

# Surgical uprighting and repositioning of severely impacted mandibular second molars

CHRISTOPHER P. McABOY, D.D.S.; JOSHUA T. GRUMET, D.D.S.; ELLIOT B. SIEGEL, D.D.S.; ANTHONY M. IACOPINO, D.M.D., Ph.D.

Surgical molar uprighting has been shown to be a predictable and reliable procedure.

Impacted second molars are thought to be a result of insufficient skeletal development to allow for normal eruption.<sup>1</sup> Impacted second molars can create a problem with esthetics, masticatory function and dental arch stability. Treatment options for impacted second molars include surgical extraction, surgical uncovering with orthodontic-assisted eruption and surgical uprighting.<sup>2</sup> We review the literature regarding surgical uprighting and present a case in which it was used successfully to treat an impacted second mandibular molar.

Because second-molar impaction is a relatively rare clinical problem, a limited amount of literature is available regarding case management. The exact prevalence of these impacted second molars is unknown, but it is thought to be approximately three in every 1,000 patients.<sup>3</sup> Second-molar impactions are thought to occur more frequently in the mandible than in the maxilla and most often are unilateral. There is a slight female predilection, and mesial inclination is a common occurrence.<sup>2</sup>

## CAUSES OF SECOND-MOLAR IMPACTION

Most published literature concerning impacted second molars assumes that inadequate arch length is the prin-

**Background.** Impacted second molars can create problems with esthetics, masticatory function and dental arch stability.

Treatment options include surgical extraction, surgical uncovering with orthodontic-assisted eruption and surgical uprighting.

**Case Description.** The authors review the literature concerning surgical molar uprighting, and present a case in which the procedure was performed successfully to treat an impacted second molar in a female adolescent. The authors surgically repositioned a horizontal, right mandibular second molar that was partially impacted in bone. The patient was followed up for three years, during which time she was free of complications.

**Clinical Implications.** Surgical molar uprighting has been shown to be a predictable and reliable procedure. When a molar tooth is severely impacted, surgical uprighting provides a viable option when other treatment modalities are contraindicated.

cipal cause of impaction. However, arch-length discrepancy is not the only cause of second-molar impaction; on occasion, second-molar impaction can occur when arch length is more than adequate to facilitate normal eruption.<sup>3</sup> In these cases, it may be that excess space between the developing second-molar crown and the first-molar roots allows the developing second molar to become inclined more mesially during the course of its eruption path and, thus, become impacted under the distal height of contour of the first molar.<sup>2</sup>

In this situation, Alling and colleagues<sup>1</sup> postulated that eruption of the second molar requires guidance by the distal root of the first molar similar to the eruption of the maxillary canine, whose eruption depends on the guidance of the lateral incisor. Other proposed causes of second-molar impaction include delayed emergence of the second premolars, premature primary molar extraction, ankylosed primary molars, dentigerous cysts, competition

for space by the third molar and odontomas.<sup>2</sup>

If left untreated, impacted mandibular second molars can create clinical problems. Should these teeth remain unerupted or partially erupted, they can cause root resorption, caries and periodontal breakdown of the first molar.<sup>2</sup> The fate of impacted second molars must be determined through collaboration among the general dentist, orthodontist, endodontist, periodontist and oral surgeon to offer the optimum treatment plan. All traditional methods of correction should be considered before an invasive surgical approach is chosen. The thought process for considering methods of correcting impacted mandibular second molars may follow a four-step sequence, as outlined below.

**Insertion of brass ligature or separating band.** If the molar is only slightly tipped to the mesial aspect, the clinician may insert a brass ligature or separating band to enable self-correction and eruption of the molar into its ideal position.<sup>4</sup>

**Extraction of second molar.** Extraction of an impacted mandibular second molar that appears to have no chance of uprighting may allow the third molar to erupt into the second-molar position. This requires precise manipulation by the oral surgeon, who must carefully consider the unpredictability of these eruption patterns.<sup>5</sup>

**Surgical uncovering, bonding and bracketing.** The third option is surgical uncovering and bonding and bracketing, followed by orthodontic uprighting and forced eruption. This can be performed with or without extraction of the adjacent third molar.<sup>6</sup>

**Surgical uprighting and repositioning.** Surgical uprighting and repositioning of the mandibular second molar with or without extraction of the third molar is the fourth option.<sup>6,7</sup>

When a molar tooth is severely impacted, surgical uprighting may provide a quick and easy solution, particularly when orthodontic treatment is contraindicated. Typical orthodontic treatment for these molars may not be an option when patient commitment is minimal, or the position of the tooth does not afford the proper environment for bonding a bracket.

When the decision has been made to perform surgical uprighting and repositioning of second

molars, Tinerfe and Blakey<sup>5</sup> recommend that certain criteria be considered. These include root length/form, available space within the dental arch, arc of rotation, occlusion, periodontal status and jaw development. The optimal root length should be one-third to one-half of the eventual length of the fully formed root to enhance the chance of revascularization after tipping and bodily movement. Adequate space must be present in the arch; to accomplish this, third molars might need to be prophylactically removed.

