

## Management of an early ankylosed mandibular second primary molar: case report

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### Abstract

*An unerupted mandibular second primary molar first was observed in a healthy male 3 years, 4 months of age. The report presents the rationale to allow the first permanent molar to erupt fully. The treatment objectives are presented with the description of the fixed appliances used to accomplish the objectives.*

Few case reports have discussed longitudinal treatment of failure of eruption of a primary second molar during the primary and early mixed dentitions. This case report describes the long-term management of an untreated ankylosed mandibular second primary molar over a 9-year period.

### Literature Review

Kurol and Thilander (1984) evaluated the longitudinal effects of ankylosed primary molars first observed in the mixed dentition until normal exfoliation occurred or treatment was indicated. The purpose of this investigation was to determine the effects of infraclusion on occlusal development. Fifty-six children with 149 ankylosed primary molars were followed. All but 5 of the 149 teeth exfoliated normally with no resultant adverse effect on occlusal development. Five ankylosed teeth were extracted. When the following criteria are present extraction is indicated: (1) Occlusal disturbances with severe tipping of adjacent teeth and resultant space loss; and (2) malposition of the permanent successor with severe infraclusion and irregular root resorption of the ankylosed molar.

Adams et al. (1981) described a mandibular second primary molar in a 5 year old that was not visible clinically but had a clinically visible orifice about 3 mm in diameter. All succedaneous teeth were present. Surgical removal of the unerupted second primary molar was performed and a distal shoe space maintainer was inserted. No subsequent observations or further treatment were reported.

Amir and Duperon (1982) described a five year old

with an unerupted mandibular second primary molar and a malformed, developing second premolar. A decision was made to remove the unerupted second primary molar. At a 6-month follow-up examination the developing second premolar appeared as an odontoma, but no further observations or treatment were reported.

Marechaux (1986) reported that a 7 year old had an unerupted mandibular left second primary molar with a small supernumerary tooth-like formation at the crest of the alveolar bone. The permanent first molars were unerupted. The patient was observed for a 3-year period and received the following care: (1) removal of the ankylosed primary molar; (2) insertion of a sectional space maintainer from the first primary molar to the now erupted permanent first molar; and (3) removal of the unilateral space maintainer after 6 1/2 months and the insertion of a lingual arch. In spite of these treatments, the space for the unerupted second premolar closed to 3 mm. Space regaining procedures were indicated at age 10. No further treatment was reported.

In the preceding case reports the unerupted mandibular second primary molars were not visible clinically.

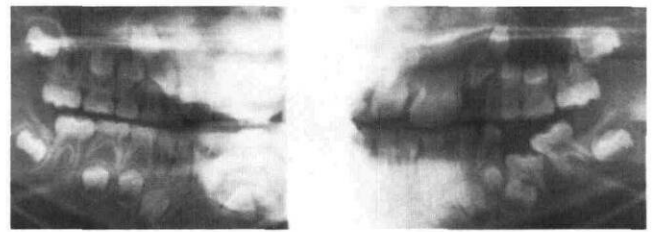
These reports contrast with Belanger et al. (1986) who described an unusual case of a 3 year old with an unerupted mandibular second primary molar. When the child returned 9 months later cusp tips were visible clinically. No treatment of the ankylosed tooth was performed because upon percussion the sound was similar to the contralateral primary molar. For the next 3 years and 9 months, periodic visits revealed that the ankylosed primary molar had self-corrected and was in the plane of occlusion.

### Case Report

A healthy 3-year, 4-month-old Caucasian male was seen for oral evaluation. An unerupted mandibular left second primary molar was noted on the panoramic



**FIG 1.** Initial examination at 3 years, 4 months. Mandibular left second primary molar unerupted. All succedaneous teeth present.



**FIG 2.** Six years, 1 month. Note unerupted left primary second molar.

radiograph (Fig 1). This report discusses only treatment of the ankylosed second primary molar. A decision was made to allow the mandibular left first permanent molar and the mandibular permanent incisors to erupt at which time the left permanent first molar would be uprighted if needed and distalized by a fixed appliance. After the permanent first molar was repositioned the unerupted second primary molar would be extracted and an appropriate space maintainer placed. Continuous follow-up evaluations were done every 6 months.

Diagnostic casts, and panoramic and cephalometric radiographs were completed at 6 years, 9 months. The diagnostic casts revealed an acceptable alignment of the teeth. The maxillary and mandibular permanent lateral incisors were unerupted and the mandibular left first permanent molar was partially erupted and mesially tipped causing space closure. When the mesiodistal measurement of the right mandibular second primary molar (9.6 mm) was compared to the space between the left first primary molar and first permanent molar there was a 3.5 mm difference. No cross-bites were noted in the transverse plane of space. In the anteroposterior relationships, the right first permanent molars were end-to-end and a Class III molar relationship existed on the left. The primary canines were end-to-end.

