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Early Surgical Management of Impacted Mandibular Second Molars

VOLUME 32 : NUMBER 07 : PAGES (446-450) 1998

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About 2-3% of mandibular second molars in my practice erupt mesially impacted--a figure that agrees with published reports. [1-3](#) I have sometimes spent several extra months of treatment uprighting these second molars. Early correction might simplify the management of such cases, shorten treatment, and minimize potential problems.

Options that have been proposed for treatment of mesially impacted mandibular second molars include:

- Separating spring.
- De-impacting spring.
- Extraction of the second molar and replacement by the third molar. [4,5](#)
- Transplantation of the third molar into the second molar position.
- Push-coil spring from first molar to second molar. [6](#)
- Push-coil spring with pins on the occlusal surface of the second molar. [7](#)
- Boot-loop arch. [8](#)
- Lever arm from the second molar to the bicuspid. [9-11](#)
- Bonded attachment to the second molar. [12-14](#)
- Nickel titanium push coil from the bicuspid ("Distal Jet" [15](#)).
- Nickel titanium .016" x .022" wire inserted from the distal and anchored to the bicuspid region. [16](#)
- Finger springs from a mandibular retainer. [17](#)
- Surgical uprighting, with autogenous bone implanted under the mesial cusp for support. [18,19](#)
- Surgical uprighting without extraction of the third molar. [20](#)
- Surgical uprighting with extraction of the third molar, but without an autogenous bone implant. [7,20-22](#)

Any of these procedures may be indicated in one case or another, but having tried all of them except transplantation, I have come to the conclusion that the last technique is the most efficient for both the patient and the clinician.

Surgical Uprighting Technique

Timing of the procedure is critical. Most authors agree that the uprighting should be performed between the ages of 10 and 15. [7,19,21,22](#) Although some have suggested that the optimal time is before root formation has been completed, [21,22](#) one report showed successful uprighting after this point. [20](#)

The surgical procedure can vary slightly, depending on the oral surgeon, but generally involves the following steps: A standard buccal flap is reflected to expose the third molar area. The third molar is sectioned and removed, and a straight elevator is placed mesially. The second molar is then uprighted by tipping it superiorly and distally until it is level with the plane of occlusion. Movement of the apices should be minimized to reduce the chance of complications.

Some authors have recommended placing an autogenous bone implant under the mesial cusp for support, but I have found this unnecessary. The mesial bone defect tends to fill in without the addition of implant bone or other material. [21,22](#)

The second molar is held in position with a 22-gauge, double-stranded brass wire, similar to the wire used years ago for molar separation. This wire is left in place for three to four months--long enough for the molar to stabilize ([Fig. 1](#)). If the deciduous molar or second premolar is not present and the first molar is free to move mesially, then a lingual arch should be used to provide support for the second molar and the brass wire.

The surgical site is closed with gut sutures, and the patient is placed on antibiotic coverage as when teeth are extracted. Salt-water rinses and a soft diet are prescribed. The patient is checked one week and one month after surgery, then returned to the orthodontist for further treatment.

Case Reports

Case 1 is a 13-year-old male who had been awaiting full eruption of the permanent dentition before treatment with fixed appliances. A panoramic radiograph revealed the reason for the delay: bilateral mesially impacted mandibular second and third molars ([Fig. 2A](#)). The third molars were extracted, and the second molars were surgically uprighted ([Fig. 2B](#)). One year later, the second molar roots had developed, and the mesial bone had filled in ([Fig. 2C](#)). Treatment was still being postponed until the full eruption of the maxillary second molars.

Case 2 (courtesy of Dr. Walter Knouse of Philadelphia) shows a mesially impacted mandibular left second molar ([Fig. 3A](#)). After

surgical uprighting, the mesial bone was noticeably deficient ([Fig. 3B](#)). It was once thought that some sort of periodontal support, such as hydroxyapatite crystals or other guided tissue regeneration, might be needed in a case like this, but the alveolar bone usually fills in to a normal level ([Fig. 3C,D](#)).

Case 3 is an 8-year-old male who began early treatment with apparently normal second molars ([Fig. 4A](#)). However, the mandibular right second molar became mesially impacted without any pressure from the third molar bud, delaying the start of Phase II treatment ([Fig. 4B](#)). After surgical uprighting, the mesial bone filled in within six months, and the patient was ready for fixed appliances ([Fig. 4C](#)).

Discussion

Mechanical uprighting procedures can be effective, but all require additional treatment time and patient cooperation. I have found that second molar extractions also extend treatment, because third molar eruption is unacceptable in at least three-quarters of these cases. The third molars must then be banded for proper alignment, which can add substantial treatment time. Even if the third molar alignment is corrected with partial appliances after the conclusion of active treatment, more time and effort are required than in other cases.

