

## Treatment of a Rare Bilateral Severe Ectopic Eruption of the Maxillary First Permanent Molar: A Case Report

MS. Ahmad Akhondi<sup>1,2✉</sup>, AH. Sadrhighi<sup>3</sup>

<sup>1</sup>Associate Professor, Dental Research Center, Tehran University of Medical Sciences, Tehran, Iran

<sup>2</sup>Associate Professor, Department of Orthodontics, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

<sup>3</sup>Postgraduate Student, Department of Orthodontics, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

### Abstract:

A 7.5 year-old girl was seeking orthodontic treatment because of severe ectopic eruption of maxillary first permanent molars. It was a rare case that represented approximately horizontal view in panoramic radiograph. The severity of problem was high, but since the patient had maxillary deficiency, it was important to perform the treatment without extraction. Treatment began with extraction of upper deciduous second molars and continued with a modified Nance appliance. The period of treatment was 16 months and the result was excellent. This satisfactory outcome of treatment justifies clinicians to evaluate and diagnose this group of problems and start treatment as soon as possible to achieve acceptable results.

✉ Corresponding author:  
MS. Ahmad Akhondi, Department of Orthodontics, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran.  
ahmadakh@sina.tums.ac.ir

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### INTRODUCTION

The condition in which a permanent tooth bud erupts in a wrong and undesirable position is termed ectopic eruption [1,2]. This is one of the most complicated phenomena in a dental system that may be caused by a myriad of general and local factors. It is most likely to occur in the maxillary first molar region [3]. A local disturbance in the normal path of eruption is usually the cause [4].

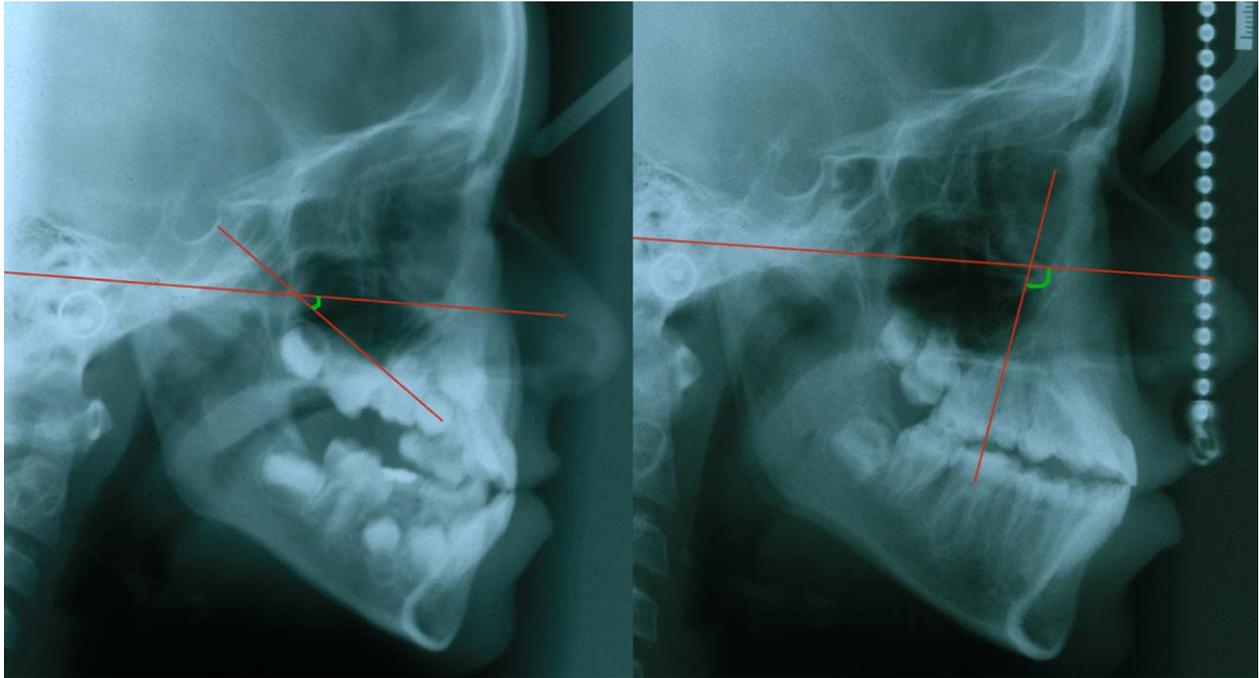
Diagnosis of this condition is almost definitely established when the maxillary first permanent molar is superimposed on the distobuccal root of the deciduous second molar and is eventually locked behind the distolingual root curvature [5].

