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A report of an impacted primary maxillary central incisor tooth

CASE REPORT

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Abstract – Primary tooth impaction is a rare phenomenon when compared to permanent teeth impaction. The purpose of this report is to present a 5year-old Chinese girl who exhibited impaction of tooth 51, its unusual consequence on the permanent successor tooth and its comprehensive management. Her parents revealed that at 6 months of age, the patient had fallen from her bed and struck her face on the floor; however, there were no teeth present in the oral cavity. The intraoral examinations identified a bony-like projection on the buccal aspect of the alveolus in the 51 region. Radiographic examination revealed that tooth 51 exhibited an unfavourable orientation, with the crown directed towards the palate. Therefore, the impacted tooth 51 was surgically removed, and two years later tooth 11 erupted into the oral cavity with an indentation on its incisal aspect, which resembled the crown of the primary teeth, thus giving the appearance of a tooth within a tooth or 'dens in dente'. Subsequently, enameloplasty and composite resin build-up was performed on tooth 11 for aesthetic reasons. It is very unusual to have the clinical crowns of both primary and permanent teeth in such close proximity within the alveolar bone, and the present case is a good example to emphasize that trauma to the primary teeth is of considerable importance due to the close proximity of the primary teeth to permanent tooth germs.

The maxillary incisors and canines, often referred to as the 'social six', are the most prominent teeth in an individual's smile (1). The normal eruption pattern of maxillary primary central incisors occurs at approximately 6 months of age, usually when approximately one-third of the root has developed (2). However, variations in the eruption sequence of the teeth are common.

Primary tooth impactions can occur primarily due to factors such as (i) mechanical obstruction in the path of eruption, which may include odontomes, ameloblastic fibroma, (ii) ectopic position of the tooth germ either due to trauma or other reasons and (iii) primary failure of eruption (3). Nevertheless, factors such as ankylosis, infection and interferences with genetic aspect of tooth development, also traumatic injuries, may also hamper the biological mechanism controlling tooth development and thus result in tooth impactions.

Impaction of a primary tooth is a rare phenomenon when compared to permanent teeth impaction; and in the literature, there are only a few reports describing this condition (4–6). Among the very few reported instances of primary tooth impaction, the most commonly impacted primary tooth is the primary second molar and the least impacted primary tooth being is the primary first molar (5). A prevalence figure of 1 in 10 000 patients was reported by Bianchi and Rocuzzo (7), who found 3 cases of primary tooth impaction among the 30 000 panoramic radiographs they studied. Therefore, it is the purpose of this report to present a primary maxillary anterior tooth impaction, its unusual consequence on the permanent successor tooth and the comprehensive management of this problem.

Clinical report

A 5-year-old Chinese girl was referred for the management of a missing primary maxillary right central incisor tooth. The patient who was the eldest of two siblings had a medical history that was non-contributory, and there was no known family history of impacted teeth.

Her parents revealed that at $\overline{6}$ months of age, the patient had fallen from her bed and struck her face on the floor. This was a fall of approximately 75 cm. There was no loss of consciousness or vomiting following the fall. There was evidence of bleeding from the gums and frenulum; hence, they sought emergency care at a general hospital. The patient was observed for a day and was discharged, with no medications. At the time of injury, the parents recall that there were no teeth present in the oral cavity.

Tooth 61 erupted at 8 months of age. Subsequently, the parents consulted a general dental practitioner who suggested waiting for the eruption of the incisor tooth. Subsequently, the parents consulted another dental practitioner when the patient was 4 years old regarding the missing tooth 51. Following the referral by this practitioner, the extra-oral examination revealed a symmetrical face, straight lateral profile, competent lips with no evidence of any extra-oral swellings. The intraoral examination confirmed that the patient was in her primary dentition with a good oral hygiene and no carious lesions. Tooth 51 was clinically missing but on palpation of the buccal aspect of the alveolus in this region identified a bony-like projection (Fig. 1a). The colour of the overlying mucosa was paler than the surrounding soft tissues. Digital pressure did not cause pain, and there was no evidence of blanching on palpation. The space between tooth 52 and tooth 61 was 7 mm. A cross-bite was evident between teeth 61 and 71, while the molars were in a flush terminal plane relationship.

Panoramic radiography revealed the presence of all primary teeth, while the development of the permanent tooth germs was consistent with the patient's chronologic age. Tooth 51 appeared to exhibit an unfavourable orientation, with the crown directed towards the palate (Fig. 2). There was no evidence of inter-proximal carious lesions on the bitewing radiographs.

The impacted tooth 51 was surgically removed (Fig. 1b,c) under general anaesthesia, and the patient was monitored for the eruption of the permanent successor tooth. The parents were informed that tooth 11 exhibited an unusual morphology on its incisal aspect, which could well be the consequence of the trauma to tooth 51. Two years later, tooth 11 erupted into the oral cavity with an unusual morphology on its incisal aspect (Fig. 1d,e). Subsequently, enameloplasty and composite resin (Esthet.XTM 3M ESPE) build-up were performed on tooth 11 for aesthetic reasons (Fig. 1g,h).



