Successful Conservative Treatment of Dentigerous Cyst Following Intrusion of Lower Primary Incisors

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ABSTRACT

This paper reports on the development of a dentigerous cyst associated with a lower permanent incisor following intrusion of two lower primary incisors. The small root remnant of one of the traumatized primary incisors was associated with granulation tissue, while the second incisor was discolored and suspected of being non-vital. The associated permanent incisor and other adjacent incisors were apically and laterally dislocated from their natural site of eruption. The conservative treatment included extraction of the involved primary discolored incisor, as well as the root remnant, followed by removal of the granulation tissue. After 18 months of follow-up, the permanent incisors were erupting in normal position, without pathological signs of the dentigerous cyst.

Following severe traumatic injury to a primary tooth, periodic radiographic follow-up, until eruption of the correspondent permanent tooth, is recommended.

Traumatic injuries to the primary incisor during the developmental stages of the corresponding permanent tooth may interfere with its future growth.[1-2] The extent of the disturbances increases after severe traumatic injury, usually intrusion or avulsion. A rare consequence of traumatic injury to a primary tooth is development of a dentigerous cyst in the corresponding permanent tooth.[3] There have been only five papers with eight case reports of dentigerous cysts associated with previous traumatic injury to the primary dentition published in the English literature; all of these cysts were located in the maxillary upper incisor region.[4-8]

The etiology of dentigerous cyst remains unclear, and several theories have been proposed to explain its origin.[9,12-15] One hypothesis suggests that the inflammation of periapical tissue originating from a primary tooth with necrotic pulp might stimulate the accumulation of fluid between the reduced enamel epithelium and the crown of the permanent tooth germ.

Dentigerous cysts occasionally become extensive, since lesions are asymptomatic even when they reach considerable size. Therefore, the treatment is difficult, as the associated teeth are often impacted and displaced a substantial distance.[9-11] Notwithstanding, in case of infection, dentigerous cysts might become symptomatic.

The classic treatment employed for elimination of dentigerous cyst includes decompression, enucleation and extraction of

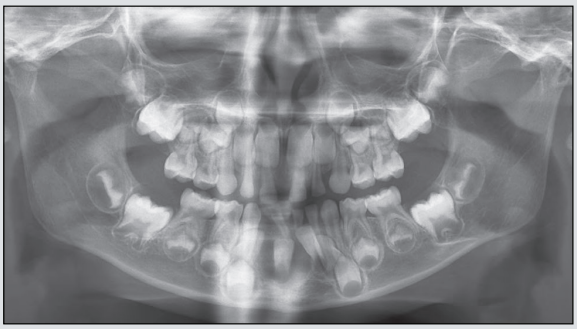


Figure 1. Panoramic view of patient at six years and five months showing missing lower right lateral primary incisor. Lower right central permanent incisor is displaced apically with delayed root development and associated with dentigerous cyst. Adjacent permanent lower incisors are displaced laterally with delayed root development.

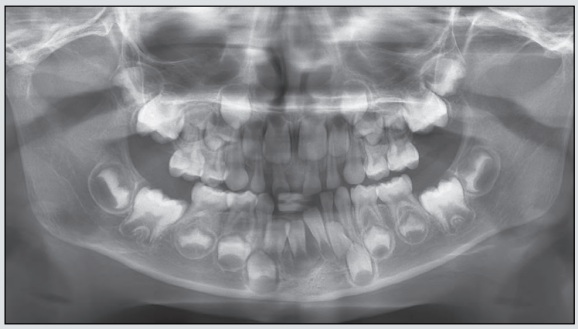


Figure 2. Panoramic view of patient three months following extraction of primary lower right central and lateral incisors. Permanent lower right central incisor is erupting. Adjacent incisors moved medially to original location. Significant decrease in size and radiolucency of dentigerous cyst is noted. Partial arrest of root development is suspected.



Figure 3. Clinical view nine months following extraction of primary lower right central and lateral incisors. Gingiva is healthy. Permanent lower left incisor erupted to oral cavity, and adjacent permanent incisors are almost erupting.



Figure 4. Panoramic clinical view nine months following extraction of primary lower right central and lateral incisors. Complete healing of dentigerous cyst. Adjacent incisors are erupting to original location.

the tooth or teeth embedded in the cyst.[9,10,16-24] However, the criteria for selecting these treatment modalities are not clearly defined.[16] A more conservative management is cyst marsupialization with careful follow-up, waiting for the spontaneous eruption of the unerupted/impacted tooth. This modality has been performed with successful outcomes.[10,16,19-20]

Considering the fact that children have a much greater and quicker capacity for regeneration of bone than adults, and that teeth with open apices have a greater potential for eruption, large dentigerous cysts in children might be treated differently from those in adults. Conservative treatment with tooth preservation may be preferred in this age group.[15,25-26]

Case Report

A six and one-half-year-old girl was referred to our dental clinic for consultation due to delayed eruption of her mandibular incisors. Medical history revealed that at 18 months, the girl underwent intrusion of her lower right central and lateral primary incisors, which re-erupted several months later with gray crown discoloration. Six months later, the crown of the lower right incisor was exfoliated. Clinical evaluation revealed granulation tissue associated with the root remnant of the lower right incisor and distal inclination of the discolored right central incisor, which was also slightly mobile. A slight loss of space and no eruption of any of the permanent incisors were noted.

