

MODIFIED HALTERMAN APPLIANCE-A KEY TO ALTER BILATERAL ECTOPIC ERUPTION OF MAXILLARY PERMANENT FIRST MOLARS

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ABSTRACT

The purpose of this case report was to introduce a simple method of correcting bilateral ectopic eruption of permanent molars using modified Halterman appliance. An 8-year-old boy reported to the Department of Pedodontics and Preventive Dentistry with a chief complaint of food lodgement in his upper right and left back tooth region. Clinical and radiographic examination revealed proximal caries to right and left upper deciduous first as well as second molars and also the mesial surfaces of permanent first molars were well below the distal surfaces of deciduous second molars suggesting ectopic eruption. The ectopically erupting maxillary permanent first molars were successfully treated by distalization within 5 months using modified Halterman appliance combined with Nance Palatal arch.

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INTRODUCTION

The mixed dentition period often presents with a variety of challenges for the pediatric dentist to manage in children. Ectopic eruption of the permanent maxillary first molar is most frequently found such phenomenon to be stressed in pediatric dentistry.[1] It is defined as “a condition in which the permanent teeth, because of deficiency of growth in the jaw or segment of jaw, assume a path of eruption that intercepts a primary tooth, causes its premature loss and produces a consequent malposition of the permanent tooth.”[2]

Ectopic eruption of permanent first molars occurs in 3-4% of children. The maxillary arch is commonly affected, and in the case of the mandible, it is a very rare condition.[3] The ectopically erupted permanent molar may cause premature root resorption, premature exfoliation or pulp obliteration of deciduous second molars.[1] Early diagnosis and treatment of ectopic eruption can prevent premature loss of second deciduous molar and thereby the resulting malocclusion.

Here we present a case report on successful correction of bilateral ectopic eruption of maxillary permanent first molars using modified Halterman appliance combined with Nance Palatal Arch.

Case report

An 8-year-old male child reported to the Department

Of Pedodontics and Preventive Dentistry with the chief complaint of food lodgement in right and left upper back tooth region. Extra oral examination showed no significant findings. Intraoral examination showed proximal carious lesions in relation to upper right and left first and second deciduous molars. The molar relation was not achieved because mesial cusps of maxillary permanent first molars were locked below the distal crown surfaces of deciduous second molars. There was no tooth mobility or tenderness to percussion in relation to maxillary primary second molars. Intraoral periapical radiograph showed ectopically erupting maxillary right and left first permanent molars with resorption of the primary second molars. Clinically canting of maxillary second primary molars was observed (Fig 1,2,3). With the clinical and radiographic findings, the right and left maxillary permanent first molars were diagnosed as ectopically erupting molars.



Fig 1 Intra oral pre operative

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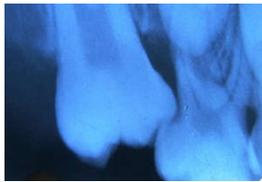


Fig 2 16 pre operative radiograph



Fig 3 26 pre operative radiograph

Treatment

Carious lesions proximal carious lesions in relation to upper right and left first and second deciduous molars were restored with Type IX *Fuji* (GC, Tokyo, Japan) Glass ionomer cement. Later the case was planned for Distalization of the ectopically erupting maxillary first permanent molars using Modified Halterman appliance.

Modified Halterman appliance design

After oral prophylaxis both right and left second deciduous molars were banded and an alginate impression was made. After stabilizing the molar bands in proper position stone cast was made. A Nance palatal arch was adapted using 0.036 stainless steel wire on the cast in order to enhance anchorage to the appliance. An acrylic button with a diameter of 12.5 mm was incorporated to increase retention to the appliance (Fig 4). A wire component with a U-shaped bend with a distal extension consisting of a hook at the terminal end of the wire was soldered buccally to the molar bands. Wire components were adapted in such a way to prevent impingement on soft tissues. The appliance was cemented using type I *Fuji* (GC, Tokyo, Japan) Glassionomer cement.



