

Case Report

Uprighting of a semi-impacted mandibular second molar with microimplant anchorage

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ABSTRACT

A 13-year-old girl sought treatment for a semi-impacted mandibular second molar. The treatment choice selected was the use of a single microimplant placed in the retromolar area for distal force application followed by segmental mechanics to achieve final root angulation. After 9 months of treatment, correct second molar alignment and angulation was achieved without the need of full-arch fixed appliances.

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1. Introduction

The impaction of mandibular second molars is a rare dental anomaly, with a prevalence of only 0.3% in the general population [1,2]. Management of these situations can be complex due to anchorage requirements.

The presence of mesially inclined mandibular second molars can be related to arch-length discrepancy in the posterior segments [3], extraction of the adjacent first molar [4], premature third molar eruption [5] or unusual angulation of the erupting second molar [6,7]. If left untreated, problems including external root resorption [8], dental caries, or periodontal disease can affect the first and second molars.

Conventional treatment consisted of uprighting springs, but the development of microimplants allowed for a more accurate application of force to the partially impacted tooth. In this article we describe the use of a microimplant placed on the retromolar area to upright a mesially inclined mandibular second molar in a patient who had a previous orthodontic treatment.

2. Diagnosis and treatment plan

A 13-year-old female patient presented with a semierupted, mesially inclined mandibular right second molar. The patient had a previous nonextraction orthodontic treatment to alleviate a moderate crowding in both dental arches, resulting in an adequate



Fig. 1. Mesially inclined mandibular right second molar in contact with the adjacent third molar during the final stage of a previous nonextraction orthodontic treatment.

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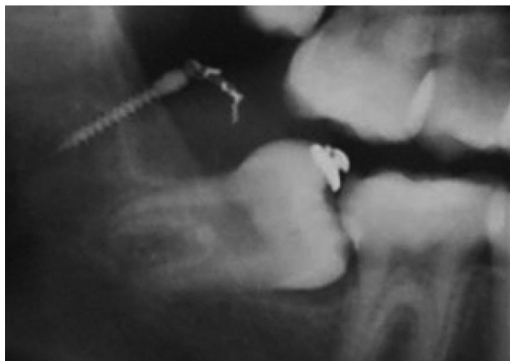
Fig. 2. Affected area 6 months after the extraction of the third molar. New bone formation has occurred in the retromolar area.

occlusion, except for the untreated partially impacted molar. A radiographic evaluation during the final stage of the previous orthodontic treatment revealed that the second molar's crown was locked behind the distal contour of the adjacent first molar and that the roots were in contact with the third molar bud (Fig. 1).

Due to the lack of space in the area, the new treatment plan for this patient involved the extraction of the third molar bud to enable the repositioning of the second molar, followed by the placement of a microimplant in the retromolar area for distal force application. After the initial molar uprighting, brackets and tubes would be placed on the affected quadrant for final alignment and angulation detailing.

3. Treatment progress

The extraction of the third molar bud was performed and treatment was delayed 6 months to allow new bone to form in the



area (Fig. 2). A single microimplant (AbsoAnchor System, Dentos Inc., Daegu, Korea) of 1.5 mm in diameter and 10 mm in length was then inserted directly in the retromolar area, and a 0.010-in steel ligature wire was extended outward for force application. There was no need for a flap or incision during microimplant placement. A button was bonded to the occlusal surface of the second molar and immediate loading was done applying 50 g of force with an elastomeric chain (Fig. 3).

After 3 months of subsequent activations, the second molar was unlocked. At this point, the occlusal attachment was interfering with the occlusion, and it was replaced by buccal and lingual buttons (Fig. 4). At a later stage, brackets and tubes were bonded in the posterior segment of the quadrant to improve the alignment and root angulation (Fig. 5). A total of 9 months of treatment was required to efficiently complete the uprighting of the semi-impacted mandibular right second molar (Fig. 6).

4. Discussion

The use of microimplants in the retromolar area can be beneficial for the treatment of semi-impacted mandibular second molars (Fig. 7). This simple technique allows distal application of force, which is our first choice for optimal biomechanical performance on these types of cases. We have also found this approach to be beneficial in multidisciplinary cases in which second molar uprighting is needed to enable an adequate prosthodontic restoration procedure. Another significant advantage is that it allows segmental instead of full-arch mechanics in cases such as this, and the total treatment time with fixed appliances can be minimized.