I have had 25 patients with a total of 30 mesially impacted second molars treated by surgical uprighting. Only one procedure had to be repeated because the uprighting was inadequate. Other clinicians have reported similar success rates.²⁰⁻²²

After follow-up periods ranging from six months to five years, there have been no complications or periodontal defects, either in the bone or the soft tissues. The crestal bone has filled in nicely. There has been no discernible root resorption, and the roots have continued to grow (although it would be impossible to determine whether they have reached their full growth potential). The pulp chambers are intact, extending to the apices, in 24 of the 30 teeth. No vitality tests have been performed, since no problems have appeared.

Surgical uprighting of impacted mandibular second molars appears to be a quick and effective procedure with minimal risk of morbidity or periodontal problems. In my experience, the procedure has made orthodontic therapy less demanding on the patient and more efficient for the practice.

Figures

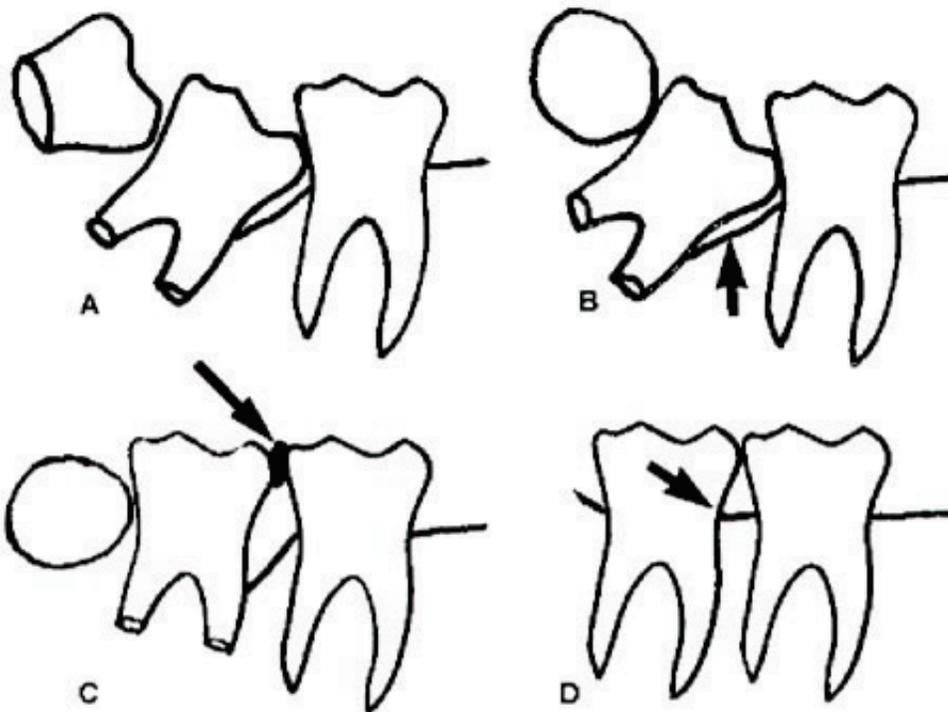


Fig. 1 Concept of surgical uprighting procedure. A. Mesially impacted mandibular second molar and third molar bud. B. After extraction of third molar bud, bone level mesial to second molar slants downward (arrow). C. After surgical uprighting, bone level is still angled and deficient mesial to second molar, which is held in place with brass wire (arrow). D. Long-term result: second molar roots have fully developed, and alveolar bone height is level.

