

# Clinical management of the ectopic eruption of a maxillary first permanent molar – Case report

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## ABSTRACT

Ectopic eruption is a concept including those clinical cases in which teeth show abnormal eruption pattern and erupt ectopically, in an incorrect position. This abnormality has been pointed out in the literature for the first permanent molars, mainly the maxillary ones. There is no specific etiological factor for this abnormality in the first permanent molar, but different factors are reported. The early approach of the ectopic eruption of the first permanent molar can prevent effects such as the early root resorption of the adjacent deciduous second molar and the loss of space for eruption of the premolar successor as well. The purpose of this paper was to report a ectopic eruption of a maxillary first permanent molar diagnosed in a nine-year-old patient with severe root resorption of the adjacent deciduous second molar. A simple and effective therapeutic approach was implemented to treat such abnormality. This clinical case was followed until complete eruption of the premolar successor.

**Keywords:** tooth eruption, ectopic tooth eruption, molar.

## Abordagem clínica da erupção ectópica de um primeiro molar permanente superior – Relato de caso

### RESUMO

Erupção ectópica é um conceito utilizado para designar aqueles casos em que os dentes apresentam algum desvio em seu padrão normal de erupção, ou seja, erupcionam numa posição atípica. Esta condição tem sido descrita na literatura para os primeiros molares permanentes, principalmente os superiores. Não há um fator etiológico específico para a erupção ectópica do primeiro molar permanente, onde diferentes fatores são relatados. A abordagem precoce da erupção ectópica do primeiro molar permanente poderá evitar sequelas, tais como a reabsorção radicular precoce do segundo molar decíduo adjacente, bem como a perda de espaço para

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erupção do pré-molar sucessor. O objetivo deste trabalho é descrever um caso de erupção ectópica de um primeiro molar permanente superior, em uma paciente de nove anos de idade, com reabsorção radicular severa do segundo molar decíduo adjacente. Uma abordagem terapêutica simples e efetiva foi adotada para o tratamento da erupção ectópica. O caso foi acompanhado até a completa erupção do segundo pré-molar sucessor.

**Palavras-chave:** erupção dentária, erupção ectópica de dente, dente molar.

## INTRODUCTION

The term ectopic eruption includes those cases in which permanent teeth show abnormal eruption pattern. Thus, ectopic eruption reflects the eruption of a tooth in an incorrect position (1). The first permanent molar is considered ectopic when radiographic examination shows superposed image and impaction on the roof of the deciduous second molar. Therefore, this abnormality can be diagnosed by radiographic examination before the eruption of the tooth (1,2).

Different causes have been suggested for ectopic eruption of the first molar, such as: abnormal angle of eruption of the first molar, larger first permanent molar and adjacent deciduous second molar, posteriorly positioned maxilla relative to the cranial base, maxillary atresia, premature eruption of first molar, asynchrony between the eruption of the maxillary first permanent molar and maxillary tuberosity growth, genetic factors, and patients with cleft lip and/or palate (2-10).

Ectopic eruption of the first permanent molars shows values ranging from less than 1% to nearly 5% (1,10). Young (11) revealed that ectopic eruption is more frequent in boys than in girls. However, other studies did not find differences between genders (1,10).

This clinical abnormality may occur in both arches, but is more frequent in the maxilla (3,11,12). Pulver (4) and Chintakanon and Boonpinon (10), state that there was no predominance of one side of the arch. However, a higher prevalence of the right side has also been reported (1).

Ectopic eruption of the permanent first molar can be classified into reversible (“jump”) or irreversible (“hold”). The reversible type is that in which the molar self-corrects spontaneously, resuming its normal eruption pattern. The irreversible type does not self-correct spontaneously, requiring therapeutic treatment. Spontaneous correction depends on the degree of atypical root resorption of the deciduous second molar, resulting from the ectopic eruption of the permanent molar, and on the magnitude of the impaction of this tooth (11,13-15).

Atypical root resorption of the deciduous second molar can be classified into four grades: grade I (mild), with resorption limited to cementum or with minimum dentin penetration; grade II (moderate), resorption of the dentin without pulp exposition; grade III (severe), resorption of the distal root leading to pulp exposure; grade IV (very severe), with resorption affecting the mesial root of the deciduous molar (1). The degree

of root resorption of the deciduous second molars may not be a criterion to define a case as reversible or irreversible (10).

The impacted tooth can cause root resorption of the deciduous second molar and its exfoliation, resulting in the premature loss of this tooth. This leads to a mesial eruption of the first permanent molar, which may result in the impaction of the second premolar (11,13,16).