Ideally, the tooth to be uprighted should not be buccally or lingually inclined, since the buccal and lingual cortical plates are needed for primary stabilization once the second molar is surgically uprighted. The angle of rotation for uprighting

the second molar should not exceed 90 degrees because, as Pogrel<sup>6</sup> suggested, uprighting teeth more than 90 degrees causes them to behave like transplants, thus diminishing the chance of future vitality.

Once uprighted, the dentist should closely check the occlusion of the teeth for any interferences that may lead to occlusal trauma. The uprighted tooth also should be positioned in a manner that allows healthy soft-tissue attachment and

access for appropriate hygiene. Careful handling and positioning of the keratinized gingivae during the procedure are critical for the long-term periodontal health of uprighted molars.

In addition, it is important that vertical jaw growth be nearly complete in all patients to achieve ideal occlusion and prevent tooth submersion during growth. If these criteria are met, second-molar uprighting has been shown to be a predictable procedure and a viable option when other treatment modalities are not possible.<sup>2</sup>

#### **SURGICAL UPRIGHTING PROCEDURE**

Most surgical uprighting procedures can be accomplished with local anesthetic, but conscious sedation or general anesthetic can be offered as an option. The incision used for second-molar uprighting begins at the distobuccal aspect of the first permanent molar and runs in a posterolateral direction toward the external oblique ridge. The surgeon then reflects a full-thickness mucoperiosteal flap in the area overlying the second molar and, if present, the adjacent third molar.

At this point, the surgeon removes the third

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molar using a standard approach. A surgical round or fissure bur is used to prepare a trough on the distal aspect of the second molar to allow distal movement, because most of these teeth tend to be mesially inclined. The dentist uses a straight elevator in one hand to carefully reposition the second molar superiorly and distally, while he or she uses the other hand to support the cortical plate and alveolar ridge.

The tooth should be relatively stable in its new position. If the tooth is not stable, the dentist should splint it for two weeks using a resin-bonded wire. If there is significant mobility and the tooth can be compressed in the socket, the surgeon must rigidly stabilize the tooth and monitor it for no less than four weeks. On occasion, autogenous bone grafting in accessible bone defects may be necessary. The dentist then evaluates the occlusion; ideally, the repositioned tooth should be slightly out of occlusion to avoid occlusal trauma. The surgeon should close the surgical site with his or her choice of suture material.

A postoperative panoramic radiograph should be obtained to establish a baseline for evaluation of future healing. The surgeon should provide the patient with postoperative instructions that are similar to those for routine extractions, and provide the patient with nonsteroidal/narcotic pain medication if he or she believes it is necessary. If an orthodontist is involved with the treatment plan, he or she can see the patient for orthodontic treatment after an initial healing period of two to four weeks.

### CASE REPORT

A 14-year-old girl was referred to one of us (E.S.) with a chief complaint of an unerupted right mandibular second molar. The patient had been receiving orthodontic treatment for the previous 15 months. A routine panoramic radiograph revealed a horizontal, right mandibular second molar that was partially impacted in bone (Figure 1). After administering a local anesthetic, the surgeon created a full-thickness flap to expose the unerupted second molar and third molar. He created space distal to the second molar using a number 8 round bur in a high-speed handpiece, and extracted the third molar. The second molar was elevated into position (slightly out of occlusion) with a straight elevator; no stabilization was required (Figure 2).

The surgeon prescribed analgesics for the



**Figure 1. Radiograph of a 14-year-old girl with a horizontal, right mandibular second molar that was partially impacted in bone.**



**Figure 2. The second molar is elevated and repositioned.**



**Figure 3. Radiograph of the patient three years after the surgical uprighting procedure.**

patient after the procedure. She was followed up for three years, during which time she was free of complications (Figure 3). The tooth remained vital and functional.

### CONCLUSION

The case report presented above describes the successful use of a surgical approach for uprighting and repositioning impacted molars. This surgical approach provides a useful alternative when traditional, noninvasive techniques are

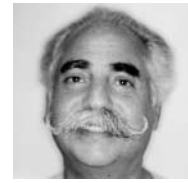
contraindicated or ineffective. Although an oral surgeon treated this patient, the approach can be used successfully by any general dentist experienced in treating bony impactions. The technique demonstrates a high degree of success when used appropriately. ■



Dr. McAbey is a recent graduate of the Marquette University School of Dentistry, Milwaukee.



Dr. Grumet is a recent graduate of the Marquette University School of Dentistry, Milwaukee.



Dr. Siegel is an oral surgeon in private practice in Long Island, N.Y.



Dr. Iacopino is a professor, General Dental Sciences, Marquette University School of Dentistry, 1801 W. Wisconsin Ave., Milwaukee, Wis. 53233-2186, e-mail "Anthony.Iacopino@Marquette.edu". Address reprint requests to Dr. Iacopino.

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