Dental Traumatology

Dental Traumatology 2010; **26**: 289–291; doi: 10.1111/j.1600-9657.2010.00882.x

Trauma-induced dentigerous cyst involving an inverted impacted mesiodens: case report

CASE REPORT

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Accepted 19 January, 2010

Abstract – There have been only a small number of studies on the association of dentigerous cysts with supernumerary teeth. The purpose of this article was to report the case of a dentigerous cyst associated with an impacted inverted mesiodens that developed secondary to trauma to its predecessor, a non-vital permanent maxillary central incisor. As a consequence of trauma, the central incisor's root development was prematurely arrested and the open apex lay close to the follicle of the underlying inverted mesiodens. The negligent attitude of both the child and parent in seeking dental treatment was a contributing factor. The case was further complicated by impaction of the adjacent permanent central incisor due to the presence of another unerupted but normally oriented mesiodens. Occlusal and Intraoral periapical radiographs revealed a well-defined radiolucent area surrounding the inverted mesiodens. Microscopic examination revealed a cystic cavity that was lined by 2–3 cell thick non-keratinized stratified squamous epithelium resembling reduced enamel epithelium. Dentigerous cysts associated with impacted permanent teeth are not uncommon but the cysts which are induced by trauma are uncommon. Development of trauma-induced dentigerous cyst around an inverted impacted mesiodens associated with the periapical area of a traumatized, non-vital, immature permanent central incisor is a rare occurrence.

Traumatic dental injuries are a major cause of morbidity among children. According to population-based studies, the prevalence of pediatric traumatic dental injuries ranges from 4.1 to 58.6% (1). A mesiodens is a supernumerary tooth located in the maxillary central incisor region. The overall prevalence of mesiodens is between 0.15 and 1.9%. A dentigerous cyst is a developmental odontogenic cyst of the jaws and encloses the crown of an impacted, embedded or otherwise unerupted tooth. The association of dentigerous cysts with supernumerary teeth is rare (2, 3) and constitutes 5–6% of all dentigerous cysts. The histogenesis of dentigerous cyst is still a matter of controversy. Due to a few reported cases of trauma-induced dentigerous cysts (4) in relation to primary or permanent teeth and none reported in relation to a supernumerary tooth, the purpose of this article was to report the first case of a trauma-induced dentigerous cyst involving an inverted impacted mesiodens which was associated with the periapical area of a traumatized, non-vital and immature permanent incisor. The mechanism that may explain the formation of dentigerous cyst in the present case is either accumulation of fluid within the reduced enamel epithelium or between the reduced enamel epithelium and the enamel of the underlying inverted mesiodens.

Case report

The patient was a 12-year-old boy who reported to the Department of Pedodontics, M. M. College of Dental Sciences and Research, Mullana (Ambala) Haryana, India with the chief complaint that one of his permanent maxillary incisor had failed to erupt. He gave a history of trauma to upper front tooth region 3 years ago. Intra-oral clinical examination revealed a missing permanent maxillary right central incisor (Fig. 1a), non-vital permanent maxillary left central incisor with fracture of clinical crown and no subjective symptoms. He denied having symptoms such as swelling or pain. His medical and dental history was unremarkable. Diagnostic maxillary occlusal and periapical radiographs (Fig. 1b and c) revealed the presence of two impacted mesiodentes, one was inverted and in close proximity to the periapical area of the immature root of left central incisor and the other mesiodens was normally oriented and was in relation to the impacted right central incisor. A well defined unilocular radiolucency was observed surrounding the crown of the inverted mesiodens measuring approximately 10 mm. On the basis of these clinical and radiographic characteristics, differential diagnosis included the hypothesis of radicular cyst, dentigerous cyst or an inflammatory follicular cyst.

The therapeutic approach included endodontic treatment of the immature non-vital permanent tooth, surgical extraction of the two mesiodentes (Fig. 2) and enucleation of the lesion. A window access was fabricated on both the buccal and palatal bone plates for removal of the normally oriented and inverted mesiodens respectively. The surgical site was curetted for removal of

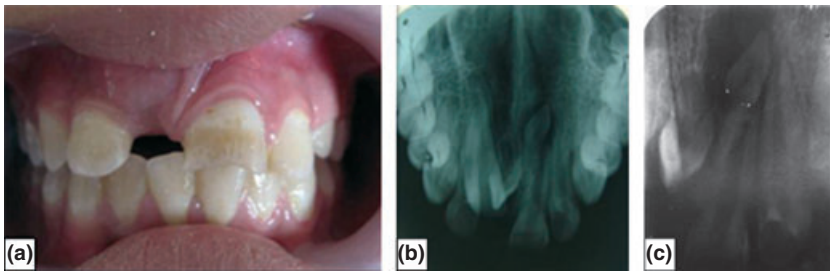

Fig. 1. (a) Pretreatment intraoral photograph showing the non-eruption of maxillary right central incisor and fracture of clinical crown of the left incisor. (b) Pretreatment occlusal radiograph showing the impacted right central incisor and presence of two mesiodentes, normally oriented and the other inverted. (c) Pretreatment periapical radiograph showing a well-defined radiolucent area with radiopaque border surrounding the inverted mesiodens. Note the wide open apex of left central incisor.

