

## Use of Nickel Titanium Coil Springs for Partially Impacted Second Molars

[ATA UMIT AKSOY, DDS, PHD](#)  
[SEMURE ARAS, DDS, PHD](#)

Mandibular second molar impaction is difficult to treat, and treatment is even more problematic if the molar is in an oblique or horizontal position, with the crown tilted mesially or toward the root of the mandibular first molar.

Self-correction of such a case is rare. Proposed treatment techniques have included:

- Attachment of uprighting springs to a second molar buccal tube.<sup>1</sup> This requires placement of a separator between the mandibular first and second molars, followed by surgical removal of the mucosal or bony barrier on the impacted molar.
- Surgical placement of separating wires.<sup>2</sup> This method is difficult to use, provides limited tooth movement, and can cause gingival problems.
- Use of Markley-type pins.<sup>2</sup> Placement and cementation of the pins and restoration of the pinholes are complicated.
- Cementation of a partial crown to the exposed part of the second molar, allowing tooth movement with springs.<sup>2</sup>
- Surgical uprighting of the second molar and splinting with autogenous bone grafts.<sup>3</sup>
- Surgical replacement of alveolar bone with cancellous bone to speed up correction of the impacted tooth's axial inclination.<sup>4</sup> This method has serious limitations, and the prognosis is not always positive.

We have developed a nonsurgical technique to erupt a partially impacted, obliquely tilted second molar, using a modified lingual arch and a nickel titanium coil spring.

### Diagnosis

An 11-year-old female presented with the complaint of anterior crowding. Clinical evaluation showed a well-balanced face and profile (Fig. 1). Model analysis showed an arch-length deficiency of 5.6mm in the maxilla and 5.0mm in the mandible, bilateral Class I molar and Class II canine relationships, and normal overjet and overbite.

Cephalometric analysis indicated a vertical growth pattern, harmonious maxillomandibular development, and upright central incisors. The upper lip was retrusive relative to the Ricketts E-line, but nicely curved and well related to the face.

Radiographic evaluation showed the presence of all four third molars and partial impaction of the mandibular left second molar in an oblique position.

### Treatment

In the first phase of treatment, a modified lingual arch and nickel titanium closed-coil spring were used to upright the impacted second molar (Fig. 2). A maxillary Hawley appliance was used simultaneously to open the bite. This process took three months (Figs. 3 and 4).

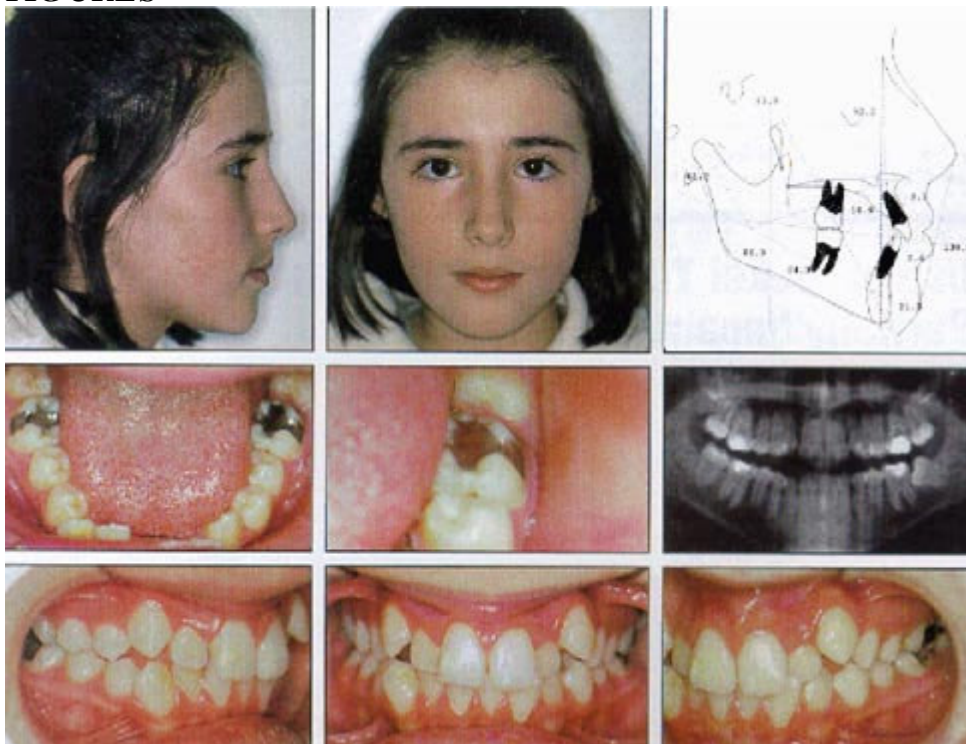
The four first molars were then banded, the anterior teeth were bonded, and the case was treated with fixed edgewise mechanics. After leveling, Class II and interarch box elastics were prescribed as necessary. Active treatment was completed in 24 months, and upper and lower removable Hawley retainers were placed.

