

## Ectopic Eruption of the Maxillary Permanent First Molar: a Brief Review and Clinical Case Report

*Erupção Ectópica do Primeiro Molar Permanente Superior: Uma Breve Revisão e Relato de Caso Clínico*  
*Erupción Ectópica del Primer Molar Permanente Maxilar: Breve Revisión y Reporte de Caso Clínico*

Marcos Rogério de **MENDONÇA**

São Paulo State University (Unesp), School of Dentistry, Araçatuba 16015-050 Araçatuba – SP, Brazil  
<https://orcid.org/0000-0001-8081-9144>

César Henrique Fukuji **FUZIY**

São Paulo State University (Unesp), School of Dentistry, Araçatuba 16015-050 Araçatuba – SP, Brazil  
<https://orcid.org/0000-0001-6967-0158>

Mayra Fernanda **FERREIRA**

São Paulo State University (Unesp), School of Dentistry, Araçatuba 16015-050 Araçatuba – SP, Brazil  
<https://orcid.org/0000-0003-0442-3126>

Alberto Carlos Botazzo **DELBEM**

São Paulo State University (Unesp), School of Dentistry, Araçatuba 16015-050 Araçatuba – SP, Brazil  
<https://orcid.org/0000-0002-8159-4853>

### Abstract

The Ectopic Eruption of the Maxillary Permanent First Molar (EEMPFM) is an eruption anomaly, characterized for the maxillary permanent first molar's impaction in the distal surface of the deciduous second molar. The etiology is related with change of the axial axis of eruption of the permanent first molar associated with missing space in the maxilla. The diagnosis is the combination of clinical and complementary examination. There are two types of Ectopic Eruption: the reversible and the irreversible. The irreversible type requires orthodontics treatment, because it causes root resorption of the deciduous second molar, causing its premature loss. For the treatment, procedures can be used with the aim of promoting distal inclination of the ectopic first molar, using separator elastics, removable or fixed appliances. The aim of this work is to report a clinical case of a patient of 9 years and 6 months old, female gender, who attended the Clinic presenting EEMPFM of the maxillary right permanent first molar. The treatment was a removable appliance composed with an acrylic base plate with clasps and a finger spring activated against a resin button bonded on the mesiobuccal cusp of the maxillary right permanent first molar. The correction of this anomaly was obtained with 35 days of treatment. Therefore, the sequence of procedures from diagnosis to the indication of an adequate treatment method is fundamental to obtain satisfactory results.

**Descriptors:** Malocclusion; Orthodontics, Orthodontic Appliances, Preventive Orthodontics, Tooth Eruption

### Resumo

A Erupção Ectópica do Primeiro Molar Permanente Superior (EEMPS) é uma anomalia de erupção, caracterizada pela impação do primeiro molar permanente maxilar na superfície distal do segundo molar decíduo. A etiologia está relacionada com a mudança do eixo axial de erupção do primeiro molar permanente associada à falta de espaço na maxila. O diagnóstico é realizado por meio da combinação de exame clínico e complementar. Existem dois tipos de Erupção Ectópica: a reversível e a irreversível. O tipo irreversível requer tratamento ortodôntico, pois causa reabsorção das raízes do segundo molar decíduo, causando sua perda prematura. Para o tratamento, podem ser utilizados procedimentos com o objetivo de promover a inclinação distal do primeiro molar ectópico, usando elásticos separadores, aparelhos removíveis ou fixos. O objetivo deste trabalho é relatar um caso clínico de uma paciente de 9 anos e 6 meses de idade, do gênero feminino, que compareceu à clínica apresentando EEMPS do primeiro molar permanente maxilar direito. O tratamento consistiu em um aparelho removível composto por uma placa de base de acrílico com grampos e um arco ativado por mola que pressionava contra um botão de resina colado na cúspide mesiobucal do primeiro molar permanente maxilar direito. A correção dessa anomalia foi obtida com 35 dias de tratamento. Portanto, a sequência de procedimentos, desde o diagnóstico até a indicação de um método de tratamento adequado, é fundamental para obter resultados satisfatórios.

**Descritores:** Má Oclusão Classe; Ortodontia; Ortodontia Preventiva; Aparelhos Ortodônticos; Erupção Ectópica de Dente.

