

An impacted primary lateral incisor as a cause of delayed eruption of a permanent tooth: case report

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Prolonged impaction of primary incisors is unusual. There have been only two such cases reported in the dental literature.^{1,2} Both cases involved maxillary primary incisors and the etiology may have been accidental trauma in both. Luxation injuries in the primary dentition are common due to the resilient nature of the bone surrounding these teeth, and complete intrusion of erupted primary incisors into the alveolar process occasionally occurs.³ However, even when a traumatic condition remains undiagnosed, intruded primary incisors don't usually remain impacted but re-erupt within a 2- to 4-mo period following the injury.³ Belostoky et al.¹ described a case in which a 10-month-old female child fell, and a maxillary primary central incisor presumed "lost" had apparently been intruded through the buccal cortical plate where it could not re-erupt. The tooth had to be surgically removed 11 years later. The authors emphasized the importance of radiographs at the time of injury to ensure that a primary tooth is indeed lost and not intruded.

Lambert and Rothman² reported a case of a 4-year-old male with an impacted maxillary primary lateral incisor, which showed no change in eruptive status during a 6-mo follow-up period. The parent did not recall dental trauma, and the authors discounted a traumatic etiology, surmising that malposition of the tooth germ was the cause of the impaction. However, both progressive discoloration of the maxillary primary central incisors (beginning at 39 months of age) and mobility were reported. These findings suggest that dental trauma could have occurred, raising the possibility that intrusive luxation may have caused the impaction in this case as well as in the previous one.

Other factors which commonly cause impaction of teeth do not similarly affect the primary incisors. These teeth occupy a superficial position within the developing alveolar process.^{4,5} Though eruption cyst and hematoma formation may briefly delay primary tooth emergence, dentigerous cyst formation associated with displacement or prolonged impaction—*as seen in the permanent dentition*—has not been reported to affect the primary teeth.⁵ Ankylosed primary molars undergoing infraocclusion may eventually become completely re-engulfed within the alveolar

process, but this condition has not been reported to affect the primary anterior teeth.⁶ Partial impaction of primary, permanent, or supernumerary teeth in the area of an alveolar cleft does occur.⁴ Other syndromes are associated with cyst formation and impaction of multiple secondary or supernumerary teeth (cleidocranial dysplasia, Gardner syndrome).⁵ However, Andreasen⁴ states that in cleidocranial dysostosis, the primary teeth, because of their superficial position, nearly always erupt spontaneously.

This case emphasizes the importance of a thorough dental history and radiographic exam in children with missing teeth.⁵ Prolonged impaction of the maxillary primary left lateral incisor was associated with eruption delay, ectopic eruption, and an apparent dilaceration of the root of the maxillary left permanent lateral incisor.

Case Report

History and chief complaint

A 9-year, 1-month-old, 56-lb girl appeared for an initial examination with the chief complaint of noneruption of the maxillary left permanent central and lateral incisors. The parents reported that the maxillary right permanent central incisor had erupted more than a year ago. Additionally, the parents stated that the maxillary left primary lateral incisor had never erupted, which heightened concern about the status of the maxillary left permanent incisors. The parents provided detailed dental records, which indicated that when the child was 3 years, 1 month of age, the maxillary left primary lateral incisor remained unerupted. Apparently, radiographs were not taken at that visit. When the child was 5 years, 6 months old and 6 years, 10 months old, maxillary occlusal radiographs were exposed and reviewed. Charting at the latter visit indicated that there had been premature loss of the maxillary left primary lateral incisor, however, notation of additional abnormality in the anterior maxillary region was not made. Both parents stated that the maxillary left primary lateral incisor had not been lost prematurely and, in fact, had never erupted. The child had been in the mother's care continuously throughout the first 3 years of life and had never had a traumatic injury to cause intrusion or the loss of the primary anterior teeth. The child was the product of an uncomplicated, full-term pregnancy and

neonatal laryngoscopy and endotracheal intubation were not used nor was the child born with natal or neonatal teeth which might have required early removal.

Oral examination

The oral exam showed a Class II, Division I malocclusion, but with good arch development and adequate space for tooth eruption. The mandibular permanent central and lateral incisors and the maxillary right permanent central and lateral incisor had erupted, but the maxillary left permanent central and lateral incisors had not. A hard swelling could be palpated just to the left of the anterior nasal spine. Maxillary occlusal and anterior periapical films confirmed the presence of the maxillary left permanent central and lateral incisors (Figs 1a, 1b) and revealed that root development of the maxillary incisors was somewhat delayed relative to the child's chronologic age.⁵ The root of the maxillary left permanent lateral incisor appeared to be dilacerated near its junction with the crown. The radiographs also revealed an impacted tooth in the left region (Figs 1a, 1b). Though superimposition complicated interpretation, the impacted tooth, in close association with the developing maxillary left permanent incisor crown, was visible in both films exposed at the previously mentioned exams (Figs 2a, 2b). The size and shape of the impacted tooth approximated that of the erupted maxillary primary incisors (Figs 1a, 1b, 2a, 2b).



