Modified Removable Transpalatal Bar for Rapid Uprighting of Impacted Second Molars

MARGHERITA SANTORO, DDS, MA
EUN-SOCK KIM, DDS
MONICA TEREDESAI, DDS
NIKOS KARAGGIANNOPOULOS, DDS

The in-office modification of a preformed transpalatal bar shown here offers a mechanically advantageous and efficient solution for uprighting an impacted second molar, especially when bonding a standard tube to the molar would be impossible and other methods would require surgical exposure of the impacted tooth. When the impacted molar is in the maxillary arch, the modified transpalatal bar provides anchorage for the application of vertical extrusive forces, which would otherwise be difficult to obtain.

Technique

A preformed transpalatal bar is connected to a lingual attachment on the adjacent first molar, then cut and modified according to the clinical situation and the patient's anatomy (Fig. 1). The bar will not interfere with the occlusion, being positioned on the mandibular retromolar pad and above the occlusal plane of the maxillary second molars.

A metal button is bonded as mesially as possible to the available crown surface of the impacted molar. Unless the tooth is completely covered by gingival tissue, surgical exposure of the impacted crown is not required, which eliminates the possibility of bond failure from surgical contamination.

Power chain is connected from the bonded button to the distal extension of the bar, along the distal marginal ridge of the mandibular second molar. Power chain is preferred over bulkier coil springs to ensure patient comfort during mastication, and also because its light intrusive force on the distal marginal ridge prevents overextrusion during the uprighting. The power chain greatly accelerates the eruption of the second molar due

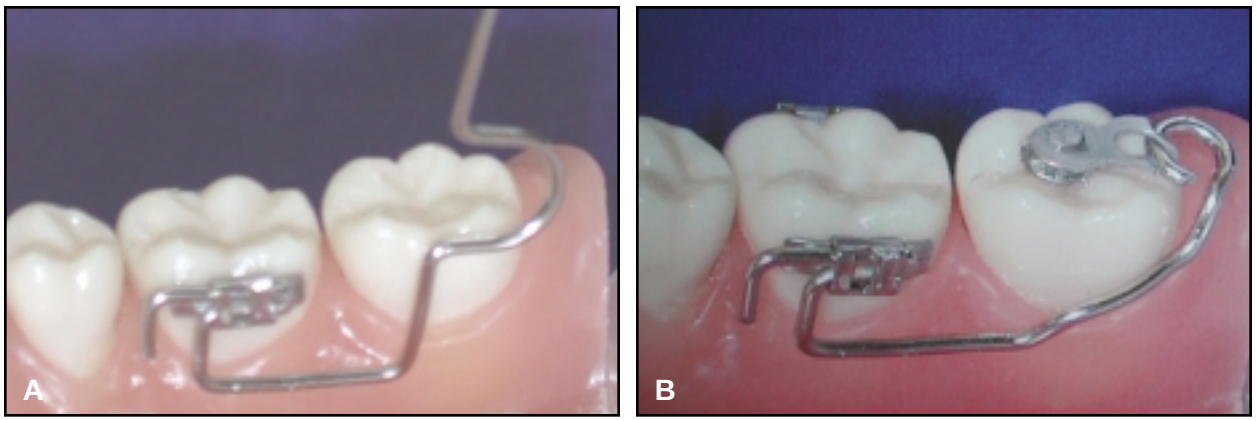

Fig. 1 A. Preformed transpalatal bar connected to lingual attachment on first molar adjacent to impacted second molar, then cut and modified according to clinical needs and patient's anatomy. B. Power chain from distal extension to bonded button on crown of impacted molar provides uprighting force with horizontal and distal vectors.

Dr. Santoro is an Assistant Professor and Drs. Kim, Teredesai, and Karaggiannopoulos are former residents, Division of Orthodontics, School of Dental and Oral Surgery, Columbia University, 635 W. 168th St., P.O. Box 20, New York, NY 10032. E-mail Dr. Santoro at ms190@columbia.edu.