### Resumen

La Erupción Ectópica del Primer Molar Permanente Maxilar (EEMPM) es una anomalía de erupción, caracterizada por la impacción del primer molar permanente maxilar en la superficie distal del segundo molar decíduo. La etiología está relacionada con el cambio del eje axial de erupción del primer molar permanente asociado con falta de espacio en la maxila. El diagnóstico se realiza mediante la combinación de examen clínico y complementario. Existen dos tipos de Erupción Ectópica: reversible e irreversible. El tipo irreversible requiere tratamiento de ortodoncia, ya que causa reabsorción de las raíces del segundo molar decíduo, provocando su pérdida prematura. Para el tratamiento, se pueden utilizar procedimientos con el objetivo de promover la inclinación distal del primer molar ectópico, utilizando elásticos separadores, aparatos removibles o fijos. El objetivo de este trabajo es informar un caso clínico de una paciente de 9 años y 6 meses de edad, de género femenino, que acudió a la clínica presentando EEMPM del primer molar permanente maxilar derecho. El tratamiento consistió en un aparato removible compuesto por una base de acrílico con grapas y un resorte activado contra un botón de resina unido a la cúspide mesiobucal del primer molar permanente maxilar derecho. La corrección de esta anomalía se logró en 35 días de tratamiento. Por lo tanto, la secuencia de procedimientos desde el diagnóstico hasta la indicación de un método de tratamiento adecuado es fundamental para obtener resultados satisfactorios.

**Descritores:** Maloclusión; Ortodoncia; Aparatos Ortodônticos; Ortodoncia Preventiva; Erupción Ectópica de Dientes.

### INTRODUCTION

The ectopic eruption of the maxillary permanent first molar (EEMPFM) is an eruption anomaly, that occurs during the initial phase of mixed dentition, characterized for the maxillary permanent first molar impaction under the distal surface of the deciduous second molar<sup>1,2</sup>. The EEMPFM occurs in children in the age group between 6 and 10 years<sup>3</sup>. Regarding the side, there is no difference between the prevalence of the sides, both revealing an incidence of 50%<sup>4</sup>.

Between siblings, there is a prevalence of 19,8%<sup>3,5</sup>. Between the genders, 60% of the cases occurs in the male gender and 40% in the female gender<sup>6</sup>. The etiology of the EEMPFM is related with a combination of factors, among them: 1) Missing space in the posterior segment of the dental arch in the maxillary tuber region<sup>1,7,8,9</sup> and the oversize of the permanent first molar<sup>8</sup>; 2) Change of the axial axis of eruption of the permanent first molar, with excessive mesial angulation<sup>10-13</sup>.

The EEMPFM can be classified in two

categories: reversible and irreversible<sup>2,14,16</sup>. The difference between them is the possibility of spontaneous correction. In the reversible type, the first molar reaches its correct position without treatment, whereas, in the irreversible type, there is a necessity of orthodontic intervention<sup>17</sup>. The reversible type represents 66%, meanwhile the irreversible type represents 34%<sup>6</sup>. The accurate diagnosis of this eruption anomaly is the result of the combination between the detailed intraoral clinical examination with the complementary examination by means of a panoramic and periapical radiographs<sup>1,2,17-19</sup>. In the clinical diagnosis of the EEMPFM, through the clinical examination, the distobuccal cusp of the maxillary permanent first molar is visualized, because the mesiobuccal cusp is blocked under the distal surface of the deciduous second molar, characterizing an ectopic eruption of the maxillary permanent first molar<sup>15,18,19</sup>. Once defined the clinical diagnosis, the next step is the complementary diagnosis by means of periapical, bitewing or panoramic radiographs.

