal of lower left third molar.
Case Report

A 25-year-old male presented with an implant that had been placed two years earlier to replace a missing upper right first molar. No temporary restoration was done, and the patient had not seen his dentist since the implant procedure.

Radiographs confirmed complete osseointegration of the first-molar implant, but the implant was distally angulated and the second molar was tipping mesially into the space of the first molar (Fig. 1). There was inadequate space for placement of an abutment and molar crown.

The treatment plan was to remove the mesially impacted upper right third molar and upright the second molar with a customized space regainer.

Begg buccal tubes were soldered to both sides of a second-molar band (Fig. 2A). An .028" stainless steel round wire was used to make a framework that could slide through the molar tubes, with an arm on each side adapted mesiodistally from the first premolar to the molar band. These two arms were soldered to a buccolingual wire crossing distal to the second premolar. A 13mm-long nickel titanium open-coil spring (1.25 times as long as the required space) was slid over each arm distal to the buccolingual wire. Coil springs were placed on both both sides to avoid mesiodistal rotation and permit only distal movement. On the buccal side, the arm was extended 3mm beyond the molar tube and bent back to prevent overcorrection and distal tipping of the molar (Fig. 2B). The second-molar band was then cemented in the mouth (Fig. 2C).

Patient compliance was excellent because the appliance was invisible and fewer visits were required. No appliance breakage or occlusal interfer-

Fig. 2 Fabrication and placement of molar-uprighting appliance. A. Begg buccal tubes soldered to buccal and lingual sides of second-molar band; nickel titanium open-coil springs slid over .028" stainless steel wire arms. B. Distal end of buccal wire arm extended 3mm distal to buccal molar tube and bent back to prevent overcorrection and distal tipping. C. Appliance cemented to second molar.
ence was experienced. After four months of treatment, records showed 3mm of second-molar uprighting (Fig. 3A). The appliance was kept passively in place for another three months before prosthetic treatment. Although the quality of the restoration was still compromised due to faulty implant angulation (Fig. 3B), the space was regained and the occlusion well restored.

Discussion

Adjunctive orthodontic treatment should be simple, esthetic, and user-friendly. The appliance shown here is easy and inexpensive to fabricate in the office. Harnessing the mechanical properties of a nickel titanium coil spring to deliver a light, constant force, it requires little reactivation to achieve as much as 3mm of correction. Treatment time is relatively short—three to six months—and the side effects of extrusion, rotation, and overcorrection associated with other uprighting appliances are avoided. The rigid .028" wire resists breakage and provides a counterclockwise moment to prevent distal tipping and allow only uprighting and bodily distal movement. Chairtime is minimal, and no occlusal recontouring is required.

This customized molar-uprighting appliance is recommended for patients with mild-to-moderate distal molar tipping and some premolar spacing. It may require modification in cases with more severely tipped molars.

REFERENCES