Management of Ectopic Eruption of Maxillary First Molar: a Case Report

Sirisan Jariyapongpaiboon, DDS., Khandakar Nuruzzaman, DDS.
Dental department, Queen Sirikit National Institute of Child Health, Khet Ratchathewi, Bangkok, 10400
(Email: sirisanj@gmail.com)
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บทคัดย่อ: การแก้ไขการขึ้นผิดที่ของฟันกรามแท้บนซี่ที่หนึ่ง: รายงานผู้ป่วย 1 ราย

สิริสรรค์ จริยพงศ์ไพบูลย์ ท.บ.*, Khandakar Nuruzzaman ท.บ.**
กลุ่มงานทันตกรรม สถาบันสุขภาพเด็กแห่งชาติมหาราชินี เขตราชเทวี กรุงเทพมหานคร 10400

การขึ้นของฟันเป็นปรากฏการณ์ที่ซับซ้อน มีปัจจัยทางพันธุกรรมและสิ่งแวดล้อมที่เกี่ยวข้องอยู่หลายประการ ฟันขึ้นผิดที่ (ectopic eruption) หมายถึง เป็นความผิดปกติของการขึ้นของฟันทั้งตำแหน่งและทิศทางของแนวการขึ้นของฟัน ทั้งนี้หากทิ้งไว้ไม่ได้รับการรักษาตามเวลาที่เหมาะสม จะส่งผลเสียที่ตามมา ได้แก่ การล้มเอียงของฟันแท้ซี่ติดอยู่ใต้ฟันน้ำนมที่อยู่ใกล้เคียง ขนาดความกว้างของขากรรไกรลดลง และมีความผิดปกติของการสบฟันได้ เป้าหมายการรักษาการขึ้นผิดที่ของฟัน (ectopic eruption) คือ การทำให้ฟันที่ล้มเอียงกลับสู่ตำแหน่งที่ถูกต้อง และมีการสบฟันที่ปกติ การที่ตรวจพบและได้รับแก้ไขแต่เนิ่นๆ จะส่งผลการรักษามีความสำเร็จมากขึ้น มีการรักษาหลายแบบขึ้นอยู่กับความรุนแรงของความผิดปกติ การรายงานผู้ป่วยฉบับนี้ เป็นการรายงานการแก้ไขความผิดปกติของทิศทางแนวการขึ้นของฟันกรามบนแท้ซี่แรก โดยการใช้เครื่องมือชนิด Halterman appliance with Transpalatal arch ร่วมกับการปรับการสบฟันและการให้ทันตกรรมป้องกัน

คำสำคัญ: การขึ้นของฟัน การขึ้นผิดที่ ฟันกรามแท้ซี่ที่ 1 เครื่องมือจัดฟันชนิด Halterman appliance

Abstract

Tooth eruption is a complex phenomenon influenced by many genetic and environmental factors which act simultaneously to achieve normal eruption. Ectopic eruption refers to abnormal eruptive position of tooth. If left untreated it leads to different unusual outcomes like locked permanent tooth, loss of space and malocclusion. The aim of correction of ectopic erupted tooth is bring it back to the functional position as well as establishment of occlusion. Early detection and corrections result in better outcome situations. There are several corrective methods of ectopic eruption depends on severity of the condition. This case reports demonstrated correction of unilateral ectopic erupted first permanent molar with Halterman appliance with transpalatal arch followed by occlusal establishment and preventive therapy.

Keywords: Tooth eruption, Ectopic eruption, first permanent molar, Halterman appliance