Acknowledgment

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Fig. 3. Microimplant placed in the retromolar area and activated with a 50-g application of force.

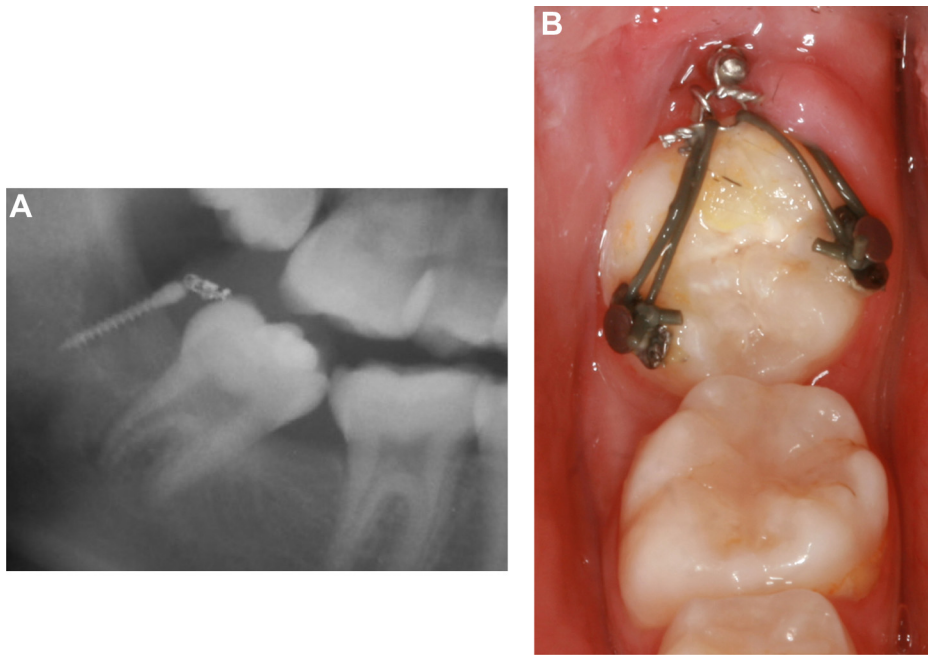


Fig. 4. (A) After 3 monthly activations, the occlusal button was interfering with the occlusion. (B) Buccal and lingual buttons placed to avoid occlusal interference.

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Fig. 5. Brackets and tubes placed on the lower right quadrant with the position of the second molar tube overcorrected to achieve adequate root angulation.



Fig. 6. Treatment completed after 9 months. Correct second molar angulation was accomplished.

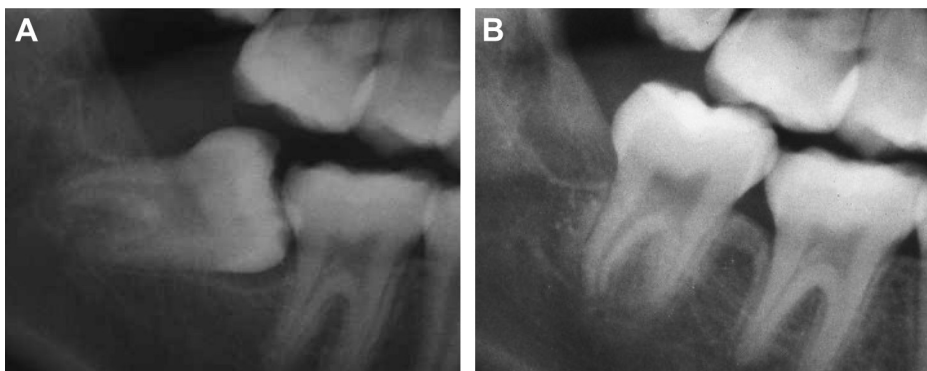


Fig. 7. Radiographic comparison showing the position of the mandibular right second molar at the beginning of treatment (A) and at the end of treatment (B).