

Maxillary first permanent molar impaction. A conservative treatment approach

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The objective of this clinical case is to suggest a treatment approach for impaction of the maxillary first permanent molars. This approach allows access to the partially erupted tooth for orthodontic bonding and utilization of loops for distalization. An important detail is the non inclusion of the primary second molar in the orthodontic mechanics, in order to reduce the risk of early loss and preserve this tooth until exfoliation.

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INTRODUCTION AND LITERATURE REVIEW

The maxillary first permanent molar initially has a mesial eruption pathway until it touches the distal surface of the primary second molar, then follows a more vertical direction until it reaches the occlusal plane. An excessively mesial inclination generates an ectopic eruption and promotes close contact between the mesial surface of the maxillary first permanent molar and the distal surface of the primary second molar. The consequences are impaction of the

maxillary first permanent molar, with atypical resorption of the distobuccal root of the second primary molar.^{20,21} Therefore, early diagnosis is fundamental, since pressure from the impacted maxillary first permanent molar on the distal surface of the primary second molar can lead to extrusion, premature occlusal contact, resorption and even tooth loss.

Clinical characteristics possibly related to the ectopic eruption of the maxillary first permanent molar include delayed eruption, with partial appearance of the crown into the oral cavity; excessive mobility or early exfoliation of the primary second molar without a clear cause, mesial eruption of the permanent molar with reduction in arch perimeter, and no space for eruption of the second premolars.

When this disturbance is not opportunely detected, root resorption of the primary second molar may extend to the pulp chamber and the teeth may present extreme mobility and often displacement. The patient can complain of pain or discomfort, and could develop a dentoalveolar abscess⁸. In these cases, extraction of the primary second molar is suggested, allowing the first permanent molar to erupt mesially and use orthodontic mechanics to regain the space loss.

Several etiologic factors have been suggested in the literature as potential causal agents of impaction of the maxillary first permanent molar: abnormal angle of eruption of this tooth, anatomy of the primary second molar (convex distal surface), increased mesiodistal widths of the maxillary first permanent molar, maxillary arch length deficiency, maxillary retrusion, agenesis of the maxillary second premolars and familial tendency.^{2,9,10,11,12,13,14,16,19,20}

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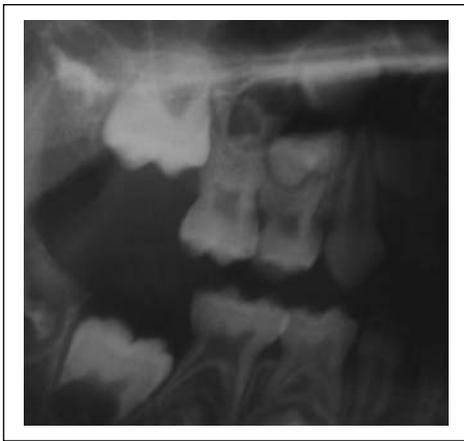


Figure 1A. Initial stage of eruption of the maxillary first permanent molar.

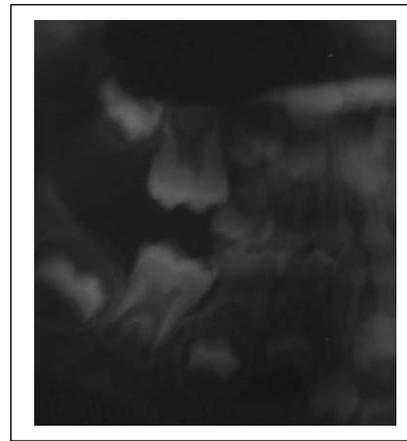


Figure 1B. Follow-up of eruption and consequent impaction of the tooth after 15 months.

Prevalence of ectopic eruption of the maxillary first permanent molar ranges between 2 and 5.9%^{2,20} and is higher among individuals with clefts (up to 20%). This is due to the maxillary anteroposterior hypoplasia and retrusion in relation to the cranial base, a characteristic often associated with the craniofacial growth of patients with operated cleft lip and palates.^{8,20,21}

Impaction may be reversible or irreversible, unilateral or bilateral.¹ It is considered *reversible* when there is spontaneous correction of the mesial pathway of eruption of the maxillary first permanent molar and normal eruption into the oral cavity. This type of impaction occurs in 66% of cases²¹ and is diagnosed retrospectively by radiographic examination²⁰ (Figures 1A and 1B). When impaction is not spontaneously corrected, it is classified as *irreversible* (nearly 30% of cases) and may yield to problems to the developing occlusion.

Bjerklin and Kurol in 1983 recommended following the eruption of the permanent molar for 3 to 6 months when resorption of the primary second molar is not severe enough and the degree of impaction is mild, considering the possibility of spontaneous correction. However, after 7 years of age, spontaneous disimpaction rarely occurs, and mechanical intervention is generally required.²⁰

Several alternatives have been suggested for treatment of impaction of the maxillary first permanent molar, involving the utilization of fixed appliances with open coils, brass wires, elastic rings and removable appliances with coil springs.^{4,5,6,7,8,16,17,21,22} However, regardless of the mechanical approach to be employed, a limiting aspect in many cases is the difficult accessibility to the maxillary first permanent molar, which may present only the distal surface partially erupted.