Introduction

In mixed dentition stage, the eruption of permanent teeth is a complex process influenced by many genetic and environmental factors which act simultaneously to achieve normal eruption. The ectopic eruption is a relatively common occurrence in the developing dentition. The ectopic eruption describes the eruption of a tooth into an atypical position. Ectopic eruption of first permanent molar usually stands for abnormal pathway of tooth eruption that locked of distal surface with or without resorption of adjacent primary molar.[1] Ectopic eruption is a disturbances usually related to atypical position of tooth eruption and associated with delayed eruption time.[2] Ectopic eruption occurs due to deviated eruptive pathway that causes interlocking of first permanent molar beneath adjacent primary molar.[3] The etiology of ectopic eruption may be due to large primary and permanent molars, small maxillary dimension or abnormal angulation in eruptive pathway of first permanent molar.[4] Variable prevalence

of ectopic eruption of the maxillary first molars was seen in previous studies that ranges between 2% and 6%, depending on the population studied.[5] It occurs 25 times more often in maxilla than mandible. It affects both sexes equally. Clinically ectopic eruption of first permanent molar is suspected in children 7 years or older if there is delayed emergence of them in oral cavity which is further confirmed by locked behind second primary molar and mostly the crown of the first permanent molar is tipped mesially. The radiographic examination should be used in early found in 5-7 year- old child.[6] The bitewing radiograph is useful in determining the severity of ectopic eruption and orthopantomography is useful in determining the presence of the second premolar and successors. The presence of ectopic eruption can cause pain and infection around a second primary molar. Untreated ectopic eruption may result in loss of space for erupting premolars, decrease in arch length and malocclusion.[7] The treatment options depend on age of the patient, status of the second primary molar, the presence of the second premolar and severity of impaction. The techniques can be divided into interproximal wedging and distal tipping. Different types of treatment modules proposed on literature review like brass wire technique, wedging spring, fixed appliance such as Humphrey appliance, Halterman appliance and Removable appliance.[8] In the case of the primary molar is moderate to severe resorption and the permanent molar has moved uprighting and distallized. The clinician can use Halterman appliance with transpalatal arch for more anchorages for uprighting and distallized the deviated first permanent molar.[9] Early diagnosis and intervention of eruption disturbances beneficial for individual child for establishing optimum occlusion.[10] The goal of treatment of ectopic eruption is uprighting and distallized the deviated molar, space regaining and establishment of normal occlusion.[3] This article represents a case report with unilateral ectopic maxillary first permanent molar treated with Halterman appliance with transpalatal arch.

Case report

A 9 years 11 months old Thai child visited dental department of Queen Sirikit National Institute of Child Health (QSNICH), Thailand for routine dental examination. The child was in mixed dentition stage where all three first permanent molars were erupted completely except left maxillary first permanent molar was impacted under left maxillary second deciduous molar (fig. 1). The impaction was seen due to mesially inclined ectopic eruptive pathway of left maxillary first permanent molar. The bitewing (fig. 2) and orthopantomogram (fig. 3) radiographs were taken for further evaluation of status of the second primary molar, the presence of the second premolar and severity of impaction. The both types of radiographic examination showed mesial inclination of eruptive pathway of left maxillary first molar as well as impaction under the crown of the left maxillary second primary molar, the resorption of dentine and distal root of the left maxillary second primary molar and presented of the left second premolar. The impression of the maxillary teeth was taken for further study and making of treatment plan.

Fig.1 Impacted left maxillary first permanent molar

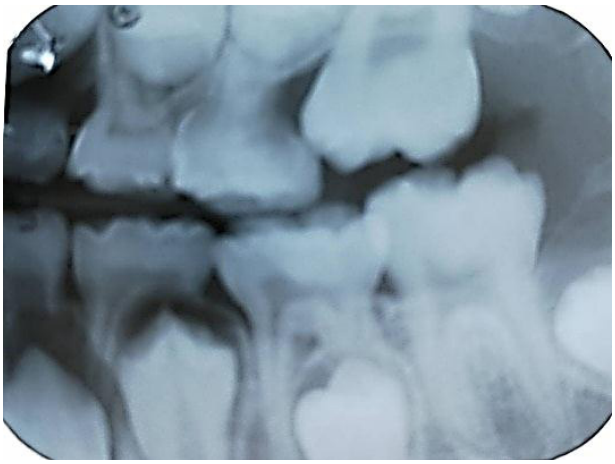

Fig.2 Bitewing radiograph

Fig.3 Orthopantomogram radiograph showed impacted left maxillary first permanent molar