Fig. 2. Removed mesiodentes.

the epithelial remnants. Microscopic findings revealed the presence of a cystic lumen lined by 2–3 cell thick non-keratinized stratified squamous epithelium resembling reduced enamel epithelium and underlying fibrous connective tissue wall showing islands of odontogenic epithelium (Fig. 3). This confirmed the diagnosis of a dentigerous cyst. The patient healed uneventfully. Clinical and radiographic examinations at 1-year follow-up revealed apical healing and eruption of impacted right central incisor (Fig. 4). The patient was then referred to the Department of Orthodontics for further needful treatment.

Discussion

Dentigerous cysts account for approximately 16.6% of all jaw cysts and are primarily related to premolars and molars and rarely affect the incisors. About 95% of these

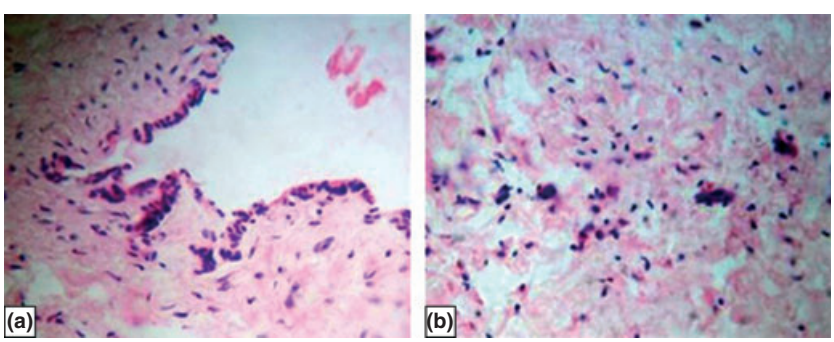

Fig. 3. (a) Photomicrograph showing a cystic lumen lined by 2–3 cell thick non-keratinized stratified squamous epithelium resembling reduced enamel epithelium and underlying fibrous connective tissue wall (original magnification x 10). (b) Photomicrograph showing islands of odontogenic epithelium (original magnification x10).

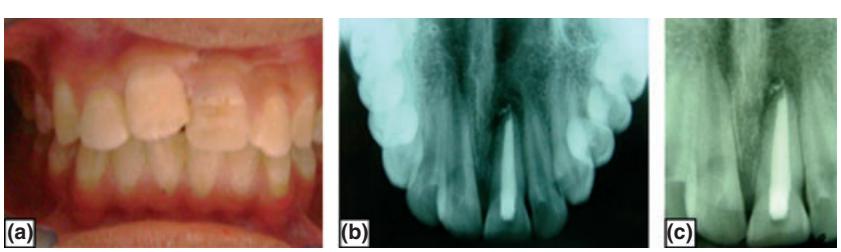

Fig. 4. (a) Posttreatment intraoral photograph showing the erupted right central incisor. (b) and (c) Posttreatment occlusal and periapical radiographs after 12 months demonstrating apical healing.

cysts involve the permanent dentition and only 5% are associated with supernumerary teeth. The exact etiology of supernumerary teeth is still unknown. One school of thought is of the view that they are formed as a result of local, independent or conditioned hyperactivity of dental lamina (5). Asaumi and co-workers (6) reported 256 mesiodentes in 200 patients and found them to be two in number in 26% of cases, the direction of crown of mesiodens was inverted in 67% and in normal direction in 27% of cases, 89% were located palatal to dental arch with none located labially and they delayed the eruption of permanent central incisors in 6% of cases and were associated with dentigerous cyst in 11% of cases.

The exact histogenesis of dentigerous cysts is unknown. It has been suggested that dentigerous cysts may be extrafollicular or intrafollicular in origin (7). Diagnosis should not be made on radiographic evidence alone but should include both macroscopic and microscopic examination of the lesion. Pulp necrosis is a commonly observed sequel in traumatized permanent teeth and is one of the possible etiologic factors for the development of dentigerous teeth (8). An inflammatory origin has also been reported (9). In the present case, there was a history of trauma to the permanent maxillary left central incisor. The tooth became non vital and root end closure failed to occur. At that time, neither the patient nor his parents sought dental treatment. The periapical area of this traumatized incisor being in continuity with the follicle of the underlying inverted mesiodens, led to the accumulation of fluid within the reduced enamel epithelium or between the reduced enamel epithelium and the enamel of the mesiodens. This would explain the widened follicular space as visible on the preoperative periapical radiograph (Fig. 1c). Extremely negligent attitude of both parent and child in seeking regular dental care was a contributing, complicating factor (10). Early removal of such teeth is recommended if they impede the eruption of adjacent permanent teeth, appear inverted or are associated with pathology (11). In the initial stages, these cysts are asymptomatic and by the time they make their appearance felt, they reach great dimensions. The cyst in the present case was discovered on routine radiographic examination. This report attempts to further highlight the importance of early diagnosis and treatment of children with dentigerous cysts.

Trauma-induced dentigerous cysts associated with unerupted primary and permanent teeth are uncommon (4, 8). Formation of such a cyst induced by trauma around an inverted impacted mesiodens which lies close to the periapical area of a non vital and immature permanent central incisor is a challenge to the clinicians and a rare occurrence.

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