Fig. 2. The panoramic radiograph reveals the unusual orientation of the maxillary right central incisor tooth. The anterior occlusal and periapical radiographs indicate the tooth crown to be palatal, and the root is directed towards the buccal cortical plate.

The patient is now under regular reviews to monitor the eruption of her permanent dentition.

Discussion

The calcification of the crowns of the permanent incisors starts 3–4 months after birth and completes at approximately 4 years of age, and the tooth erupts



Fig. 1. Intraoral pictures of the 5-year-old Chinese girl illustrating (a) the anterior region of the maxilla where the primary maxillary right central incisor is clinically missing, and there is a bony-like hard projection on the buccal aspect of the alveolus, (b) the impacted primary maxillary right central incisor during the surgical removal, (c) buccal and palatal views of the extracted primary tooth, (d) the unusual morphology of the permanent maxillary right central incisor, (e) the occlusal view of the permanent maxillary right central incisor with an indentation of tooth-like form, (f) the reconstruction of the indentation that resembled the crown of the primary teeth, thus giving the appearance of a tooth within a tooth or 'dens in dente' and (g) the frontal and (h) occlusal views of the permanent maxillary right central incisor tooth after enameloplasty and composite resin build-up.

into the oral cavity when the root is about one-third formed (2). Traumatic dental injuries, especially intrusion of the primary teeth, can cause considerable damage to the developing successor tooth germs depending on its stage of development (8). A recent clinical observational study (9), of children under the age of 4 years, reported that over 50% of the permanent successor teeth whose predecessors had intrusion injuries exhibited one or more developmental disturbances, approximately 28% presented with enamel hypoplasia and 16% exhibited ectopic eruption and dilacerations. Therefore, it is apparent that the younger the children are, when an intrusion injury occurs, the more severe are the consequences on the permanent successor; this was evident in the present case. The trauma experienced at the age of 6 months caused intrusion of tooth 51, which displaced the developing successor tooth germ. It then seems that the crown of the developing permanent successor calcified around the primary tooth, thus, distorting its morphology. This resulted in a permanent tooth with an indentation which resembled the crown of the primary teeth, thus giving the appearance of a tooth within a tooth or 'dens in dente' (Fig. 1f). The origi-nal description of 'dens in dente' also known as dens invaginatus radiographically presents as an infolding of enamel and dentin (enamel located in the centre which is covered by dentin peripherally due to the invagination), which may extend into the pulp cavity, the root and sometimes even to the root apex.

The reason for the 'dens in dente' appearance could be attributed to the orientation of the tooth crowns as a consequence of the traumatic injury. It is very unusual to have the clinical crowns of both primary and permanent teeth in such close proximity within the alveolar bone that the crown morphology is distorted. Normally dilacerations occur (8). The age of the patient and the resulting orientation of the crown of tooth 51 as a consequence of trauma explain the unusual clinical presentation and morphology of the tooth 11. Furthermore, the appearance of the crown of tooth 11 illustrates that the enamel was laid down to embrace the crown of tooth 55 due to the close proximity of the primary tooth and the permanent tooth germ at a stage prior to calcification of the crown.

Frequently, multiple teeth are involved following a fall on the face. Therefore, it is surprising to note that the adjacent primary anterior teeth did not exhibit any evidence of damage as a consequence of the trauma, thus developing a suspicion as to whether trauma was the primary cause for the consequences in the present case. A possible explanation is that the tooth 51 could have been in a more superficial position that the adjacent tooth germs at the time of trauma, hence bearing the entire impact. Nevertheless, one cannot rule out the possibility that the cross-bite evident on all the primary maxillary incisors is a resultant of trauma due to the palatal displacement of the primary tooth crowns.

In the presented case, a hypothetical explanation of congenital absence of tooth 51 and the concomitant occurrence of an inverted supplemental tooth 51 is redundant; as congenital absence of central incisors is very rare, reported to be as low as 0.01% (10), and that along with concomitant hyperdontia has never been reported (11). Therefore, intrusion of tooth 51 is the most likely explanation in the present case.

Intruded primary maxillary teeth re-erupt spontaneously in 78% of the cases (Innes, 2009). However, in the present case, tooth 51 failed to erupt into the oral cavity, due to its unusual orientation. Therefore, surgical removal was necessary, and given the age of the patient, it was considered appropriate to perform the procedure under general anaesthesia. Furthermore, removal of tooth 51 facilitated the eruption of tooth 11 without any further intervention. Nevertheless, enameloplasty followed by composite resin build-up was performed to enhance the aesthetics of tooth 11. The patient may require orthodontic therapy for proper alignment of her teeth; this will be considered at a later date as the patient is currently under review for monitoring the eruption of her other permanent teeth.

We opine that the present case is a good example to illustrate that trauma to the primary teeth is of considerable importance due to the close proximity of the primary teeth to permanent tooth germs. Nevertheless, the age of the patient, type of trauma and stage of development of permanent tooth germ are all factors that determine the nature and extent of damage to the permanent tooth. Therefore, a careful evaluation with appropriate patient-specific interventions and regular followup is essential in the management of orofacial trauma in children.

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