As for treatment timing, the therapy adopted should coincide with the active phase of tooth eruption of the first permanent molar (14,16). The therapeutic attitude varies from follow-up of suspected cases of reversible ectopic eruption to the extraction of the resorpted deciduous second molar (11,17). The distalization of the impacted molar, with the maintenance of the deciduous second molar, may be achieved by the placement of brass wires or separator elastics in the area of contact between the first permanent molar and the deciduous second molar. Fixed braces may also be used (2,12,16-23).

The purpose of this paper was to report an ectopic eruption of a maxillary first permanent molar, diagnosed in a nine-year-old patient with severe root resorption of the adjacent deciduous second molar.

## CASE REPORT

A nine-year-old female patient attended to the Children's Clinic of the School of Dentistry, Universidade Luterana do Brasil (ULBRA), Canoas, Brazil, for a routine checkup appointment.

Intraoral examination revealed that the right maxillary first permanent molar was below the occlusal plane relative to the adjacent deciduous molar. The tooth in question was partially erupted and its mesial surface was in a lower plane compared with the distal surface. In addition, its mesial marginal ridge was partially covered by the distal surface of the adjacent deciduous second molar (Figures 1 e 2). The clinical condition showed an ectopic eruption of the first permanent molar.



FIGURE 1 – Clinical image of the partially erupted maxillary first permanent molar and the crown with mesial inclination.



FIGURE 2 – Mesial marginal ridge of the first permanent molar partially covered by the distal surface of the deciduous molar.

A periapical radiographic examination of the region confirmed the clinical condition, besides having an atypical pattern of root resorption of the right maxillary deciduous second molar and impaction of the first permanent molar in the distal surface of the deciduous molar (Figure 3).



FIGURE 3 – Radiograph showing impaction and ectopic eruption of the first permanent molar and the resulting pathological resorption of the adjacent deciduous molar.

Clinical and radiographic examination confirmed ectopic eruption and impaction of the first permanent molar, associated with atypical root resorption of the adjacent deciduous molar. The deciduous second molar did not show any clinical sign or symptom indicative of pulp damage due to pathological resorption. Based on the methodology proposed by Barberia-Leache et al. (1), the severity of resorption of the deciduous second molar and the degree of impaction of the first permanent molar were characterized. The degree of impaction was 1.5 mm and resorption was categorized as grade III. In model analysis, the patient showed negative discrepancy.

The proposed treatment was the placement of a “twisted” brass wire between the first permanent molar and the deciduous second molar (Figures 4 and 5). The

activation, by means of wire twisting, was performed at the moment of insertion and after fifteen and thirty days. The patient was assessed one week after the last activation, showing clinical and radiographic disimpaction of the first permanent molar (Figures 6 and 7).



FIGURE 4 – Clinical image of the start of treatment with brass wire.



FIGURE 5 – Radiograph of brass wire placement.



FIGURE 6 – Clinical image of the first permanent molar already disimpacted after removal of brass wire.



FIGURE 7 – Radiograph displaying disimpaction and the process of ongoing rholysis of the deciduous molar.

The patient was clinically discharged and began to be followed on a six-monthly basis, when exfoliation of the deciduous second molar and proper eruption of the premolar successor were observed (Figures 8 and 9). After two years of follow-up, the patient was referred to corrective orthodontic treatment for esthetic and functional completion.



FIGURE 8 – Image showing proper eruption and positioning of premolar in the arch after two years of follow-up.



FIGURE 9 – Radiograph of erupted second premolar.

## DISCUSSION

The purpose of this paper was to report the clinical case of a patient with ectopic eruption of a maxillary first permanent molar, focusing on the main clinical and radiographic features of the case, as well as its treatment.

The described clinical picture was diagnosed as ectopic eruption based on the literature. According to Barberia-Leache et al. (1), the maxillary first permanent molar is regarded as ectopically erupted if it appears radiographically in a superposed image and impacted in the distobuccal root of the second deciduous molar; besides that, the distal cusps of the permanent molar emerge before the mesial cusps.

Some studies describe a higher prevalence of ectopic eruption in maxillary molars (3,11,12). Therefore, the case described herein is in accordance with the most common clinical manifestation described in studies, since it involved a maxillary molar. Different factors have been associated with the etiology of this abnormality (2-10), and the negative model discrepancy observed in this case may be associated with the described ectopy.

Some authors demonstrated that the ectopic eruption of the maxillary first permanent molars can occur both unilaterally and bilaterally (1,10). Barberia-Leache et al. described a higher frequency for the right side, when the eruption is unilateral (1). The case reported in this paper involved the right side of the arch, in a unilateral pattern. This higher frequency of the right side, when the condition is unilateral, is difficult to explain, but, like in other multifactorial anomalies, there is a variation in the frequency of sides. However, there are also reports showing no difference in distribution between sides (10).

