The advantages of a rapid maxillary expander (RME) anchored to the deciduous teeth in the mixed dentition have been described in the literature, as has the use of a cast-metal Haas-type RME bonded to six deciduous teeth.1-4 If the upper first permanent molar remains impacted against the second deciduous molar, however, the distal root of the deciduous molar may experience early resorption, leaving the permanent molar unable to erupt spontaneously. It then becomes impossible to band the deciduous second molar, especially considering the poorly retentive coronal anatomy of the deciduous teeth. The use of bands could not only increase the risk of appliance failure, but create another obstacle to first-molar eruption. An alternative approach would be to extract the deciduous second molars and expand the permanent teeth, but this could lead to early loss of the leeway space, with the consequent need to regain space by distalizing the upper molars or by using extraoral traction in a second treatment phase, or to wait for full eruption of the first molars. It might also require a transpalatal bar to be used before expansion to correct a buccal molar inclination or molar rotation.

This article describes a modified cast-metal Haas-type RME, with rigid arms for de-impaction of the first permanent molar, that offers better stability and retention and avoids the need for extraction of the deciduous molar (Fig. 1).
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Fig. 2 Case 1. 8-year-old female patient with maxillary transverse deficiency, anterior open bite, and impacted upper first permanent molars before treatment.
Appliance Fabrication

1. Take an alginate impression of the maxillary arch and pour a plaster cast.
2. Build up a clear acrylic (Duplitop*) splint on each side, carefully adapting the resin to the deciduous teeth from canine to second molar and including some of the occlusal surfaces for retention.3,5
3. Using the lost-wax-fusion technique, replace the acrylic resin with metal castings. Verify a precise fit to the labial and palatal surfaces of the deciduous second molar, and eliminate the distal metal surface so as not to interfere with the occlusal aspect of the impacted first permanent molar.
4. Extend a rigid distal arm from the palatal (Fig. 1A) or buccal (Fig. 1B) end of the metal splint, and bend a terminal loop for hooking an elastic chain. After confirming the adaptation of the splints to the plaster model, finish and polish the metal.
5. Laser-weld the cast-metal splints to a Titanhyrax* expansion screw, using pure grade 1 titanium connector bars (50mm long, 1.2mm in diameter).
6. Use the salt-and-pepper technique to build up two resin pads over the expansion screw, carefully adapting the acrylic to the palatal anatomy.

*Registered trademark of Dentaurum GmbH & Co., Ispringen, Germany; www.dentaurum.de.

Fig. 3 Case 1. A. Cast-metal Haas-type RME with palatal arms bonded to six deciduous teeth; distal traction applied to impacted molars with elastic chain. B. Molar impaction corrected after three months of treatment. C. Maxillary expansion completed after one month of passive stabilization and 28 daily activations. D. Four months later, brackets bonded to upper incisors for alignment.
reactivated every three weeks, the molar impaction was corrected in three months (Fig. 3B). The palatal arms were then cut away, and the occlusal composite was removed from the second molars. After a one-month stabilization period, maxillary expansion was completed with 28 daily activations (Fig. 3C). Four months later, brackets were bonded to the upper incisors for alignment (Fig. 3D). After another eight months of treatment, all appliances were removed. Total treatment time was 17 months (Fig. 4).

Case 2

A 7-year-old male presented with a narrow palate, macrodontic upper central incisors with a severe lack of space for lateral-incisor eruption, and an impacted upper right first permanent molar (Fig. 5). A cast-metal Haas-type RME was bonded to six deciduous teeth, and a buccal arm was connected with elastic chain to a buccal button on the impacted molar (Fig. 6). Since the buccal arm

7. Sandblast the inner surfaces of the cast-metal splints to enhance retention of the appliance. Titanium splints should be sandblasted with titanium dioxide.
8. Coat the inner surfaces of the splints with a small quantity of glass ionomer cement,** and bond the appliance in place.
9. Bond a button to the mesiobuccal surface of the impacted first permanent molar, then connect it to the terminal loop with elastic chain.

**Fuji Ortho LC, Trademark of GC America, Inc., Alsip, IL; www.gcamerica.com.
Modified Cast-Metal Haas-Type Expander

did not interfere with mastication, no occlusal separation was needed. Distal traction was reactivated every three weeks, and the molar impaction was corrected in two months (Fig. 7).

Discussion

Altered eruption of the upper first permanent molar can lead to early resorption of the deciduous molar roots, with a consequent early loss of the deciduous second molar and leeway space. Premature extraction of the deciduous teeth is therefore contraindicated, especially in patients who also require maxillary expansion.

A modified cast-metal Haas-type RME is a simple solution that avoids the need for deciduous-molar extraction while preserving leeway space and correcting the permanent-molar impaction.
Distal arms can be welded palatally or buccally to the expander, depending on individual patient needs. The palatal approach requires bite opening to avoid occlusal interferences; the buccal approach may increase the risk of cheek irritation or mucosal lesions. Either method allows the correction of molar impaction within a few months, after which the metal arm can be removed and maxillary expansion initiated.

REFERENCES


