

Uprighting Mesially Impacted Second Molars with Miniscrew Anchorage

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Although mesial impaction of a mandibular second molar is relatively rare, with a prevalence of about .3%,^{1,2} it can present a difficult clinical problem. The orthodontist usually needs to upright the molar as soon as possible to avoid complications such as dental caries or root resorption of the adjacent first molar.

With the widespread availability of skeletal anchorage, procedures such as extraction and surgical uprighting of impacted second molars^{3,4} are gradually being replaced by simple orthodontic techniques.⁵⁻⁹ Most of the methods that use miniscrew anchorage, however, apply distal forces directly to the impacted teeth.⁹ Such methods have three major disadvantages: they are uncomfortable for the patient, the effectiveness of their mechanics is relatively low because of the short force span, and they can rarely be applied in the maxillary arch.

*Orlus orthodontic mini-implant, Ortholution, 207 Dunchon B/D., #416-1, Seongnae-dong, Gangdong-gu, Seoul 134-844, Korea; www.ortholution.com.

**Trademark of Bisco, Inc., 1100 W. Irving Park Road, Schaumburg, IL 60193; www.bisco.com.

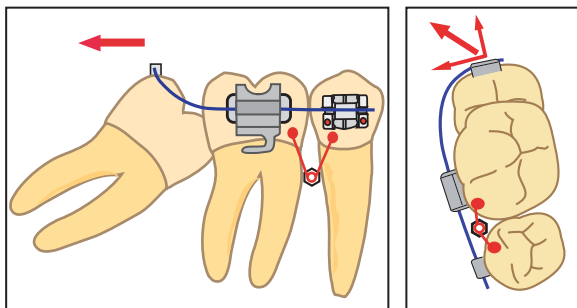


Fig. 1 Miniscrew anchored to first molar and second premolar with .016" x .022" stainless steel wire; .016" superelastic nickel titanium wire engaged between brackets on anchor teeth and bracket on disto-occlusal surface of impacted second molar. Distal and rotational forces upright second molar while moving crown distally and buccally.

This article presents a simple and effective alternative for molar uprighting, using indirect skeletal anchorage, that can be applied in either arch.

Procedure

1. Insert an appropriate miniscrew* between the roots of two teeth adjacent to the impacted second molar (Fig. 1). Attach an .016" x .022" stainless steel wire between the miniscrew and the crowns of these anchor teeth, using Light-Core** composite. Bond a bracket to the disto-occlusal surface of the second molar, and engage an .016" superelastic nickel titanium wire between that bracket and the ones on the adjacent anchor teeth. This will provide simultaneous distal and rotational forces that will upright the second molar while moving its crown distally and buccally.
2. Once the second molar has been sufficiently uprighted, rebond the bracket to the buccal surface, and engage an .016" x .022" superelastic nickel titanium wire and an open-coil spring (Fig. 2). (If the impaction is mild enough to allow this configuration at the outset, the previous step may

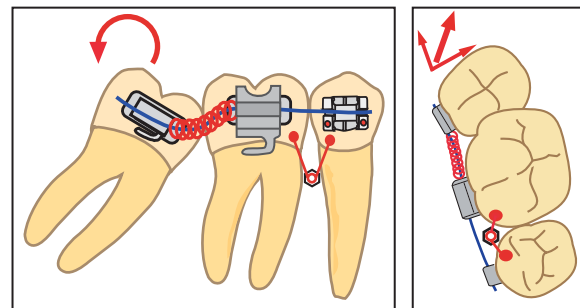


Fig. 2 .016" x .022" superelastic nickel titanium wire and open-coil spring engaged between brackets on anchor teeth and bracket on buccal surface of impacted second molar. Distal force and counterclockwise moment upright second molar while moving roots mesially.

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be omitted.) A distal force and counterclockwise moment will be applied, so that the second molar will be uprighted while its roots are moved mesially. When the molar is in proper position, it can be incorporated into a continuous archwire.

Case Report

A 17-year-old female presented with mild crowding and impacted maxillary left and mandibu-

lar left and right second molars (Fig. 3).