The treatment is essential, because the early intervention can reduce the extension of the bad positioning of the teeth. Furthermore, if this eruption anomaly is ignored and the appropriate treatment is not performed, it can cause complications to the individual, as premature loss of the maxillary deciduous second molar due to resorption caused for the maxillary permanent first molar, the consequent decrease of length and perimeter of the dental arch and the potential impaction of the second premolar<sup>7,17,20</sup>. Regarding this adversity, the dentist can use four types of treatment: the use of removable orthodontics appliances, the use of fixed orthodontics appliances, the tooth extraction or a more conservative approach, using methods of separation with elastics or orthodontic brass wire<sup>17,20</sup>. In cases of small resorption (less than 1.5mm), it is indicated a follow-up period from 3 to 6 months, and self-correction may occur. If there is no self-correction, the treatment is necessary<sup>20</sup>. When the required amount of movement is limited, associated with few or none clinical visibility of the first permanent molar, there are 2 types of treatment recommended: the use of elastic separator and the use of orthodontic brass wire. In this last one, it is placed an orthodontic brass wire of 0.6 or 0.7mm diameter and it is tightened around the interproximal contact area between the deciduous second molar and the permanent first molar. The wire must be tightened every two weeks<sup>20</sup>.

If the resorption is severe (more than 1.5mm) and it is necessary, a distal movement that can be realized through the orthodontics techniques mentioned above. If there is access to the occlusal surface of the permanent first molar, the options of

treatment are a acrylic plate with finger spring or simple fixed appliance, for example, a transpalatal arch and a finger spring welded on this metallic structure, acts as a lever over a button placed to the permanent first molar, forcing it distally<sup>20</sup>.

The aim of this work is to present a treatment option of EEMPFM with the use of removable appliance.

#### CLINICAL CASE

Patient of female gender, age of 9 years and 6 months, attended the Orthodontics Clinic of the School of Dentistry of Araçatuba - UNESP for a clinical routine examination. In the clinical examination, the patient presented in frontal view (Figure 1A), a balanced face, adequate lip seal and normal facial characteristics. The lateral view (Figure 1B) revealed a mildly convex profile. The clinical facial examination presented characteristics of normality.



Figure 1: In A, frontal view, and in B, profile view (Source: Author).

The intraoral clinical examination (Figure 2) evidenced the presence of a mild open bite, especially involving the maxillary right central incisor and maxillary left central incisor. In addition, the maxillary left lateral incisor revealed an anterior crossbite. Also, the patient presented a slight midline shift to the left side.



Figure 2: Intraoral Image, the frontal view (Source: Author).

In the intraoral right side (Figure 3A), the maxillary deciduous canine (Red arrow) was in Class I relationship, the maxillary right primary second molar (Yellow arrow) and mandibular right primary second molar showed mesial step for the mandible and the mesiobuccal cusp of the maxillary right permanent first molar (Blue arrow) was under the occlusal plan and its distobuccal cusp was in contact with the distobuccal cusp of the mandibular right permanent first molar. Therefore, the maxillary right permanent first molar presented in Class II relationship of dental nature. The horizontal trespass was within the normality. In the intraoral left side view (Figure 3B), the maxillary deciduous canine (Red arrow) and the maxillary permanent first molar (Blue arrow) were in Class I relationship, and the maxillary left deciduous second molar (Yellow arrow) and the mandibular left deciduous second molar revealed a mesial step for the mandible.



Figure 3: In A, the lateral view of the right side, and in B, the lateral view of the B side (Source: Author).

In the intraoral examination at maxillary occlusal view (Figure 4A), revealed a maxilla with an oval form, without showing any atresia. The maxillary left permanent lateral incisor revealed linguoversion (Red arrow - Figure 4B) and the maxillary right permanent first molar shows giroversion mesiolingual with the mesiobuccal cusp blocked under the distal surface of the maxillary right primary second molar (Blue arrow).

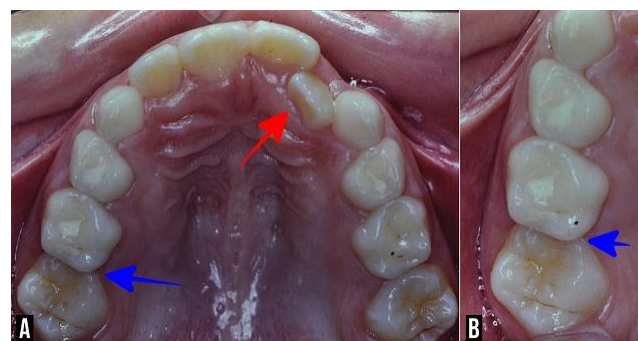


Figure 4: Intraoral image of maxilla occlusal view in A, and a close-up view in B (Source: Author).