The average impaction of ectopic maxillary first permanent molars ranged from 1.6mm to 2.91mm (1). In the case described herein, impaction was 1.5mm. Greater impactions are associated with more severe degrees of resorption of the adjacent deciduous molar. In the case reported herein, the resorption of the deciduous molar was categorized as severe (grade III), and the magnitude of impaction of the first permanent molar was close to the average described in the literature (1).

Barberia-Leache et al. (1) did not find a correlation between the degree of resorption of the deciduous molars and the average impaction (mm) of maxillary first permanent molars, due to the fact that small impactions sometimes cause severe resorptions and greater impactions are also associated with less severe resorptions. Grades I and II were associated with cases of self-correction of impacted molars, while grades III and IV were related to the maintenance of the impaction (1). It is necessary to emphasize that the case described herein required intervention, because the severity of the impaction was grade III, with a greater probability of the first permanent molar to remain in the ectopic position.

Sequelae may occur in the absence of early diagnosis and proper treatment. One of them is the root resorption of the second deciduous molar and its resulting exfoliation,

which causes the premature loss of this tooth, resulting in the mesial eruption of the first permanent molar. This mesialization might lead to the loss of the space available for the eruption of the second premolar (11,13,16). Early diagnosis and the immediate start of treatment, using the natural forces of eruption of the first molar, allow the prevention of future malocclusions (1). In the case described herein, if the condition had been diagnosed at an early age, the higher root resorption of the deciduous molar could be prevented. However, even with the severe resorption caused by the ectopic eruption of the permanent molar, the patient did not report any local painful symptom or discomfort until exfoliation of the tooth in question. The absence of local pain and infection, even in cases of resorption of deciduous molars, has been reported in cases of ectopic eruption of the first molars (10).

Generally, ectopic eruption was not the reason for consultation of the patients assessed. The diagnosis is determined by a delay or asymmetry in molar eruption and is radiographically confirmed. It should be reinforced that the clinical examination is fundamental, but the radiographical diagnosis is definitive.

The degree of root resorption of the deciduous second molar may depend on the place where the first permanent molar impacts this tooth. If the crown is impacted, where there is enamel, resorption will not occur; however, the chance of resorption is greater if it occurs below the cemento-enamel junction. (10).

It has been suggested that self-correction depends on the degree of resorption and on the amount of enamel of the second molar superposing the crown of the first molar (15). However, this was not confirmed in the study by Chintakanon and Boonpinon (10), in which two reversible cases of maxillary ectopic eruption showed a high degree of root resorption of the deciduous molar. Thus, the degree of root resorption of deciduous second molars is not a criterion to define a case as reversible or irreversible. Additionally, in the same study, all cases affecting the mandible were irreversible and resorption was not observed in most cases.

In the case described herein, it was found that the first permanent molar was below the occlusal plane relative to the deciduous second molars, and radiographic examination confirmed the impaction of the first permanent molar in the distal surface of the deciduous molar and an atypical resorption pattern for this tooth. The deciduous second molar showed no clinical sign or symptom indicative of pulp damage due to pathological resorption. Therefore, it was decided to maintain the deciduous molar rather than to extract it.

Conservative and simple therapeutic approaches may be adopted, such as the placement of a brass wire between the first permanent molar and the deciduous second molar, in order to lead to the distalization of the impacted molar by periodically twisting the wire.

The use of the brass wire, a low cost treatment, along with the cooperation of the patient's guardians, who attended consultations, allowed the case to be resolved in a short period of time. This therapy enabled the repositioning of the permanent molar and



also the maintenance of the second deciduous molar. If it had been extracted, it would be necessary to recover the space and/or to maintain it until the eruption of the premolar successor. This would result in a higher cost treatment and a higher need of cooperation from the patient.

## **FINAL REMARKS**

It should be highlighted how important it is for the dentist to find the correct diagnosis and treatment in face of the presence of an ectopic eruption of the first molar. Diagnosis is often late, accompanied by severe root resorption of the adjacent deciduous molar. This aspect emphasizes the need of early diagnosis of this condition to prevent future occlusion impairments.

The adoption of simple and low cost therapeutic approaches may lead to the resolution of the case and to the re-establishment of the correct eruption axis of the first molar.

The diagnosis of suspected cases of ectopic eruption of first molars may be performed even before the eruption of these teeth by taking radiographs of the area. In this situation, the periodic follow-up of the patient is greatly important, in order to prevent clinical sequelae resulting from this condition.

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