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DENTAL TRAUMATOLOGY

Case Report

Pulp canal obliteration in an unerupted permanent incisor following trauma to its primary predecessor: a case report

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Abstract – Trauma to a primary tooth may result in damage to the underlying developing permanent tooth bud because of the close proximity between the root of the primary tooth and its permanent successor. We report an unusual case where injury to the primary dentition resulted in pulp canal obliteration (PCO) of a permanent maxillary central incisor prior to its eruption. The other permanent maxillary central incisor was diagnosed as malformed because of trauma to the primary dentition at an earlier age. The occurrences of PCO or crown malformation dose not routinely disrupt the eruption of those teeth. Periodic assessment is required to determine the need for endodontic intervention.

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The effect of trauma to the primary teeth on their permanent successors is well-documented in the dental literature (1–8). A wide range of defects was described including white or yellow enamel opacity, enamel hypoplasia, dilaceration of the crown, root angulation, and arrest of root formation (2, 3, 5). It was also found that the younger the child is at the time of injury the more severe is the damage inflicted to the permanent tooth (1). Defects to the permanent incisors occur more often as a result of intrusion of their primary predecessors followed by avulsion and luxation injuries (1).

Accelerated dentine apposition with subsequent pulp canal obliteration (PCO) is a well-known complication in permanent teeth following direct trauma (6, 9). It usually occurs following mild luxation injuries to the permanent incisors (6, 10). PCO in a yet unerupted permanent incisor following trauma to its primary predecessor is extremely rare and was reported only twice in surveys (5, 11).

The purpose of the present article is to describe a case in which trauma to a primary incisor resulted in PCO of its unerupted permanent successor.

Case report

A healthy 8-year-old boy was referred to the emergency clinic of the Department of Pediatric Dentistry, Hadassah School of Dental Medicine, Jerusalem, Israel complaining that the maxillary permanent central incisors failed to erupt.

According to his dental history, his maxillary primary central incisors were injured at the age 2.5 years but were not seen by a dentist before the age of 4 years. Clinical examination, at the age of 4 years, revealed an uncomplicated crown fracture of the maxillary right primary central incisor and small mesial carious lesions on both primary central incisors. The right primary central incisor had radiographic manifestation of PCO. However, crown malformation was observed in the left permanent central incisor (Fig. 1). The child was 7.5-year-old when he fell off his bicycles and suffered another trauma to his primary anterior teeth. A dentist did not see him till his present visit at the age of 8 years. According to his mother, the primary incisors were still in the mouth at the time of the second injury.

Fig. 1. A periapical radiograph at the age of 4 years demonstrating PCO in the right primary central incisor and a crown malformation in the left permanent central incisor.

On his first visit to our department, clinical examination revealed an expansion of the gums in the area of the right maxillary central incisors. The right permanent central incisor was palpable through the soft tissue, but has not yet emerged into the oral cavity. The coronal malformation observed in the left permanent incisor in the earlier radiograph was also seen in the periapical radiograph taken at age 8 years. PCO limited to the crown and the incisal one-third of the root could be clearly seen in the, yet unerupted, right permanent central incisor (Fig. 2).

Fig. 2. A periapical radiograph at the age of 8 years exhibiting the obliterated crown of the right permanent central incisor while the developing root is partially obliterated and present an irregular apex. The left permanent central incisor crown appears malformed.

On a follow-up examination 2 month later, the right permanent central incisor had already erupted into the oral cavity. On a periapical radiograph, taken on that visit, the root seemed to continue its development and the PCO in the right tooth was evident.

Discussion

A search in the dental literature did not reveal any case report on PCO in a permanent tooth prior to its eruption. There are only two mentions of such cases in surveys of the effect of trauma to the primary dentition on the permanent teeth (5, 11). The child in the present case experienced dental trauma on two different occasions. The first, at the age of 2.5 years, affected the left permanent incisor causing coronal malformation. The right permanent incisor was probably not affected on this occasion and the PCO that was observed in the right permanent incisor must be the result of the second trauma. This is based on the fact that radiographs taken 2 years after the first injury did not reveal any pathological findings in the right permanent tooth.

