

Interceptive management of eruption disturbances: case report

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The aim of the present report is to describe a case of a patient with eruption disturbances of an ankylosed lower primary second molar; delayed development of a maxillary permanent canine associated with an odontoma and a class III dental malocclusion. In such a case the objectives of treatment are: to prevent impaction of the lower second premolar and tipping of the lower first molar; to establish correct anterior overbite and overjet and to control the development of the permanent upper canine.

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INTRODUCTION

The conditions that predispose young children to develop a malocclusion of the permanent dentition may be detected early in the primary dentition. Early diagnosis is very important to monitor and to prevent complications, but especially to define the logical order in the pattern of treatment. Interceptive orthodontic treatment could not only improve skeletal malrelationship and eliminate functional interferences, but also may correct disturbances during the eruption.^{1,2}

In fact aberrations during eruption as lack of space or crowding of dental arches, premature loss of the primary teeth with subsequent partial closure of the area, ectopic position of teeth, some physical barrier in the eruption path (supernumerary teeth, odontoma) or trauma and ankylosis are common conditions that may interfere with growth of the maxillo-facial complex and occlusal development.

The aim of the present report is to describe a case of a patient with eruption disturbances (ankylosed lower primary second molar, delayed development of a maxillary permanent canine associated with an odontoma) and a class III dental malocclusion.



Figure 1. Initial intraoral frontal view.

CASE REPORT

A 7 year-old Caucasian male referred to the orthodontist for examination by his dentist because he revealed an important malocclusion. A review of his medical history showed nothing remarkable. The face of the patient was symmetrical with straight type profile. Clinical examination showed an early mixed dentition comprising the maxillary right and left first molars, maxillary permanent right and left central incisors, maxillary permanent right and left lateral incisors, mandibular right and left first molars and mandibular permanent central and lateral incisors (Figure 1). Carious lesions were found in the primary teeth and infraocclusion of the primary lower right second molar was observed. The mandibular primary left second molar was extracted for the presence of a destructive carious lesion, consequently the mandibular first permanent molars had migrated mesially. Panoramic radiograph evaluation demonstrated the presence of permanent dental series and confirmed the ankylosis of the lower primary right second molar; moreover it showed the presence of an amorphous radiopaque mass in anatomical proximity of

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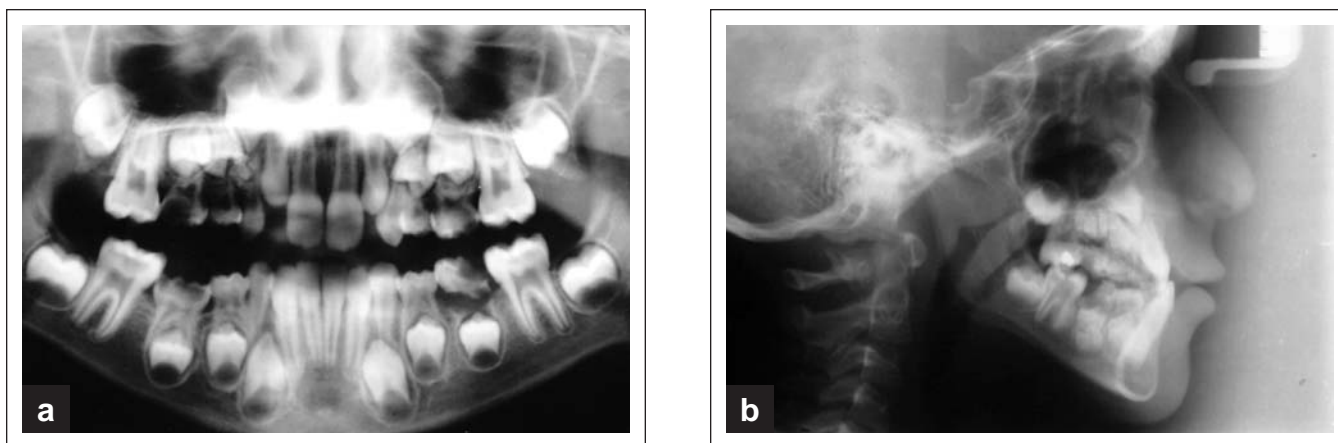


Figure 2. Initial radiographic views: a. Panoramic view; b. Lateral cephalometric radiography view.

primary upper right canine, partially superimposed on the crown of the upper permanent right canine (Figure 2a).