Fig. 1A Occlusal radiograph (pre-op) showing impacted incisor



Fig. 1B Anterior periapical film (X-ray beam from patient's left side)



Fig. 2A Occlusal radiograph (at 5yrs, 6 months of age)



Fig. 2B Occlusal radiograph (at 6yrs, 10 months of age)

Clark's rule was used to locate the tooth for surgery.⁷ A second periapical film was exposed in approximately the same horizontal plane as the first periapical film but from an angle slightly to the left of that of the first exposure. Comparison of the two periapical films showed that the crown of the impacted tooth was positioned facially to the maxillary left permanent central incisor with its incisal edge at the approximate level of the cemento-enamel junction of the left central incisor.

Treatment

At a subsequent visit, a full-thickness envelope flap was reflected facially from the distal aspect of the right central incisor to the distal of the left primary canine. Care was taken to first separate the fibers of the maxillary frenum to preserve the integrity of the flap. Flap elevation exposed the crown of the impacted tooth. Tooth removal was accomplished with a large curette. The periosteal flap was closed with three interrupted 4-0 gut sutures and by continuous application of pressure with sterile gauze for 5 min. The impacted tooth had proportions similar to those of a primary incisor (Fig 3), however root development was incomplete and the incisal edge of the tooth had a lobed appearance (Fig 3).

At a 12-mo postoperative visit, ectopic eruption of the maxillary left permanent incisor had just occurred.

The maxillary left permanent central incisor had erupted favorably (Fig 4a). Review of the radiographs strongly suggested a dilaceration of the root of the maxillary left permanent lateral incisor such that the crown of this tooth has a marked facial orientation relative to the long axis of the root, and that the crown of the maxillary left permanent canine had drifted mesioangularly and facial to the dilacerated root of the maxillary left permanent lateral incisor (Figs 4a, 4b).

Discussion

The size and shape of the impacted tooth, its position, and degree of root development as seen on earlier films suggest that it is either the maxillary left primary lateral incisor or a supernumerary primary incisor^{5,8} (Figs 2a, 2b, 3). In view of the detailed history it seems unlikely that the maxillary left primary lateral incisor exfoliated, was removed, or avulsed. However, it is possible that a traumatic event at the initiation of tooth eruption might have caused marked intrusion of the primary lateral incisor that went unrecognized by the parent. If such event occurred at 1 year of age, the root of the maxillary primary incisor would have been approximately one-half to two-thirds formed and calcification of the crown of the permanent maxillary lateral incisor would have just

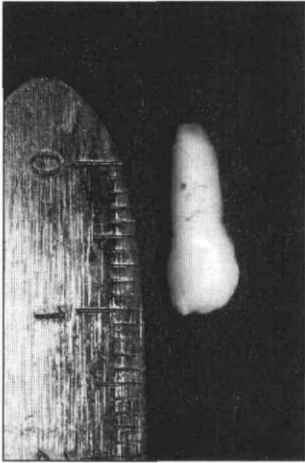


Fig. 3 The surgically removed impacted primary tooth.



Fig. 4A Frontal view, (12 months post-op)



Fig. 4B Occlusal radiograph, (12 months post-op) suggesting dilaceration of the maxillary left permanent lateral incisor and resultant mesial drift with the potential for impaction of the maxillary left permanent canine.

begun.⁹ Such an event could account for impaction and cessation of root development of the primary lateral incisor and the associated dilaceration of the root of the maxillary left permanent lateral incisor. Dilaceration of the permanent lateral incisor could also have occurred because its continued root development had to conform to the associated hard structure of the impacted tooth (Figs 2a, 2b).

Other unidentified events could have caused disruption to the dental follicle early in primary tooth development resulting in coronal deformation and subsequent noneruption of the primary incisor. Natal and neonatal intubation or laryngoscopy in preterm infants, though not implicated in this case, has been shown to cause a high frequency of coronal hypoplastic defects in maxillary anterior primary teeth.¹⁰ Such an early disruptive event could also account for the lobed appearance of the incisal edge of the impacted tooth, which is more typical of permanent than primary incisor crowns¹¹ (Fig 3).

In a comprehensive review, Primosch⁸ stated that the prevalence of supernumerary primary teeth in the population is 0.3–0.6%, that the vast majority of such teeth are of the supplemental type affecting primary lateral incisors, and that these teeth rarely remain unerupted. Supplemental teeth are not conical or tuberculate in shape but closely resemble their counterparts in the normal complement of teeth.

If the impacted tooth is a supplemental primary incisor the history would suggest that the maxillary left primary lateral incisor had never formed. If this were the case, the permanent successor would likely have not formed. Grahnen and Granath¹² showed hypodontia of primary incisors, when early extraction or tooth avulsion could not be implicated, was usually associated with agenesis of the corresponding permanent incisor. The likely rationale for their observation is that the successional tooth buds of the permanent incisors develop just lingual to the buds of their primary predecessors at about 5 to 6 mo in utero; and that this process (the development of the successional lamina from the dental lamina) is very

likely to be impaired by an abortive development of the primary incisor tooth bud.^{13, 14}

Orthodontic treatment will be initiated to correct the Class II malocclusion and to prevent impaction and encourage normal eruption of the maxillary left permanent canine.

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