The maxillary left second molar was severely locked, with only a small portion of its crown exposed. Since the first molar was tipped distally, the first and second premolars were used as the anchor teeth (Fig. 4). A miniscrew was inserted and tied to these teeth with .016" × .022" stainless steel wire. Once the second molar was upright, a bracket was bonded to the adjacent first molar, and both molars were aligned. Because of the miniscrew

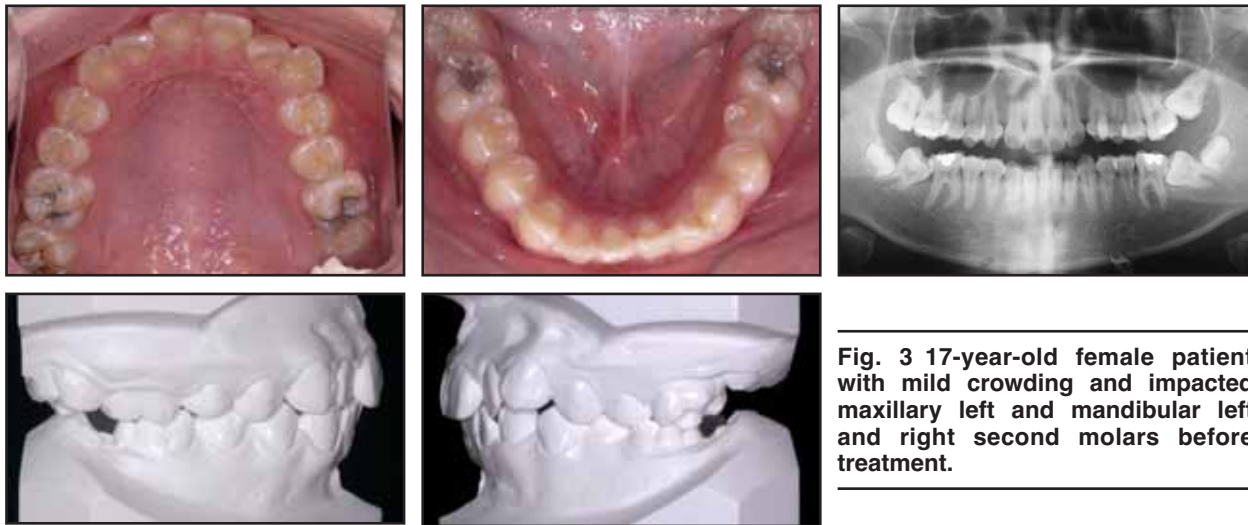


Fig. 3 17-year-old female patient with mild crowding and impacted maxillary left and mandibular left and right second molars before treatment.

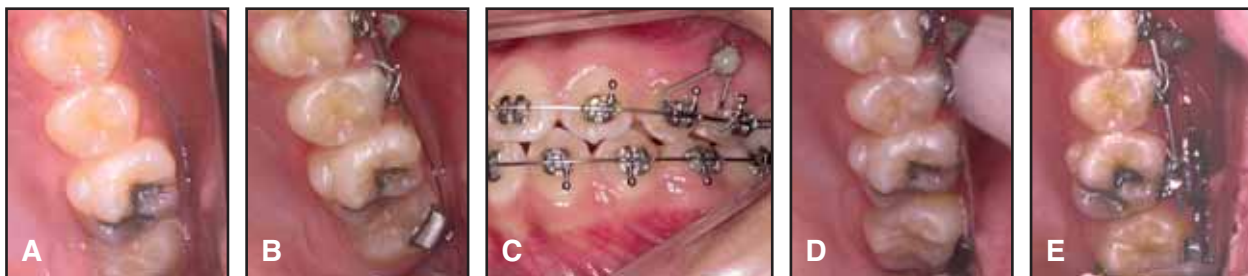


Fig. 4 Uprighting of impacted maxillary left second molar. A. Before treatment. B. Uprighting wire engaged with indirect miniscrew anchorage. C. Buccal bracket bonded after seven months of treatment. D. Six months later. E. Patient after completion of treatment.

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Fig. 5 Uprighting of impacted mandibular right second molar. A. Before treatment. B. Uprighting wire engaged with indirect miniscrew anchorage after seven months of treatment. C. Six months later.

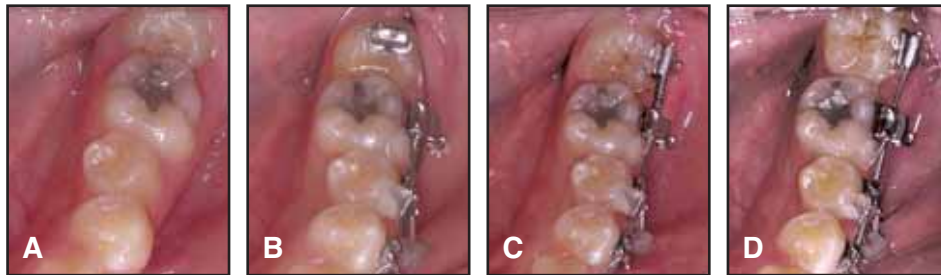


Fig. 6 Uprighting of impacted mandibular left second molar. A. Before treatment. B. Uprighting wire engaged with indirect miniscrew anchorage after 13 months of treatment. C. Six months later. D. Another three months later.