Dr. Santoro


Dr. Kim


Dr. Teredesai


Dr. Karaggiannopoulos

to the favorable direction of force vectors.

A rigid base arch, at least .018" × .025", should be used to stabilize the first molar. As soon as the crown is completely exposed and partially uprighted, a tube is bonded to the buccal surface of the second molar, and a flexible, continuous archwire can be applied to facilitate mesial movement of the roots.

Case 1

A 17-year-old female transferred from another office with partial appliances bonded to the permanent teeth (Fig. 2). The treatment plan included extraction of the mandibular left third molar and uprighting of the adjacent, mesially impacted second molar.

The mandibular arch was aligned progressively, up to a rectangular .018" × .025" stainless steel archwire. At this stage, the first metal button was bonded to the only exposed area of the second molar crown, the distal marginal ridge. Two months later, as the uprighting progressed, a new button was added in a more mesial position. The distal button was left in place to prevent excessive extrusion of the second molar (bite-plane effect). A month later, a buccal tube was bonded for the final mesial movement of the second molar roots. The total duration of molar uprighting was four months.

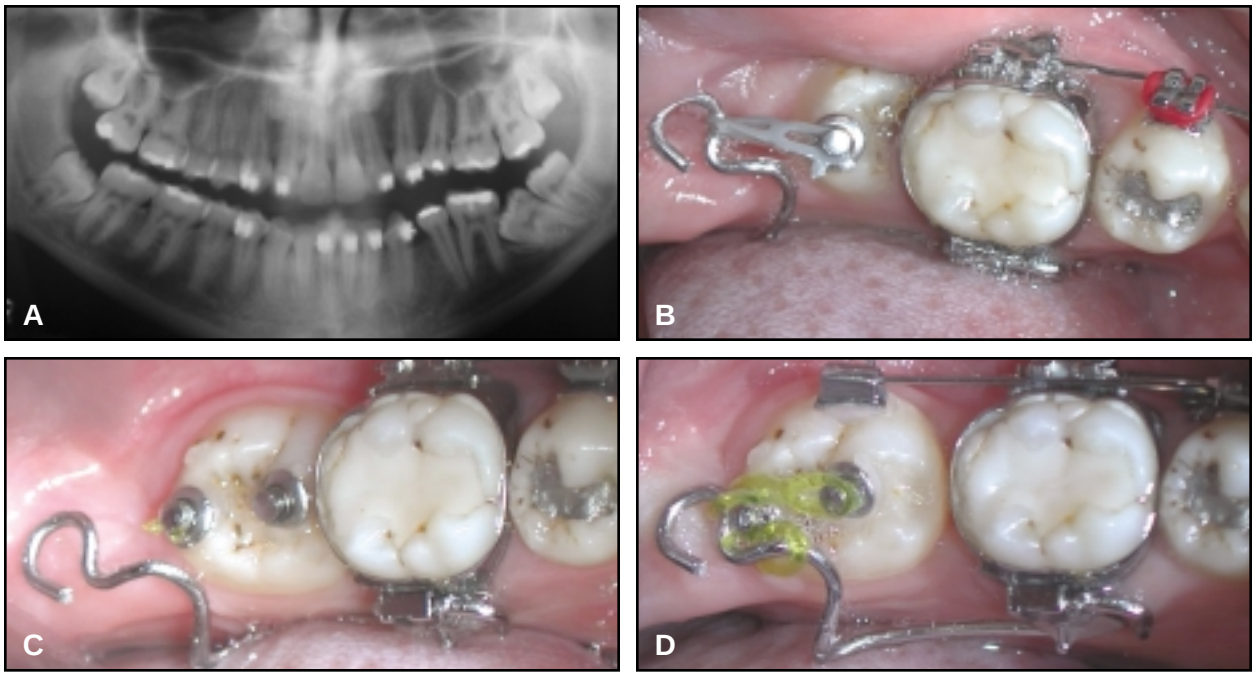

Fig. 2 Case 1. A. 17-year-old female with impacted mandibular left second molar. B. Button bonded to distal marginal ridge of impacted molar, with power chain running distally to distal extension of transpalatal bar. C. Two months later, another button bonded more mesially to improve direction of applied force. D. Molar eruption after four months of treatment, with buccal attachment bonded for continuous archwire.