The panoramic radiograph (Figure 1) revealed a missing lower right lateral primary incisor. The lower right central permanent incisor was displaced apically with delayed root development and associated dentigerous cyst. The permanent lower right lateral and left central and lateral incisors were displaced laterally with delayed root development. The conservative treatment included extraction of the root remnant, curettage of the granulation tissue associated with it and extraction of the discolored lower right central primary incisor.

The treatment was performed after administration of local anesthesia under nitrous oxide analgesia. Clinical examination three months later revealed healthy gingiva with an erupting left central incisor. Panoramic examination (Figure 2) revealed that the right central incisor was erupting, and the adjacent incisors moved medially to their original location. A significant decrease in the size and radiolucency of the dentigerous cyst was noted. Partial arrest of root development was suspected.

Clinical examination six months later revealed healthy gingiva with the erupted left central incisor (Figure 3). The adjacent incisors were also erupting. The panoramic view (Figure 4) showed complete healing of the dentigerous cyst and the adjacent incisors erupting into their proper positions.

Discussion

This case describes a rare complication of intrusion of lower primary incisors and emphasizes the effectiveness of the conservative treatment option, followed by careful follow-up until eruption of the corresponding permanent teeth.

A dentigerous cyst is defined as one that encloses the crown of an un-erupted tooth and is attached at the cemento-enamel junction.[27] Histological examination usually shows a thin fibrous cyst wall lined by two to three layers of flat or cuboidal epithelial cells. Inflammatory cell infiltration of the cyst wall is common, and localized proliferation of the epithelial lining may occur in response. In such cases, an inflamed dentigerous cyst cannot be differentiated histologically from an inflammatory dental cyst.

Dentigerous cysts most commonly occur in the second and third decades of life, although they can also be found in children and adolescents.[28] These cysts account for more than 24% of jaw cysts. However, the incidence rate of dentigerous cysts involving the permanent central incisors is just 1.5%. Impaction of permanent incisors due to a dentigerous cyst associated with primary tooth intrusion is even more infrequent.

In the case presented here, inflammation around the apex of the traumatized primary incisors may have induced changes in the previously normal follicular epithelium of the successor tooth, leading to epithelial proliferation, cystic transformation and impaction of the associated permanent incisor.[29]

Management options for such teeth include extraction of the primary tooth and further observation until the permanent incisors erupt, surgical extraction of the impacted tooth followed by implant placement, surgical repositioning and orthodontic correction.[30] Gondim et al. reported a case of a dentigerous cyst associated with the germ of a permanent maxillary central incisor that developed secondary to trauma to the predecessor primary incisor. The therapeutic approach included endodontic treatment of the primary tooth and marsupialization of the lesion.

After 36 months of follow-up, the permanent incisor presented with normal physiologic conditions, absence of dental anomalies, and it had erupted in its correct position in the oral cavity.[8] The researchers concluded that with proper case selection, marsupialization might be a good treatment option for conservative management of dentigerous cysts.

Children usually present with rapid wound healing and high tissue regenerative capacities. Therefore, as can be seen from this report, timely recognition and extraction of the primary tooth, followed by the observation period until the impacted permanent incisor erupts in the oral cavity, might be preferred over more aggressive treatment modalities. However, careful follow-up is a

major requirement in those cases. And if impacted permanent incisors fail to erupt, or the cyst fails to disappear, further intervention is warranted.

It is also noteworthy that when patients with injured primary teeth are treated, it is essential that parents be advised of the need for prolonged professional supervision until the eruption of the corresponding permanent tooth. Periodic evaluation should include radiographs at appropriate intervals to detect pathologic alterations, such as internal or external root resorption, pulp space calcification, periodontal ligament space changes, and alterations in surrounding alveolar bone, as well as to confirm undisturbed development of the underlying permanent teeth. Sometimes parental concerns regarding radiation safety might influence proper diagnostic decisions for the dentist.

Trauma to the deciduous teeth should not be overlooked, since it can result in development of pathology that could indirectly affect the permanent successors, as seen in this case. Hence, periodic visits to the dentist enable early detection, diagnosis and treatment and, as consequence, avoid morbidity.

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