In the intraoral examination of the occlusal view of the mandible (Figure 5), the inferior arch presented appropriate form, mild crowding of the teeth mandibular left permanent lateral incisor and the mandibular right permanent lateral incisor, and the presence of cavities in the mandibular left primary second molar and mandibular left permanent first molar.

Panoramic radiograph evaluation shows that the maxillary right permanent first molar was blocked under the distal surface of the maxillary right primary second molar and the distobuccal root of the maxillary right primary second molar showed a severe resorption with missing space for the maxillary right premolar (Figure 6 - Yellow arrow). Others radiographic characteristics were within normality.



Figure 5: Intraoral Image, mandible occlusal view (Source: Author).

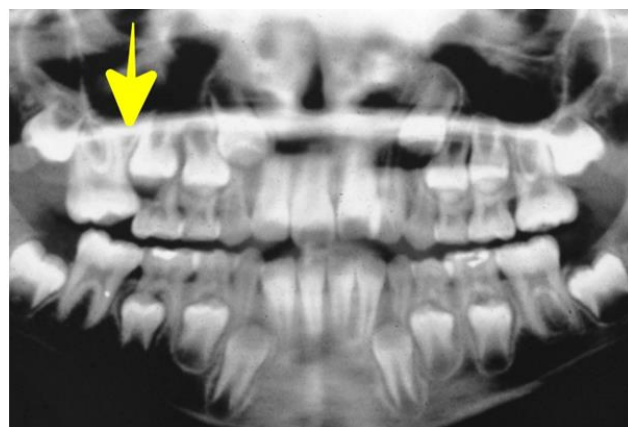


Figure 6: Panoramic Radiograph. Yellow arrow showing the maxillary right permanent first molar blocked under the distal surface of the maxillary right primary second molar (Source: Author).

The aim of the treatment for this case was the distalization of the maxillary right permanent first molar to eliminate the mesiobuccal cusp block and to regain space for the maxillary right second premolar. For the realization of the treatment, it was used an acrylic base plate with clasps and a simple finger spring (Figure 7 - Red arrow) activated against a resin button bonded on the mesiobuccal cusp of the maxillary right permanent first molar. On the mesial surface of this resin button, it was made an undercut for the digital coil spring insert (Figure 7 - Blue and yellow arrow). The activation of the finger spring was of 1mm, and the appliance was checked weakly for clinical control. The appliance was used 16 hours per day.

After 21 days, the maxillary right permanent first molar was unblocked and a space of 3mm was created between the distal surface of the maxillary

right primary second molar and the maxillary right permanent first molar (Figure 8A). After 35 days of treatment were completed, the maxillary right permanent first molar was completely unblocked (Figure 8B and Figure 9).

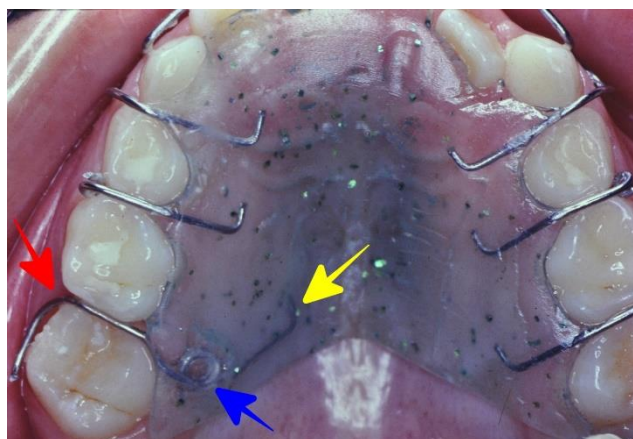


Figure 7: Intraoral Image, maxilla occlusal view (Source: Author).