Radiographically, the ankylosed mandibular second primary molar was unerupted (Fig 2). The mandibular left second premolar was rotated and distally inclined.

A cephalogram revealed that the maxilla and mandible were related well to the cranium and with each other. The teeth related well to the maxilla and the mandible, and the maxillary and mandibular incisors to each other. Relationships in the vertical plane of space were acceptable for this age.

Treatment to distalize the mesially tipped mandibular left first permanent molar would begin when the mandibular permanent lateral incisors erupted. This occurred 1 year and 2 months later (8 years, 1 month of age).

### Treatment Objectives

Treatment was confined to the mandibular arch. The mandibular left first permanent molar was to be uprighted and distalized to allow greater access for the eventual removal of the ankylosed tooth. These movements were to be accomplished with a series of leveling round arch wires (up to a .018) and then an open coil inserted to further translate the first permanent molar. With insertion of the open coil the midlines would need to be maintained. After distalization the ankylosed second primary molar would be removed surgically. The bands were to remain but the wire was removed during the surgical procedure and then retied after the procedure was completed to allow for healing. Final insertion of a space maintainer would prevent relapse of the now distally positioned first permanent molar.

### Space Regaining

The first permanent molars were banded with preattached .022 x .028 buccal tubes with gingival hooks. Mandibular premolar bands with welded Siamese brackets (.022 x .028) were adapted to the primary first molars. Brackets were direct bonded to the mandibular incisors with Ormco System 1+® (Ormco Corporation; Glendora, CA).

The initial wire was .0175 Wildcat® (GAC International; Central Islit, NY) stopped arch wire. This wire (bent gingivally at the distal of the buccal tube) was used to preserve the axial inclination of the mandibular permanent incisors. Three weeks later a .016 stopped arch wire was inserted. To maintain tooth position a single ligature wire was twisted and tied to all brackets between the first primary molars. Five weeks later a stopped .018 arch wire was inserted for further leveling of the first permanent molar. The wire was removed 3 weeks later. The stop was removed and the wire was reinserted through the buccal tube of the left first permanent molar to allow for translation. An open coil (.009 x .030) was placed on the arch wire before it was retied. The amount of activation was determined by the

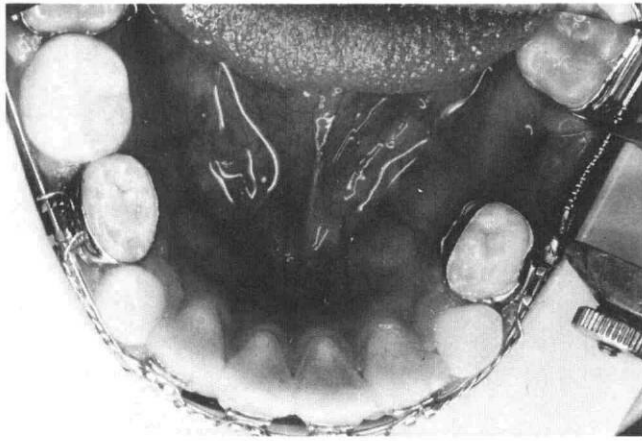


FIG 3. Total treatment time 4 months. Note split crimpable stops on .018 arch wire.

length of the coil as measured from the mesial of the buccal tube on the first permanent molar to the midpoint of the bracket of the primary first molar. To preserve the midline a single ligature wire was twisted and tied to all brackets between the first primary molars. Further activation of the coil took 2 visits at 3-week intervals. Reactivation is accomplished by first compressing the coil and then compressing a split crimpable stop onto the arch wire. Total treatment time was 4 months (Fig 3).

#### Surgical Removal of the Ankylosed Primary Molar

Under IV sedation (5 months after initiating orthodontic treatment), the ankylosed tooth was removed surgically without difficulty. The arch wire was then retied after suture placement. Within 1 week the sutures loosened and were removed. Iodoform gauze was placed into the socket and repacked 3 times at 5-day intervals and then removed. The surgical wound was healing as expected. Four months later the mesiodens was removed under IV sedation without complication after radiographs confirmed that the apices of the erupted permanent maxillary central incisors were closed.

#### Immediate Segmental Space Maintainer

After the surgical site of the ankylosed primary molar had healed, the bands and brackets on all teeth except the left first primary and first permanent molars were removed. An immediate temporary segmental space maintainer was placed. A

.020 wire was adapted to fit passively into the bracket and the buccal tube was tied to the bracket. A waiting period for further treatment decisions was planned due to behavioral management problems.