This situation could be classified into reversible and irreversible categories. Young [6] has termed these situations "jump" and "hold" cases, respectively. In jump cases, molar teeth can

erupt spontaneously without any intervention and ultimately ends in a normal position of the molars. In contrast, hold cases are situations in which the maxillary permanent first molar could not erupt in its normal path and remains impacted [6].

The exact etiology of ectopic eruption of the maxillary permanent first molar is not well known yet. Pulver [7] mentioned multiple factors that could influence the path of normal eruption and increase the chance of ectopic eruption such as small maxilla, small arch, posteriorly positioned maxilla relative to cranial base, morphology of the distal bulbous contour of the maxillary second deciduous molar that acts as a predisposing factor to locking of the permanent molar during eruption and retarded calcification and eruption of dentition [7].

Based on different study populations, the pre-



**Fig 1.** The angle between Frankfort plane and the line tangents mesial surface of the first molars representing severity of ectopic eruption before treatment (left) and amount of improvement after treatment (right).

valence for ectopic eruption of the maxillary first molar could range between 2% and 6% [1,2]. Furthermore, prevalence of this anomaly in siblings of patients with ectopic eruption is 19.9% [8]. This malposition is considerably greater than what it is for the general population, suggestive of a genetic background.

Harrison and Michal [9] recommended a classification system for the severity of ectopic eruption. Based on the extent of radiographic superimposition, ectopic eruption is categorized into four groups with no sign of impaction to severe impaction more than the width of the distal marginal ridge.

Based on the method of Bjerklin and Kuroi [4], panoramic x-rays can be used for the measurement of the degree of mesioinclination of the first permanent molar. This method includes a horizontal reference line drawn through the lowest point of orbit fossae bilaterally and a line tangent to the mesial surface of the crown of the ectopic tooth and mesial surface of its mesiobuccal root. The resulting angle between the aforementioned lines indicates

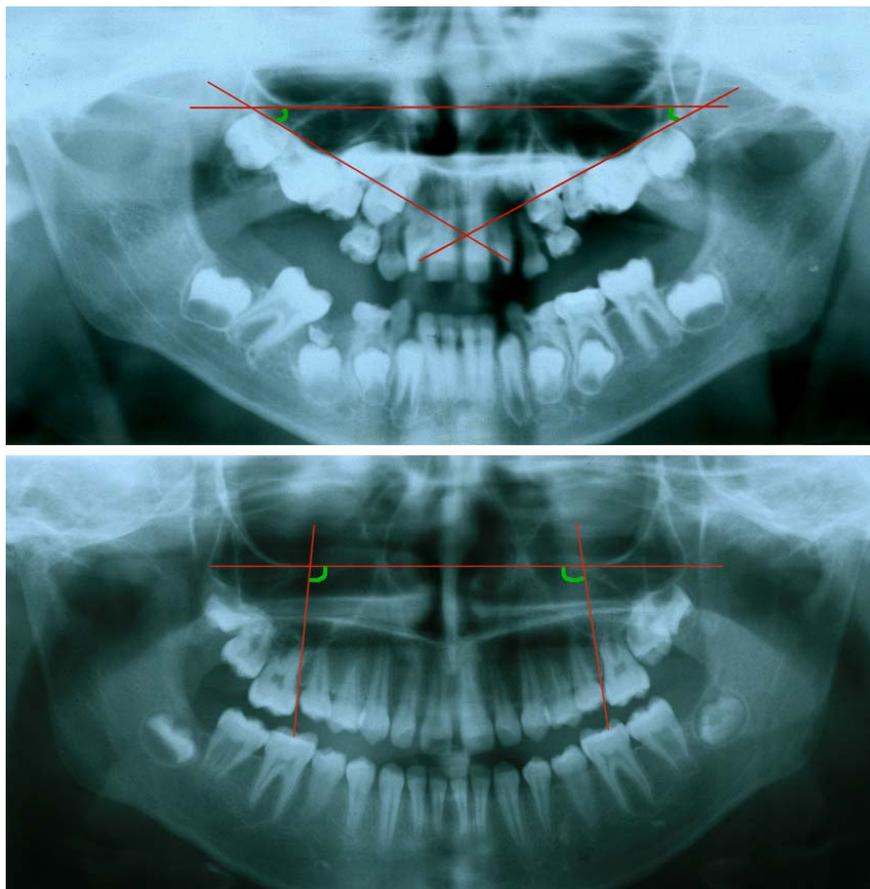
molar angulation [4].