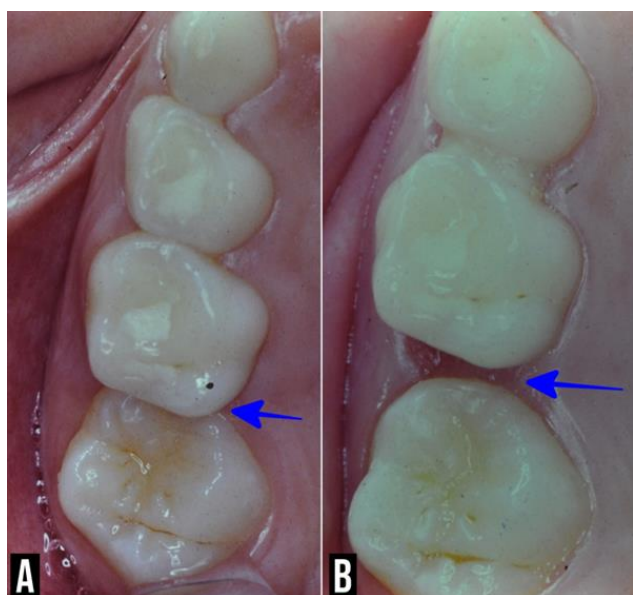


Figure 8: In A, 15 days after the beginning of the treatment, and in B, 35 days after the beginning of the treatment (Source: Author).

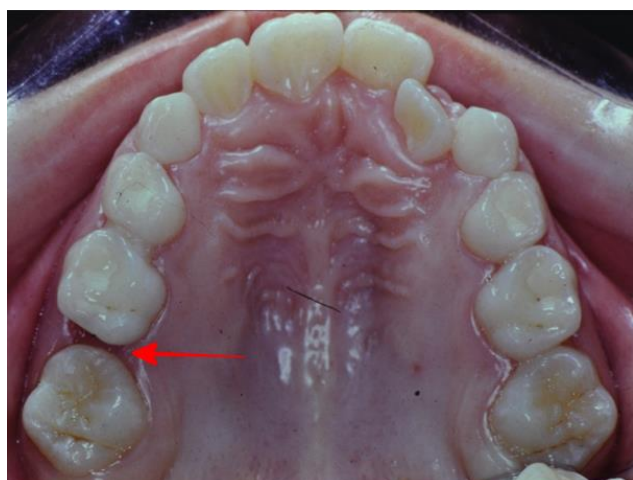


Figure 9: Intraoral Image, occlusal view, after 35 days (Source: Author).

According to image of the long-term control (Figure 10), one year after the treatment was finalized, it was noted the correction of the EEMPFM (Blue arrow), the eruption of the maxillary right second premolar and the correction of the anterior crossbite of the tooth maxillary left permanent lateral incisor (Red arrow).

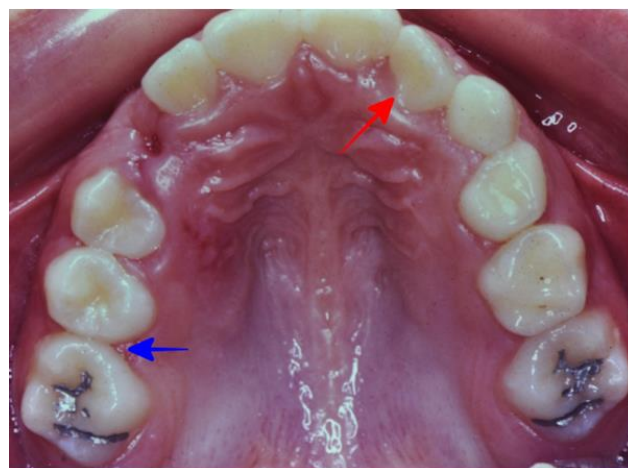


Figure 10: Intraoral Image, occlusal view, after one year (Source: Author).

### CONCLUSION

The results were obtained as planned: maxillary right permanent first molar in normal occlusion. The patient and the parents demonstrated to be satisfied with the results. With a proper treatment, ectopic eruption of the first permanent molar can have a quick and simple approach with an effective appliance, being beneficial to provide an appropriate and correct occlusion.

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### CONFLICTS OF INTERESTS

The authors declare no conflicts of interests.

### CORRESPONDING AUTHOR

**Marcos Rogério de Mendonça**

São Paulo State University (Unesp),  
School of Dentistry, Araçatuba  
16015-050 Araçatuba – SP, Brazil  
E-mail: rogerio.mendonca@unesp.br

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