The patient presented anterior cross-bite and lingual inclination of the maxillary incisors, a mild Class III molar relationship and a Class I primary canine relationship.

Cephalometric analysis revealed a skeletal Class III malocclusion (ANB = -1) and a clockwise rotation (FMA 31) pattern (Figure 2b).

TREATMENT OBJECTIVES

In such a case the treatment objectives are to:

1. prevent impaction of the lower permanent right second premolar and tipping of the lower first molars;
2. establish a correct anterior overbite, overjet and maxillary transverse diameter;
3. control the radiopaque mass and the development of the upper permanent right canine.

TREATMENT PLAN

Treatment involved the extraction of the ankylosed tooth to facilitate the normal development and correct eruption of the lower permanent right second premolar. This approach was important to maintain a symmetrical shape in the lower arch. A removable appliance was used to control the loss of space in the mandibular arch and to prevent the tipping of the lower first molars.

The maxilla was expanded with a rapid palatal expansion device to increase transversal dimension. Once palatal expansion was achieved, the appliance was left in place for 6 to 8 months to allow bone deposition in the midpalatal suture.

After active expansion, an edgewise appliance was placed and initial alignment and leveling of upper incisors with a utility arch wire was accomplished to correct anterior cross-bite and to establish an opti-

mal anterior guidance (Figure 3). After 8 months of treatment the correct anterior relationship was obtained. The patient showed a late mixed dentition and he was monitored with a functional approach using a Bionator.³

Radiographic inspection was used to evaluate the radiopaque mass and the development of the upper permanent right canine. When the upper left canine was erupting, the patient was referred for consultation regarding the radiopaque mass to the surgeon. It was decided to remove the lesion to facilitate the eruption of the upper permanent right canine. To allow for the removal of the lesion the upper primary right canine was extracted too. Post healing was uncomplicated. Clinical examination revealed the amorphous mass to be an odontoma of five millimeters, consisting of calcified small structures looking like teeth. Five months after the surgical treatment the upper permanent right canine was going to erupt spontaneously (Figure 4). Orthodontic treatment involved upper and lower full arch banding to obtain uprighting of the lower first molars, correct alignment, overbite and overjet (Figures 5-6).

DISCUSSION

In the management of eruption disturbances in the primary dentition early recognition and diagnosis as well as proper step of treatment and careful following up are very important. The first problem to analyze in this patient is the ankylosed primary molar.

Ankylosed tooth is a mixed dentition problem that needs orthodontic therapy because it seldom self-corrects.³

Consequences of the secondary infraoccluded retention of primary molars are: tipping of the neighboring teeth, loss of space, extreme eruption of the antagonist and consequent alteration in the occlusal plane in the opposite jaw, posterior open bite, malocclusion and rotations in the succedaneous teeth.^{2,4-10}



Figure 3. Panoramic view after the first phase of orthodontic treatment.



Figure 4. Panoramic view after surgical treatment.



Figure 5. Intraoral frontal view after orthodontic treatment.