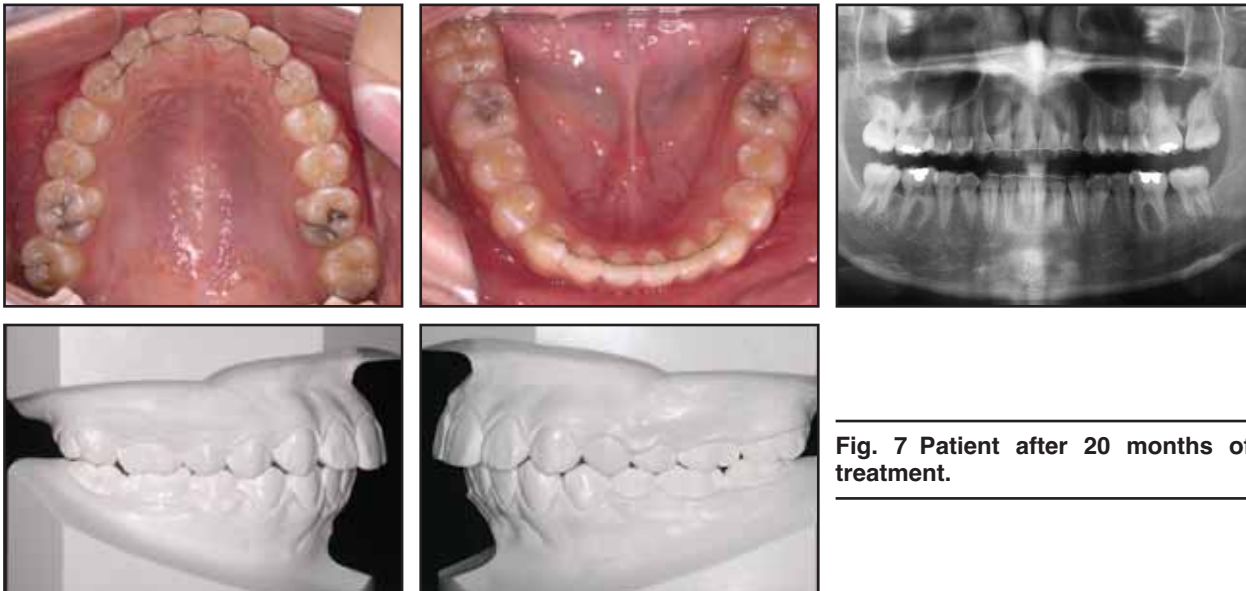


Fig. 7 Patient after 20 months of treatment.

anchorage, there were no unwanted side effects such as extrusion of the premolars.

The mandibular right second molar was only mildly impacted, allowing a bracket to be bonded immediately to its buccal surface. A miniscrew was placed between the mandibular right first and second premolars, which were anchored with .016" × .022" stainless steel wire. An .016" × .022" superelastic nickel titanium wire and open-coil spring were used to rapidly upright the second molar (Fig. 5).

The mandibular left second molar was more severely impacted. A miniscrew was inserted between the first and second premolars, and this molar was uprighted using the same procedure as for the maxillary left second molar. Complete uprighting required rebonding the brackets and changing the open-coil spring (Fig. 6).

After 20 months of treatment, the impacted teeth were in ideal positions with proper interdiggitation (Fig. 7). Healthy alveolar bone was visible around the teeth on the panoramic radiograph. Fixed retainers were bonded in both arches, and an upper wraparound retainer was also delivered.

Discussion

Because this treatment method was being used for the first time, the three impacted second molars were not uprighted simultaneously. After the success of the technique was confirmed with the maxillary left second molar, uprighting was begun in the mandibular arch. Although the total treatment time was 20 months, it took only three months to upright the mandibular right second molar and six months for the mandibular left second molar.

This case demonstrates that mesially impacted second molars can be uprighted easily and without side effects using indirect miniscrew anchorage and superelastic nickel titanium wires. As long as the brackets are repositioned appropriately during treatment, both crown and root movement will be efficient and precise, and patient discomfort will be minimized.

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