After analysis of the treatment protocol, on next visit molar band trial was given on bilateral maxillary second deciduous molar and impression was taken for the purpose of making of Halterman appliance with transpalatal arch. After soldering of palatal bar and hook, the molar bands were fixed inside the mouth using glass ionomer luting cement. Lingual button was bonded on the occlusal surface of first permanent molar for power chain traction to Halterman appliance with transpalatal arch (fig. 4). The distal traction of pressure was given using power chain to the button and soldered hook with 50 gram of force. The duration for the active traction was 2 weeks with renewal of the power chain was carried out once weekly. As the interlocking was released the appliance was maintained for 1 month to preventing the relapse of the ectopic. After that the appliance was withdrawn from oral cavity and allows first permanent molar for spontaneous movement (fig. 5). On the next follow up visit after 3 months, all the premolars were erupted in aligned occlusion with no abnormality detected. All the deep pits and fissures were sealed (fig. 6) with pit and fissure sealant and child was appointed for next follow up.

Fig. 4 Halterman appliance with transpalatal arch

Fig. 5 Released interlocking following appliance therapy

Fig. 6 Well aligned sealed permanent occlusion

Discussion

Tooth eruption usually refers to a phenomenon by which movement of tooth occurs from developmental position to functional position which is affected by genetic, molecular, cellular or tissue responses.[11] Ectopic eruption is a non-symptomatic condition which is usually detected during routine examination at the time of first permanent molar eruption.[6] The etiology of ectopic eruption of first permanent molar is idiopathic and suppose to affected by both genetic and environmental factors.[12] Untreated ectopic eruption of first permanent molar may leads to premature loss of primary molar, space deficiency and unfavourable occlusion.[13] The treatment options for ectopically erupted permanent molars usually depends on the severity of the condition.[14] According to Barberia-Leache et al. classification, ectopic eruption is classified into 4 grades regarding intensity of the primary second molar distal root resorption are stated below-

Grade I: Mild - limited resorption 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 - resorption that affects the mesial root of the primary second molar.[5]

Study by Young DH found that, spontaneous self-correction in 69.4% of the cases, but in 30.6% the molar stayed locked in place. The result also added, grades I and II normally self-correct spontaneously and grades III and IV remain impacted. 15Althoght most cases of ectopically erupting permanent molar spontaneously self-correct, however the time to treatment is very important. Spontaneous correction usually occurs before seven years of age. A lack of timely intervention may result in early loss of the primary molars as well as lack of sufficient space for eruption of the second premolar.[16] The treatment options depend on age of the patient, status of the second primary molar, the presence of the second premolar and severity of impaction. The treatment techniques can be divided into interproximal wedging and distal tipping. In Grade I Mild conditions can be treated with simple and less technique sensitive elastic separators or springs.[3, 14] In this case, the ectopic eruption was categorized as grade III or severe condition due to resorption leads to pulp exposure of adjacent primary second molar. The severe condition can be treated with distal tipping of ectopic first molar by transpalatal arch on primary molars with extended cantilever arm distally.[16] Halterman appliance were selected for the treatment due to it can provide sufficient force to correct severe ectopic eruption conditions.[13] Halterman appliance uses distal tipping technique to correct ectopic eruption which is consist of band and distal extension loop. The appliance is activated through placement bonded button on first permanent molar and hooked elastomeric band or C- chain through distal loop. The disadvantages of Halterman appliance is loss of anchorage that causes mobility of adjacent deciduous tooth.[8] In this case in order to prevent anchorage loss, the right sided second deciduous molar was added to the appliance through palatal arch. Successful uprighting of permanent molar was achieved through Halterman

appliance with transpalatal arch shown in this case report. The end results were effectively achieved while retention is not recommended due to occlusal interlocking of the erupted permanent molar.

Conclusions

Ectopic eruption of first permanent molar may leads to several unusual conditions like locked permanent molar, space loss and malocclusion. Early loss of deciduous molars can also be the consequences. As incidence of ectopic eruption is relatively common, Dentists need to be aware about the sequelae and treatment options. Early detection and intervention of ectopic eruption through routine examination can helps in elimination of certain consequences as well as aids in establishment of optimum occlusion. This case report demonstrated early detection and correction of ectopically erupting first permanent molar without any harmful outcome.

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