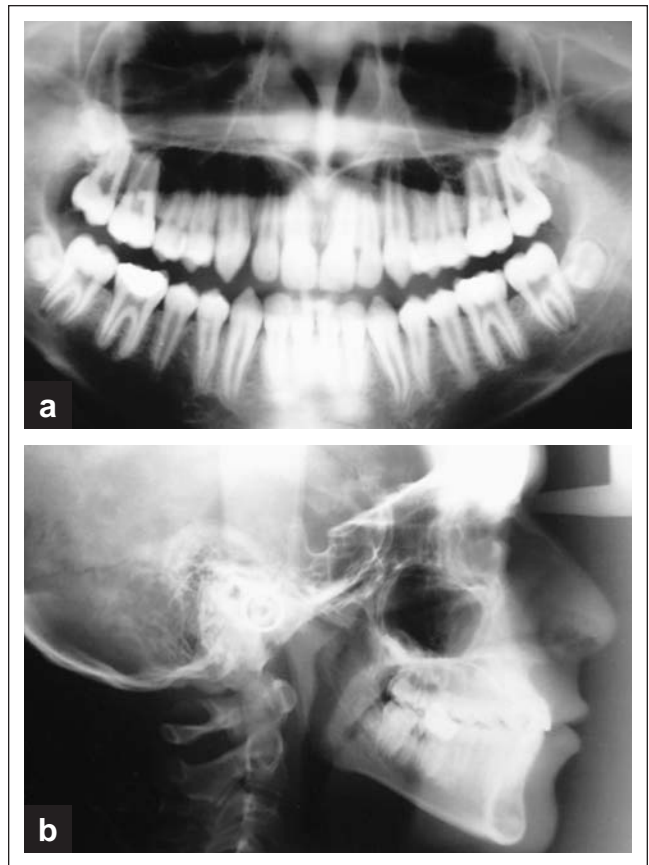


Figure 6. Radiographic views after orthodontic treatment: a. Panoramic view; b. Lateral cephalometric radiography view.

Many of complications were observed in this patient:

1. tipping of the first molar as result of primary mandibular infraocclusion of second molars;
2. second premolar development was slower than the other premolars;
3. loss of space.

Early or late onset of the treatment depends on the severity of infraocclusion, the presence and the location of the succedaneous,¹¹ the extent of tilting of the neighboring teeth and the age of the patient.^{5,9}

In case of minimal infraocclusion careful monitoring every 6 to 12 months will allow assessment of the rate of progression of the condition; in these cases the extraction of the infraoccluded tooth must be delayed until the permanent tooth on the opposite side of the mouth is ready to erupt.^{3,5,8,9}

Extraction of the ankylosed retained molar and the use of a space maintainer are indicated in cases of severe infraocclusion, serious occlusal disturbances and dislocation of the crypt of the successor, as in the present case.

Early extraction is often advised, as removal may become increasingly more difficult as the infraocclusion progresses.^{5,9}

In our case considering the age of the patient, degree of the infraocclusion, the existence of the successor tooth, the absence of the primary second molar on the opposite side of the mouth and the consequent necessity of a space maintainer, extraction of the infraoccluded molar was recommended.

At the same time the other problem to correct in this patient is the dental class III malocclusion, as result of the lingual inclination of the upper incisors.

Pseudo class III problem (malocclusion) warrants early intervention to facilitate normal growth and development of the cranio-facial complex.^{1,3,12}

Early intervention temporarily improves skeletal relationship by influencing the increment and direction of facial growth.¹²

To correct the class III dental malocclusion in this patient we used a rapid maxillary expansion device to increase transversal dimension and a fixed edgewise appliance to obtain alignment and leveling of the permanent upper incisors. There is some evidence in the literature that maxillary expansion can be beneficial in certain types of class III malocclusion. In fact palatal expansion has been shown to produce a forward and downward movement of the maxilla, by affecting the inter-maxillary and circummaxillary sutures.¹³⁻¹⁵

The last problem of this patient to treat was the presence of an odontoma apically to the root of the primary upper right canine, which delayed the development of the permanent canine.

According to some authors^{16,17} the surgical removal of odontoma allowed the spontaneous eruption of the impacted tooth, without orthodontic appliance.

However Becker¹⁸ affirmed that this resolution is far from adequate in most cases, and it is therefore necessary to treat impacted tooth with an orthodontic appliance, after the surgical removal of the lesion.

CONCLUSION

Careful supervision of the developing dentition and occlusion and correct diagnosis of aberrations in eruption are essential for early intervention and for preventing complications. In fact one goal of early treatment should be the correction of disturbances during the eruption.

The treatment and prognosis may include a broad range of options, from passive observation with periodic radiographic follow up to exposure with traction of the tooth and to a rather aggressive decision of extracting the tooth.

Specific objectives of treatment are to create or maintain space, guide eruption of the impacted tooth and establish ideal transverse dental arch width of the posterior teeth, class I canine and molar relationships bilaterally and ideal overbite and overjet.

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