#### Insertion of Lingual Arch

As anticipated, the immediate segmental space maintainer inserted 5 months previously needed to be replaced with a lingual arch before the first primary molar exfoliated. The first permanent molar band was removed and new bands were adapted with a welded Wilson vertical post. After the impression was made, the first permanent molar band was recemented and the segmented wire retied to prevent relapse until the lingual arch could be inserted. This lingual arch was removed 14 months later.

A series of periapical radiographs illustrate the 4 treatment procedures used in this case report (Fig 4): (a) leveling arch wire; (b) open coil with split crimpable stops; (c) segmental space maintainer; and (d) Wilson lingual arch. These radiographs also show that the distally inclined second premolar uprighted but remained rotated. Photographs were made 2 years and 4 months (12 1/2 years) after the lingual arch was removed. The treatment objective to regain the space for the mandibular left second premolar was met (Fig 5, next page). It is anticipated that future comprehensive treatment will be instituted to correct the Class II malocclusion.

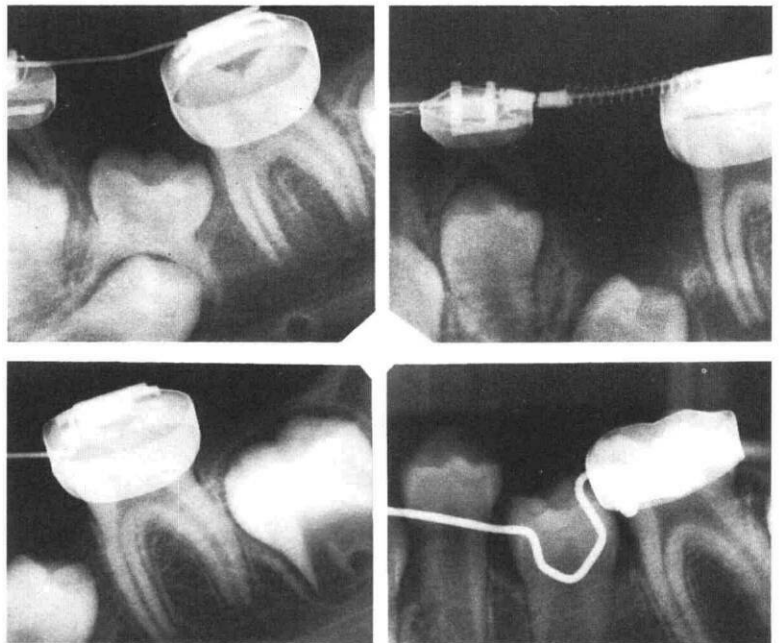


FIG 4. Summary of the 4 treatment procedures to distalize and maintain the mandibular first permanent molar: (a) leveling arch wire; (b) open coil with split crimpable stops; (c) segmental space maintainer; and (d) lingual arch. Note the uprighting of the second premolar.

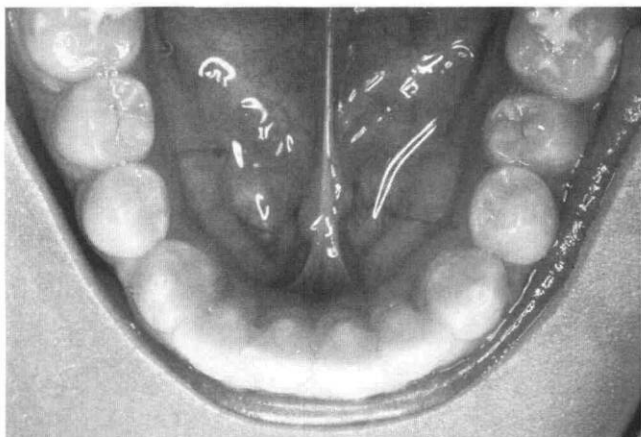


FIG 5. Treatment objective met at 12 1/2 years.

## Discussion

An alternative approach to the treatment of this case could have been the removal of the unerupted second primary molar at an early age since a tentative diagnosis was made at 3 years, 4 months of age. Periodic recall visits confirmed failure of eruption. Early removal of the second primary molar and the immediate insertion of a distal shoe space maintainer was considered. Contraindications to this approach were:

1. Surgical extraction for a young child is often traumatic and difficult, potentially requiring a general anesthetic
2. Damage to the developing second premolar may occur
3. Invasion of the crypt of the developing second premolar by the intraalveolar extension was possible
4. Accelerated root resorption of primary first molar used as an abutment could occur
5. The first permanent molar could tip mesially over the distal extension
6. Other types of space maintainers would be required over the long term (Hicks 1973; Kapala 1980; Barker 1982; Mathewson et al. 1982; McDonald et al. 1987).

The total time during which the appliances were worn was approximately 2 years. The periodic, early observation appointments helped to establish a rapport with the patient, allowing for surgical removal of the ankylosed primary molar.

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