Therefore, the use of elastic rings and brass wires is difficult due to the limited access for its placement, mainly related to the depth of the contact area between the two teeth. When this is attained, three force vectors are generated: distal (on the maxillary first permanent

molar), mesial and extrusive (on the primary second molar), even though the ideal objective is distalization of the maxillary first permanent molar. The extrusive force component produces a premature occlusal contact on the mandibular primary second molar, which could increase root resorption, accelerating the possibility of early loss of the maxillary second primary molar. Thus, the use of coils associated to fixed appliances, without inclusion of the primary second molar, plays a fundamental role when the priority is disimpaction of the maxillary first permanent molar combined with maintenance of the primary second molar.

Rationale in treatment approach

1. Promote better access to the maxillary first permanent molar.
2. Cease the process of active resorption of the primary second molar.
3. Avoid early loss of the primary second molar.
4. Increase the arch perimeter.

The conservative treatment approach suggested initially comprised increasing the crown of the maxillary first permanent molar from the distobuccal cusp with increments of light-cured composite resin. Thereafter, using a piece of 0.020" wire as a guide, brackets were passively bonded on the canine and first primary molar (anchorage units) and maxillary first permanent molar, without including of the second primary molar in the mechanics (Figures 2A, 2B, 2C, 2D). In case more anchorage was required, a transpalatal bar could be used joining the primary first molar on both sides.

The mechanics applied for distalization involved utilization of a passive segment of 0.020" stainless steel archwire, a nickel-titanium open coil tightened between the maxillary first permanent molar and primary first molar (Figure 2C, 2D), with monthly activations for approximately 3 to 4 months and an average force of 80 to 100g.

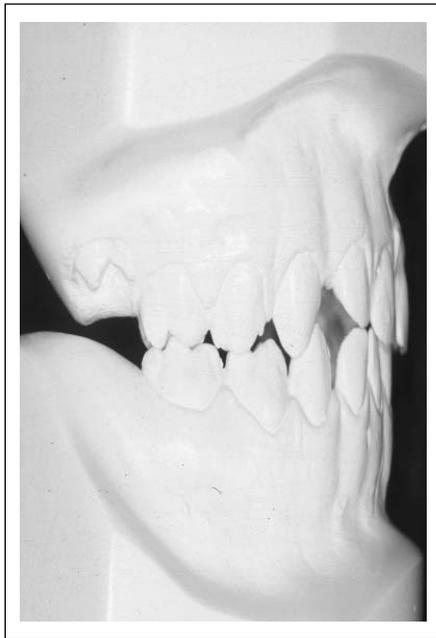


Figure 2A. Initial dental cast

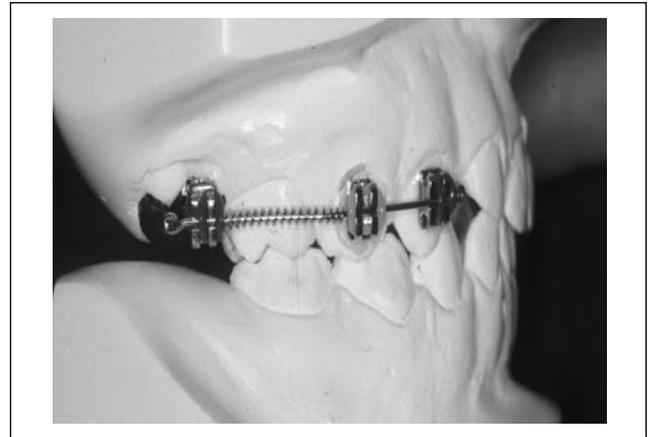


Figure 2C. Mechanics for distalization of the maxillary first permanent molar with open coil.

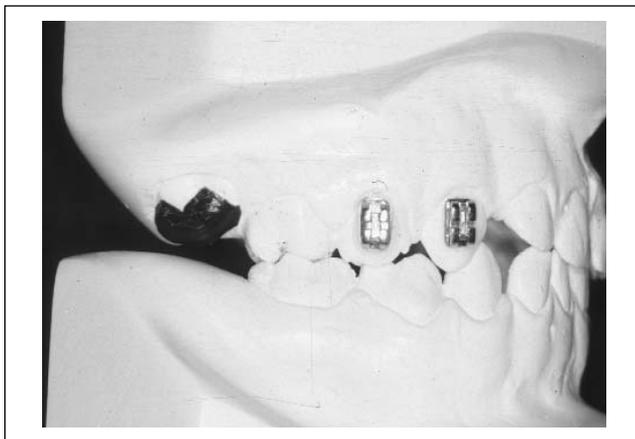


Figure 2B. Clinical crown increase of the maxillary first permanent molar and bonding of brackets.