## Results

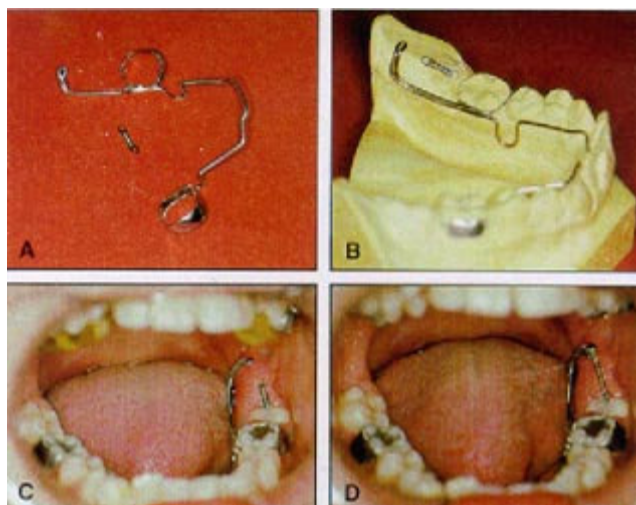
Post-treatment records showed a Class I occlusion and a well-aligned and interdigitated occlusion (Fig. 5). The gingival tissues were moderately hyperemic, but this condition should improve with more effective oral hygiene after removal of the fixed appliances.

Post-treatment radiographs showed the mandibular left second molar in a vertical position. □

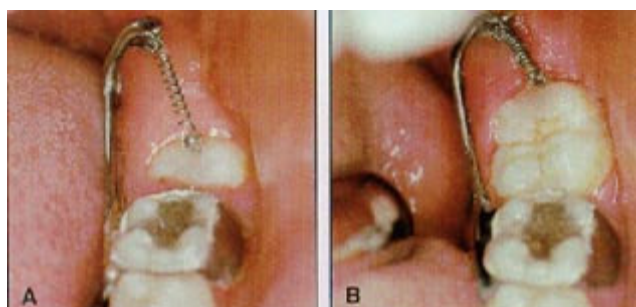
## FIGURES



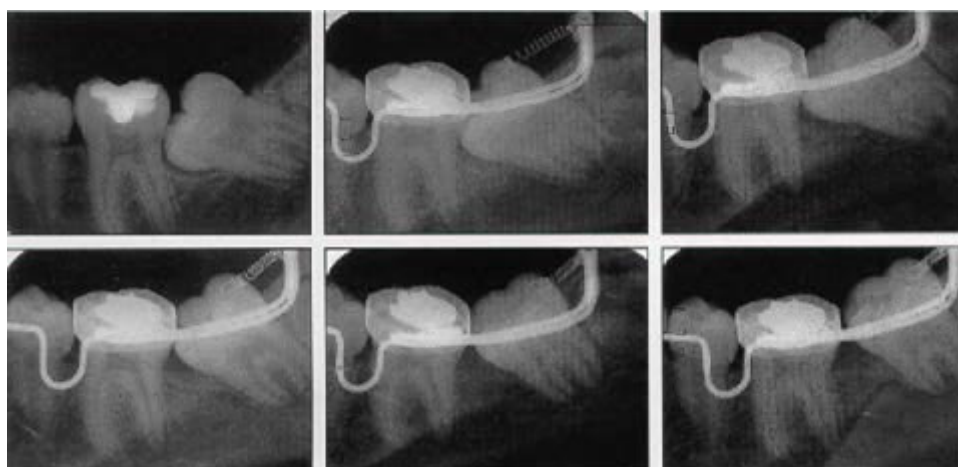
**Fig. 1** 11-year-old female before treatment.