### CASE REPORT

The parents of a 7.5 year-old girl seeking orthodontic treatment were mainly concerned with the general delay in eruption of the teeth. Her physical status was recorded as normal. The only issues in regard to her medical profile were a history of adenoidectomy three years prior to admission as well as a nail biting habit. In dental evaluation, she had impaction of primary upper second molars and permanent upper first molars.

Considering the skeletal pattern, she demonstrated a Class III pattern with a straight profile (Fig 1). An edge-to-edge incisor relationship was apparent. Her Panoramic radiograph revealed a rare kind of severe ectopic eruption of both first permanent maxillary molars (Fig 2).

Treatment commenced with surgical extraction of upper deciduous second molars and bonding buttons to the occlusal surfaces of upper permanent first molars. The next step was fabrica



**Fig 2.** The angle between the line that connects lowest border of orbits and tangents to the mesial surfaces of the first molars representing severity of ectopic eruption before treatment (up) and amount of improvement after treatment (down).

tion of a banded appliance that basically resembled a Nance holding appliance.

It consisted of an extension of wire formed similar to a Z spring that was attached to the appliance bilaterally for distal movement of the first molar crown of upper permanent first molars. The appliance was cemented to the upper primary canines (Fig 3).

The appliance was activated by fastening elastic thread from the spring to the buttons, exerting distal force to correct the path of eruption of the first molars. This appliance was replaced with a bonded version that included the same form of springs extending towards the distal aspect of the first molars. In this situation, the spring was directly activated and engaged the button located on the occlusal sur-

face of the impacted teeth. Repositioning of the button during treatment was necessary to provide optimal access and to adjust the point of force application. After four activation appointments, new impressions were obtained and another appliance was constructed that also included bands on primary canines. This appliance was cemented one year after start of treatment.

Five times activation in each month resulted in satisfactory outcome regarding the correction of first molar inclinations. In order to assess the amount of changes in permanent upper first molar angulations at the end of treatment, Bjerklin and Kurol's [4] assessment method was used. These angles were  $33^\circ$  and  $37^\circ$  before treatment for the right and left sides, re-



**Fig 3.** The view of fixed appliance used for distal movement of first molars.

spectively. At the end of treatment the right side angle increased to  $100^\circ$  and the left to  $97^\circ$ , indicating a  $67^\circ$  correction in right side and  $60^\circ$  on the left (Fig 1 and 2). Total duration of treatment was 16 months and treatment result was satisfactory.

## DISCUSSION

This was a rare case considering the severity of ectopic eruption. Surprisingly this anomaly occurs bilaterally with approximately the same amount of deviation from normal path of eruption. There is no doubt that this case could be included in irreversible category. The severity of impactions was so high that these teeth could be considered impacted. These impactions also lead to impaction of the second deciduous molars. This patient showed maxillary deficiency and class III skeletal relationship. This type of malocclusion usually urges the clinician to avoid extractions in the upper arch in order to prevent a further decrease in overjet.

At the first glance, the severity of ectopic eruption observed in the radiograph might persuade the clinician to extract the first permanent molars. If the angulations of the ectopically erupting teeth deviate more than 45 degrees from normal path of eruption, the clinician will probably think about extraction of

those teeth. In this case, the angulations of ectopic eruptions were much more than 45 degrees from normal, which shows poor prognosis of treatment [10], but because of the maxillary deficiency, it was our aim to avoid extraction to prevent worsening the situation. Despite the severity of the malocclusion, with beginning the treatment in an appropriate age and selection of suitable appliances, the result of treatment was satisfactory.

## CONCLUSION

If treatment commences at a proper time and is based on careful treatment planning and technique, the result of treatment can be acceptable. Delaying the treatment until completion of root formation can lead to impaction and interference in the eruption of adjacent teeth. Furthermore, treatment in such a situation could be very difficult and some of the patients' teeth may be sacrificed in order to achieve the treatment result. The earlier treatment is started, the more acceptable results could be achieved.

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