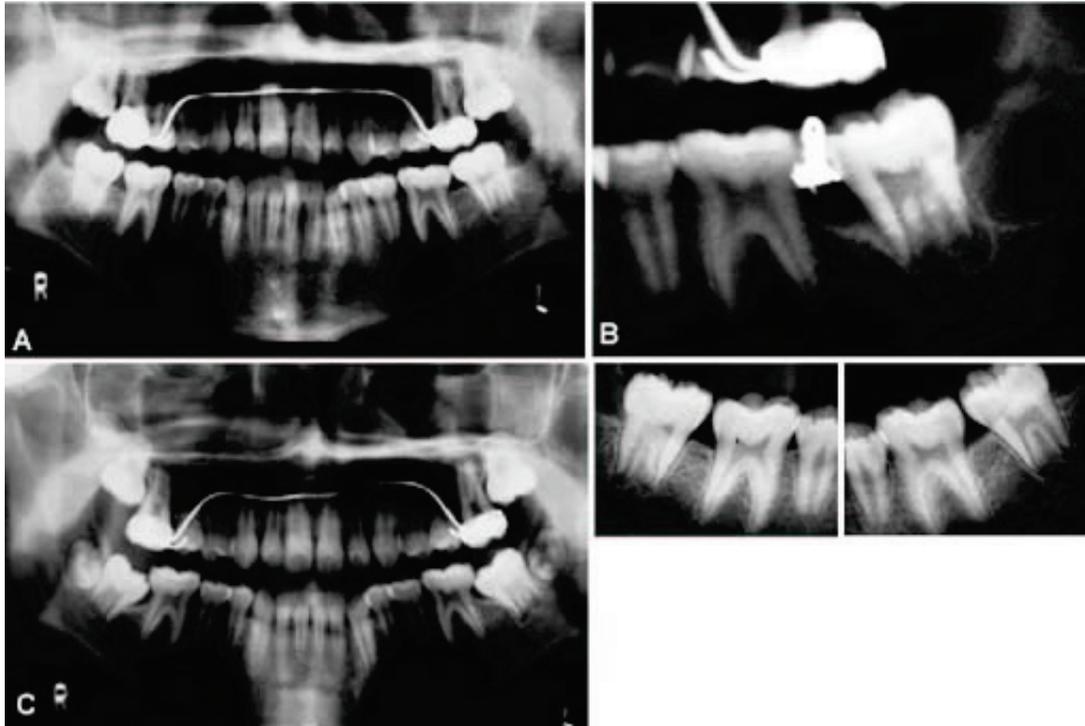


Fig. 2 Case 1. A. 13-year-old male with bilateral impacted mandibular second and third molars. B. Second molar surgically uprighted and held in place with brass wire. C. Patient one year later, showing root development and mesial bone fill.



Fig. 3 Case 2. A. Mesially impacted mandibular left second molar. B. After surgical uprighting, with brass wire in place. Mesial bone is noticeably deficient. C. Six months later, showing bone beginning to fill in. D. One year after surgery, showing normal alveolar bone height.

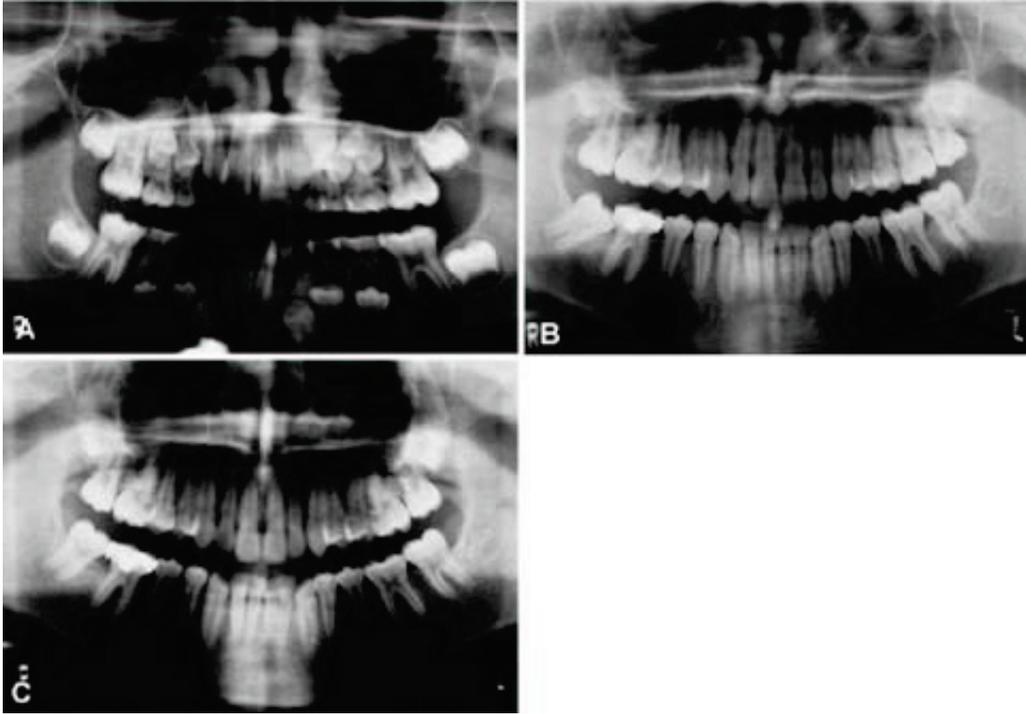


Fig. 4 Case 3. A. 8-year-old male beginning early treatment, with apparently normal second molars and no visible third molar buds. B. Patient at age 13, with impacted mandibular right second molar. C. Six months after surgical uprighting, with brass wire in place, showing rapid bone fill (first molar band is from earlier lingual arch).

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