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Case Report
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Unique Eruption Pattern: Second Premolar Eruption without Root Resorption of Its Predecessor: A Case Report

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ABSTRACT

This case describes an unusual eruption path of mandibular second premolar. In normal circumstances, the tooth follicle of the premolars are located between the roots of their predecessors and as the crown of the premolars develop and part of the root formed, the eruption commences causing gradual root resoption of primary molars and subsequent shedding. In the present case the right mandibular second premolar amazingly managed to erupt in normal alignment without causing root resorption of its predecessor.

Key words - Eruption; Root resorption; Shedding; Predecessors; Alignment.

INTRODUCTION

The tooth eruption is a complex and tightly regulated process which is divided into five stages: preeruptive movements, intraosseous stage, mucosal penetration, preocclusal and postocclusal stages. Preeruptive movements occur during crown formation and are so small that they could only be observed by vital staining experiments.[1] Active eruption movements occur when root formation begins and therefore it was believed that eruptive force comes from periodontal ligament. Although tooth eruption mechanisms are still under debate. It was suggested that periodontal ligamentprovides eruption force after the tooth has pierced gingiva but not during intraosseous stage.[2] For active tooth eruption to begin eruption pathway by osteoclasts in alveolar bone must be formed. In succedeaneous dentition, this pathway follows the gubernacular canal above each tooth; i.e., bone resorption widens the canal to allow the crown to move through it and exit the alveolar bone.[3]

From studies on the dogs it was shown that dental follicle (DF) plays major role during intraosseous stage of eruption as teeth didn't erupt if the DF had been removed. Simultaneously when the tooth in the DF was replaced with dental amalgam but the DF had been left intact, artificial tooth erupted.[4] Osteoclasts which create eruption pathway are formed from mononuclear cells which in turn are recruited to the DF by chemokines CSF-1 (functional colony-stimulating factor-1) and MCP-1 (monocyte chemotactic protein-1). Osteoblastsmight also influence the process of eruption by activating osteoclasts. Formation of the tooth eruption pathway is a localized, genetically programmed event that does not require pressure from the erupting tooth. Putative eruption genes and their products are localized primarily in either the DF or stellate reticulum.[5,6]

During intraosseous stage there is a coordinated translocation of the tooth into resorbed space, bone apposition at the DF fundus and simultaneous root elongation. Formation of the eruption pathway is completed soon after the cusps reach the alveolar crest and at this point the rate of eruption accelerates.[7]

During the process of shedding, the primary successors are positioned in such a way that it facilitates the process of roots resorption of the primary teeth with subsequent progressive resorption and exfoliation of primary teeth as permanent tooth develops. It is unusual for the permanent incisors and premolars to erupt without resorbing their predecessors.

Case Report

A 12-year old boy attended the Department of Pediatric dentistry of Dental School in Tripoli suffering from pain in the lower left molar region. On Examination, the patient had full complement of permanent dentition with lower left first molar was tilted mesialy. The striking feature was the presence of the retained lower second primary molar which was badly decayed (remaining roots) and erupted both premolars in that side with proper alignment. More amazingly, peri-apical radiograph revealed that the roots of the primary second premolar were complete with no sign of resorption (Figure 1). Because the crown of the second primary molar was destroyed by caries the periapical radiograph shows mesial tilt of the crown of first permanent molar.

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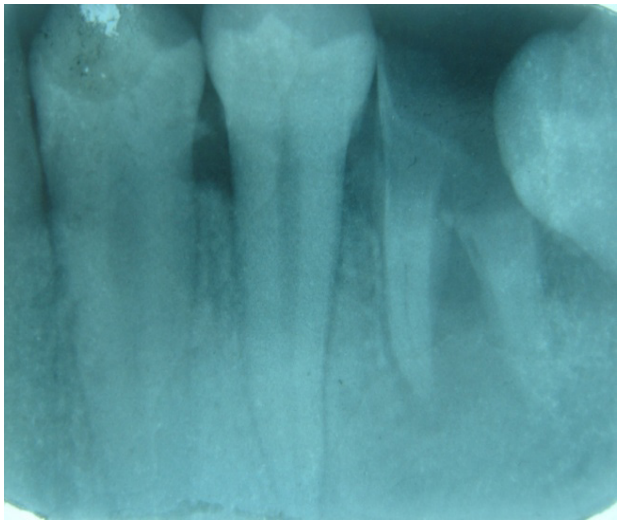

Figure 1: First and second premolars erupted with no rowding and the intact second primary molar roots.

DISCUSSION

The characteristics of occlusion of early childhood are well documented. The relative positions of the primary teeth to their predecessors are in such a way that the primary anterior teeth are positioned lingual and palatal to the upper and lower permanent anteriors respectively. In the posterior segment, the premolars are located between the roots of their predecessor (Figure 2).

During the process of eruption of permanent teeth the roots of the primary teeth gets resorbed. Sometimes, the permanent incisor erupts lingual/palatal to their predecessors causing little or no resorption to the primary teeth with subsequent delayed eruption of the permanent teeth. In the present case it is not clear how did the lower second premolar manage to erupt without causing root resorption to the second primary molar. One explanation could be mesial position of second premolar to its predecessor which is very unusual case. No such case has been mentioned in the literatures.

The treatment of the present case was extraction of retained roots of second primary molar to allow for eruption and mesial shift of first permanent molar and subsequent orthodontic space closure if required.

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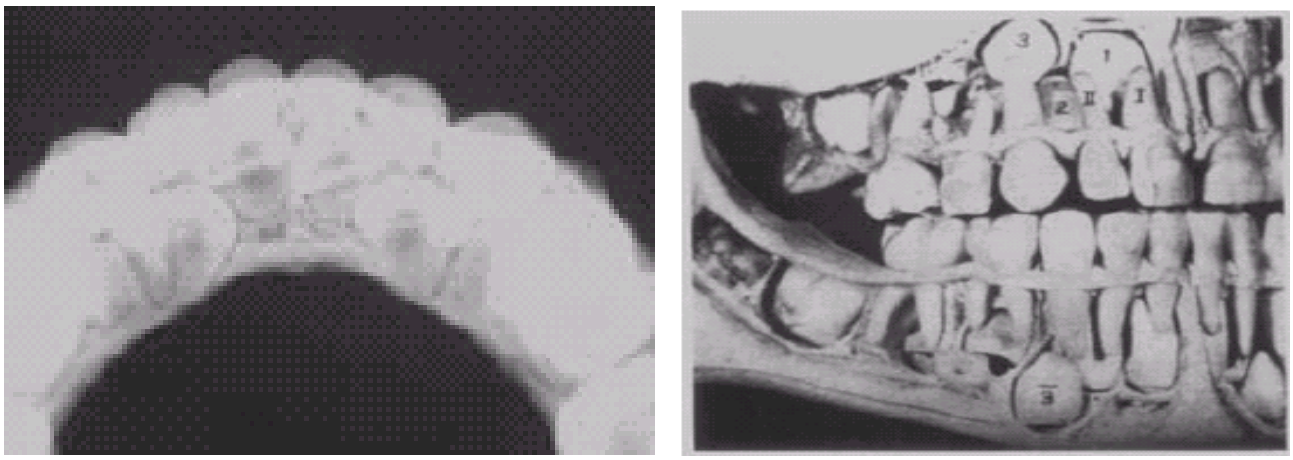

A **B**

Figure 2 (A, B): The relative position of permanent teeth to their predecessor