Fig 4 Modified Halterman appliance

A medium sized lingual button was selected. Under proper isolation the occlusal surface of maxillary first permanent molars were etched, bonding agent was applied curing was done, then using flowable composite lingual buttons were placed and light cured. The occlusal button was placed as far as mesially as possible to allow greater length of elastic chain to assist the distalization and also to reduce occlusal trauma by preventing occlusal interferences if the button is placed more distally.[3] An elastic chain was stretched and engaged

from the occlusal button to the distal extension hook with the help of an artery forceps(Fig 5,6,7).



Fig 5 Immediately after appliance insertion



Fig 6 16 Immediate post operative radiograph



Fig 7 26 Immediate post operative radiograph

Monthly activation of the modified Halterman appliance combined with Nance Palatal arch was done by replacing the elastic chains. After 2 months of the appliance placement, the intra-oralperiapical radiograph revealed 2-3 mm distal movement of the maxillary left first permanent molar and 1-2 mm distal movement of maxillary right permanent molar. After 5 months of the continued treatment ectopic eruption of both permanent molars was corrected, but the permanent first molars erupted in cross bite. To correct the cross bite Quad helix appliance was planned (Fig 8 and Fig 9).



Fig 8 Quad helix appliance



Fig 9 Intra oral Quad helix appliance

Quad helix was activated for every 2 weeks and after 1 month the cross bite was also corrected (Fig 10,11,12). Therefore the complete treatment span was 6 months in this case.



Fig 10 Intra oral post operative



Fig 11 5th month post-operative radiograph



Fig 12 26 5th month post-operative radiograph

DISCUSSION

Ectopic eruption of permanent maxillary first molar is a developmental disorder in the path of eruption was first described by Chapman in 1923.[4,5] Several etiologic factors have been suggested for ectopic eruption of first permanent molars, which include lack of growth in the posterior region of the jaw, inadequate arch length, abnormally large first permanent molars mesially inclined eruption path of first permanent molars [6,7,8] and significant familial tendency with multifactorial mode of inheritance.[9]

Pulver indicated that the etiology of ectopic eruption of the maxillary first molar was a combination of a small maxilla, larger primary and permanent molars, and abnormal angulation of the eruption of the permanent first molars. Ectopic eruption has been often unrecognized condition, recognized during routine clinical and radiographic examination.[1]

Ectopic eruption of first permanent molar is of two types, reversible and irreversible, also called “Jump” and “hold” types, respectively.[10] In the case of reversible ectopic eruption, no treatment is needed in children as the permanent molar spontaneously frees itself and erupts. [11] Whereas Sim recommended early treatment which can prevent space loss of 6-8mm.[1] Various techniques such as interproximal wedging, brass wire, elastic separators, Halterman appliance, Humphrey appliance, spring loaded appliance, cross arch appliance, double spring appliance, removable appliance with double spring and cervical headgear appliance.[3,10,12]

In most cases, brass wire or separator alone is not effective since the amount of space that could be created is limited. Humphrey appliance, which can be an invasive procedure if a

shallow preparation is done on the occlusal surface of permanent first molar to engage wire component, requires more chairside time, laboratory procedure and time required to disimpact the ectopically erupting permanent first molar from the distal cervical constriction of the primary second molars with Humphrey appliance is two and half months approximately. Teeth separating material may cause pain and infection during activation.[5] Cervical headgear can be used, but it may show potential orthopaedic changes on the maxilla.

Therefore in the present case report, Modified Halterman appliance combined with Nance palatal arch was designed for correction of bilateral ectopic eruption of maxillary permanent molars. Similarly, for the correction of bilateral ectopic eruption of mandibular molars, Modified Halterman appliance incorporated with Lingual arch can be suggested.

CONCLUSION

Modified Halterman appliance combined with Nance Palatal arch can be recommended as a better option for the successful correction of bilateral ectopic eruption of maxillary permanent molars as it gathers more anchorage because of its design and more reliable in such clinical situations with high predictability of success when compared to the other conventional methods.

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