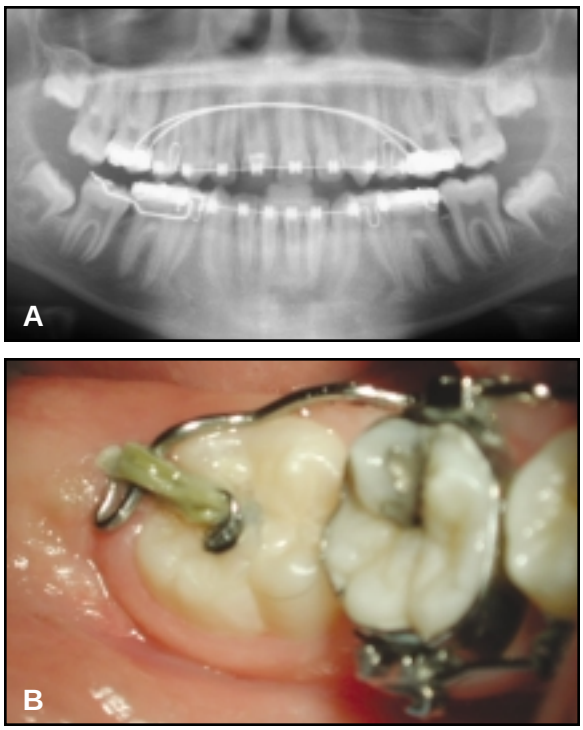

Fig. 3 Case 2. A. 13-year-old male with impacted mandibular left second molar. Third molar was left in place during uprighting of second molar with transpalatal bar and bonded occlusal button. B. Two months later, second molar was upright.

Case 2

A 13-year-old male presented with an impacted mandibular left second molar (Fig. 3). A button was bonded to the occlusal surface of the impacted tooth. The third molar in this case was left in place during treatment; its presence did not prevent or slow down the uprighting of the second molar.

Initial uprighting required only two months.

Discussion

An impacted second molar presents a trying clinical challenge.[1] If the impaction is severe and the position of the tooth is unfavorable, as in horizontal or distal impaction, surgical repositioning or extraction is the treatment of choice.

Conventional methods used to upright mesially impacted second molars—such as coil springs compressed between the first and second molars, uprighting springs, and removable appliances—usually interfere with the occlusion and oral function, may result in medical emergencies from aspirated attachments, and often require special patient cooperation. Other laboratory-fabricated auxiliaries, such as lingual arches with distal extensions, require more chairtime, advance planning, and expense. The inclusion of the impacted second molar in a continuous, flexible archwire usually generates archform distortions and undesirable side effects.[2-7]

The method proposed here offers several advantages:

- No laboratory work or impressions are required.
- The lingual attachment can be easily welded to the first molar band and the transpalatal bar adapted to the patient's anatomy.
- The biomechanical advantage of the distal extension of the bar results in a shorter treatment duration—four to five months vs. the eight to nine months of conventional methods.
- The applied force is distal to the center of resistance of the second molar.
- The bar is not soldered or connected directly to the first molar band or the main archwire. Should an emergency arise, the bar can be removed at any time during treatment without interfering with the rest of the mechanics. When tied in with a security ligature, however, it is not easily displaced during normal function.
- Surgical exposure is usually not required, greatly reducing bond failures.
- Because of the light force applied by the power chain and the mesial direction of the reaction force, minimal side effects are seen on the anchorage first molars.
- As soon as sufficient uprighting is obtained, the rigid main archwire can be replaced with a more flexible alloy to complete mesial root movement. If a double tube is used on the first molar, the main archwire can be left in place, and a flexible sectional wire used to connect the second molar to the first molar.
- The second molar never erupts above the occlusal plane.

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