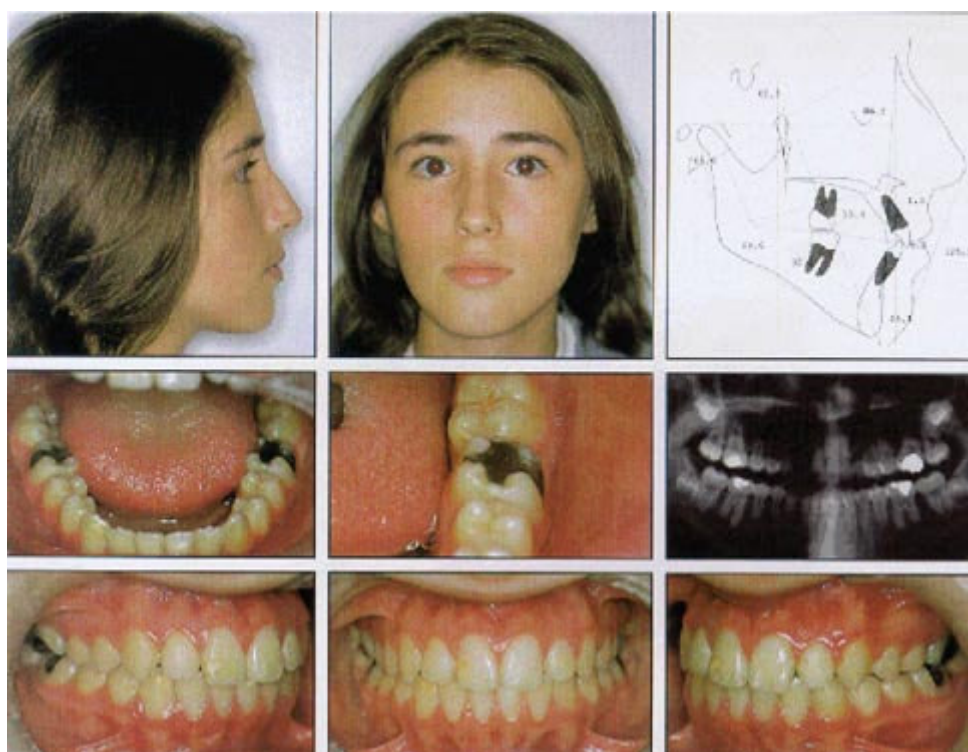
**Fig. 2** A. Modified lingual arch and nickel titanium closed-coil spring. B. Fabrication of appliance on cast. C. Passive appliance immediately after insertion. D. After activation.



**Fig. 3** A. Appliance immediately after placement. B. Mandibular second molar after three months of uprighting.



**Fig. 4** Periapical radiographs during three months of uprighting.



**Fig. 5** Patient after 24 months of active treatment.

#### REFERENCES

- 1 Freeman, R.S.: Orthodontic potpourri: Mandibular second molar problems, *Am. J. Orthod.* 94:19-25, 1988.
- 2 Johnson, E. and Taylor, R.C.: A surgical-orthodontic approach in uprighting impacted mandibular second molars, *Am. J. Orthod.* 61:508-514, 1972.
- 3 Davis, W.H.; Patakas, B.M.; Kaminishi, R.M.; and Parsch, N.E.: Surgically uprighting and grafting mandibular second molars, *Am. J. Orthod.* 69:555-561, 1976.
- 4 Holland, D.J. and Mass, M.: The surgical positioning of unerupted, impacted teeth (surgical orthodontics), *Oral Surg.* 9:130-140, 1956.