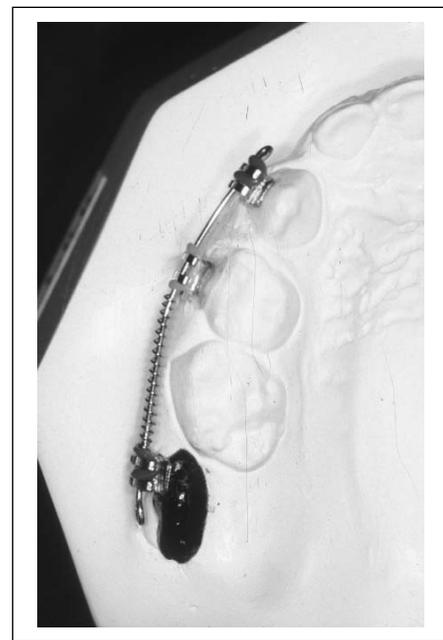


Figure 2D. Occlusal aspect of the mechanics.

Therefore, disimpaction of the maxillary first permanent molar could be effectively obtained without consequent application of forces, especially extrusive forces on the primary second molar, which are common when separating elastics and brass wires are used. Clinical and radiographic follow-up demonstrated an interruption in the process of resorption of the distal surface of the primary second molar following the distalization of the maxillary first permanent molar. Such finding reinforces the importance of a conservative treatment targeted to space maintenance through a biological approach. After correcting the ectopic eruption, the resin was removed and the bracket was bonded again on the buccal aspect of the maxillary first permanent

molar for leveling. Thereafter, the patient was instructed to keep a strict hygiene of the area and will be followed until the other permanent teeth erupt. (Figures 3A, 3B, 3C, 3D)

CONCLUSION

When managing a clinical case with impaction of the maxillary first permanent molar, the dentist should emphasize preservation, establishing a protocol for early diagnosis and treatment plan which targets the recovery of arch perimeter by distalization of this tooth and maintenance of biological integrity of the primary second molar. These bases supported the proposition of the present conservative treatment approach.

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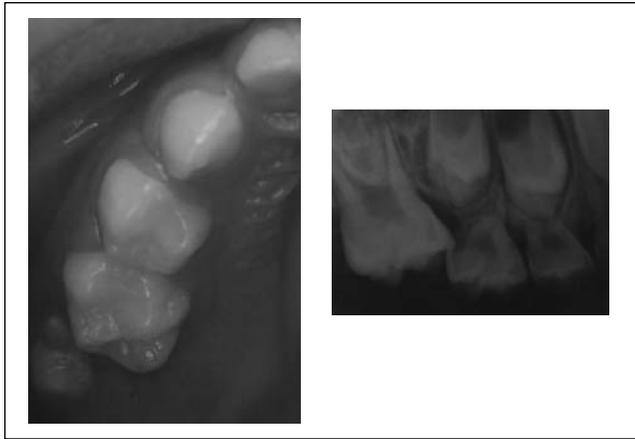


Figure 3A. Impaction of the maxillary first permanent molar and ectopic resorption of the primary second molar.



Figure 3C. Follow-up at 2 months after disimpaction.

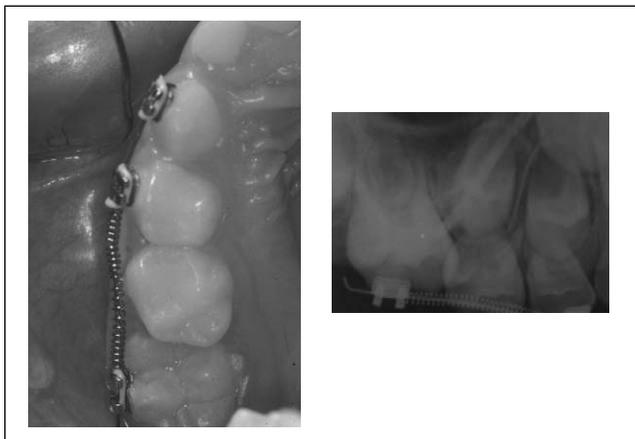


Figure 3B. Mechanics for distalization.

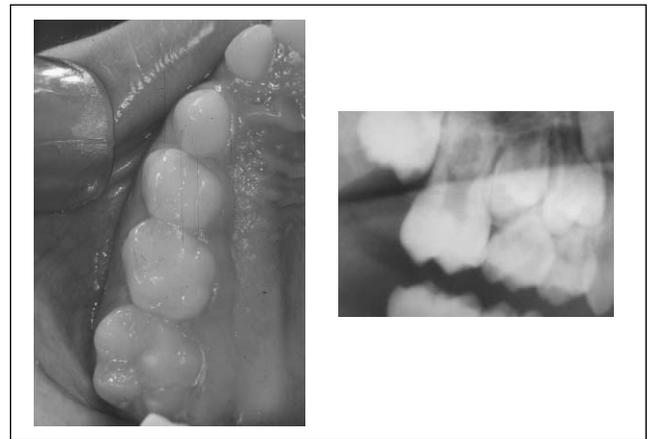


Figure 3D. Follow-up at 3 months after disimpaction.

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