At the time of the second trauma, the child was 7.5 years old. In most children at this age, the maxillary primary central incisors are already exfoliated. In the present case, the maxillary primary teeth were still in the mouth when the child fell off his bicycle and was injured. As the primary incisors were missing at the clinical examination 6 months after the injury, one can assume that the roots were almost completely resorbed. In this condition, the remaining root of the maxillary primary incisor is usually in close proximity with the incisal edge rather than the labial surface of the permanent tooth. In trauma to the primary teeth at an earlier age, the relations between the root of the primary incisor and its permanent successor will usually cause the root of the primary tooth to affect the labial surface of the permanent tooth. In the present case, the impact to the primary tooth was probably transferred to the permanent successor imitating a force needed for luxation or subluxation injuries that would result in PCO in erupted permanent teeth.

The treatment of permanent teeth with PCO is controversial. While some clinicians advocate root-canal treatment as soon as the process is detected (6), others favor the more conservative approach and suggest follow up and intervention only in cases showing clear signs of pulp necrosis (12). Robertson et al. found no higher frequency of pulp necrosis in obliterated teeth subjected to caries, new trauma, orthodontic

treatment, or complete crown coverage than intact teeth. Although the incidence of pulp necrosis in teeth displaying PCO seems to increase over the course of time, prophylactic endodontic intervention on a routine basis does not seem justified (12). Our case demonstrates that both teeth did not loose their erupting force as a result of the injuries they suffered. Hence, a meticulous follow up and treatments when appropriate after the teeth have erupted seems to be the correct response for both teeth.

Conclusion

A possible squeal of trauma to anterior primary teeth is PCO in the unerupted permanent successor. The occurrences of PCO dose not necessarily interrupt the course of eruption of the permanent teeth. A close periodic examination is required to determine the condition of the pulp and the need for endodontic intervention in case of pulp necrosis.

References

1. Von Arx T. Developmental disturbances of permanent teeth following trauma to the primary dentition. Aust Dent J 1993;38:1–10.
2. Ben-Bassat Y, Brin I, Zilberman Y. Effects of trauma to the primary incisors on their permanent successors: multidisciplinary treatment. J Dent Child 1989;56:112–6.
3. Abbott PV, Gregory PJ. Complicated crown fracture of an unerupted permanent tooth – a case report. Endod Dent Traumatol 1998;14:48–56.
4. Andreason JO, Ravn JJ. The effect of traumatic injuries to primary teeth on their permanent successors. Part II. A clinical and radiographic follow-up study of 213 injured teeth. Scand J Dent Res 1971;79:284–94.
5. Zilberman Y, Fuks A, Ben Bassat Y, Brin I, Lustman J. Effect of trauma to primary incisors on root development of their permanent successors. Ped Dent 1986;8:289–93.
6. Andreason JO, Andreason FM. Textbook and color atlas of traumatic injuries to the teeth, 3rd edn. St. Louis: Mosby; 1994.
7. Andreasen JO, Sundstrom B, Ravn JJ. The effect of traumatic injuries to primary teeth on their permanent successors. Part I. A clinical and histologic study of 117 injured permanent teeth. Scand J Dent Res 1971;79:219–83.
8. Ben Bassat Y, Fuks A, Brin I, Zilberman Y. Effect of trauma to the primary incisors on permanent successors in different developmental stages. Pediatr Dent 1985;7:37–40.
9. Roberston A. A retrospective evaluation of patients with uncomplicated crown fractures and luxation injuries. Endod Dent Traumatol 1998;14:245–56.
10. Robertson A, Andreasen FM, Andreasen JO, Noren JG. Long-term prognosis of crown-fractured permanent incisors. The effect of stage of root development and associated luxation injury. Int J Paediatr Dent 2000;10:191–9.
11. Ishikawa M, Satoh K, Miyashin M. A clinical study of traumatic injuries to deciduous teeth. Part 3. The influence on their permanent successors. Shoni Shikagaku Zasshi 1990;28:397–406.
12. Robertson A, Andreasen FM, Bergenholtz G, Andreasen JO, Noren JG. Incidence of pulp necrosis subsequent to pulp canal obliteration from trauma of permanent incisors. J Endod 1996;22:557–60.