Treatment of a Large Dentigerous Cyst in a Child

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ABSTRACT

A dentigerous cyst is a developmental odontogenic cyst that develops when fluid accumulates between the reduced enamel epithelium and the tooth crown of an unerupted tooth. Treatment modalities range from marsupialization to enucleation and are based on the premise that the pathological process can be controlled locally with minimal injury to the adjacent host structures. The purpose of this case report was to describe the diagnosis of a large expansible dentigerous cyst in an 11-year-old boy. The chosen treatment was an initial decompression to reduce the size of the osseous defect, followed by enucleation and tooth extraction.

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Odontogenic cysts constitute a group of frequent intraosseous lesions of the maxillary bones and are one of the main causes of these bones' destruction.[1] A dentigerous cyst (**DC**) encloses the crown of the unerupted tooth and is generally attached to the tooth's neck.[2] The exact pathogenesis of DC remains unknown; however, most authors are in favor of a developmental origin from tooth follicles.[2] DCs often appear during the second or third decade of life, with peak incidence in the teenage years. They occur in the mandible's posterior area, followed by the maxillary canine region[3] and the maxillary third molars.[4]

Diagnosis is usually made by radiographic examination of the affected area. DC radiographs show a well-defined unilocular radiolucency around the crown of an unerupted tooth, which is often delineated by a sclerotic border.[5] Computed tomography scan is an advanced modality to diagnose for large cysts. Differential diagnoses for DCs include ameloblastoma, adenomatoid odontogenic tumor, and ameloblastic fibroma.

Cysts smaller than 3 cm in diameter (ie, those that are normally filled with regenerate bone after cyst removal) can be treated by primary excision. The treatment of large lesions exceeding 3 cm in diameter, however, is less clear. Many surgeons decompress the cyst to avoid the risk of infection, which often occurs when large cysts are excised.[5] This procedure relieves pressure from the cystic fluid, thus allowing shrinkage of the cystic space and the apposition of bone to fill the void.[6] Decompression can be performed by making a small opening in the cyst and keeping it open with a drain.[7]

The purpose of this article was to describe the case of a large dentigerous cyst in a young boy, including his diagnosis, treatment, and follow-up.

CASE REPORT

An 11-year-old boy was referred to the Oral and Maxillofacial Surgery Clinic of the School of Dentistry at Universidade Federal do Parana, Curitiba, Paraná, Brazil,

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with a swelling on his right cheek. No other symptoms were present, and the boy reported no pain. The boy's past medical history was noncontributory. The extraoral examination revealed facial asymmetry resulting from the swelling of the right side of his face. No submandibular or cervical adenopathy was observed.

Intraoral examination revealed an expansion of the right maxillary buccal cortical bone. The overlying mucosa was normal. On palpation, fluctuation was evident. A panoramic radiograph (Figure 1) revealed a well-defined circular radiolucent area in the right maxilla, 6 cm in diameter, that included the crowns of the unerupted central and lateral incisors and the canine. The teeth were significantly displaced. The lateral incisor was at an angle of approximately 90° to the axis of the primary teeth. The central incisor was located in the roof of the right maxillary sinus, and the canine was vertical and dislocated to the distal part of the cyst.

Under local anesthesia, a needle aspiration biopsy was performed to establish whether the lesion was solid or cystic. This produced an amber-colored fluid. At the same time, a window 1 cm in diameter was prepared in the cyst wall and a special drain was inserted into the orifice to keep it open. The drain was sutured to the oral mucosa (Figure 2). The orifice's excised material was fixed with 10% formalin and embedded in paraffin. The section was stained with hematoxylin-eosin. Microscopic examination showed a fragment of fibrous connective tissue with a chronic inflammatory cell infiltrate and some islands of odontogenic epithelial rests. The histopathological diagnosis was a DC (Figure 3). The patient was instructed to rinse the stent once or twice a day with a sterile saline solution and to report any complication immediately.

The patient was radiographically examined bimonthly to follow the course of treatment. After surgery, the cyst cavity decreased in size but did not disappear, and the tooth crowns moved slowly. The central incisor moved its position 90° in relation to the occlusal line, and the maxillary floor remained intact. The canine and central incisor moved, and the change in their position following decompression caused an unerupted lateral incisor to become impacted.

No tooth appeared in the oral cavity (Figure 4). For this reason, the remaining cyst was operated on under general anesthesia and enucleated. Additionally, the unerupted, displaced teeth and primary teeth in the region were removed (Figure 5). A diagnosis of DC was confirmed after the material was examined. One week after the operation, the surgical site showed good healing. Two years after the boy's first visit to our service, the radiolucency had completely disappeared. During this 2-year period, the cyst did not recur (Figure 6). The patient was rehabilitated with a partial removable prosthesis due to the maxilla's growth. Future treatment consisted of rehabilitation with a bone graft and dental implants.

DISCUSSION

Thus far, treatment of large cysts in the maxillofacial region has not been standardized. Treatment choices have included: marsupialization; marsupialization plus space packed with medicated gauze to prevent early wound closure; decompression; and complete enucleation.[8] New treatment methods, however, such as laser incisions[9] and fenestrations,[4] are also described in the literature.

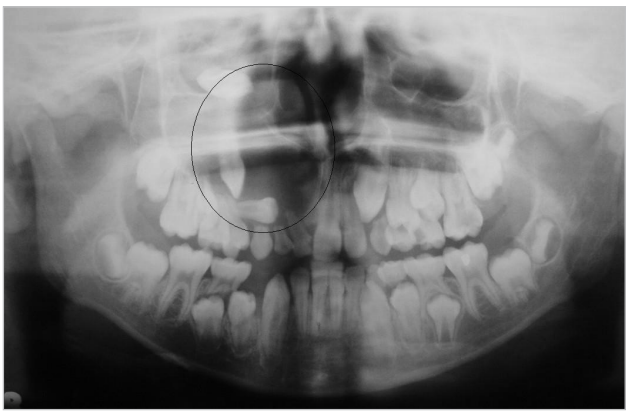

Figure 1. Panoramic radiographic showing initial aspect of the lesion.

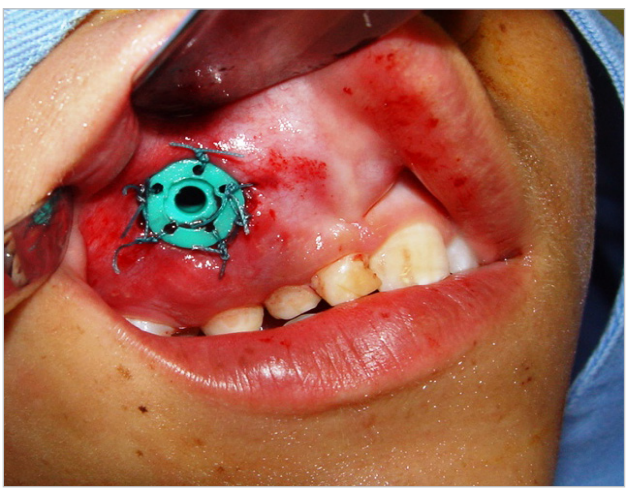

Figure 2. Drain sutured in the oral mucosa.

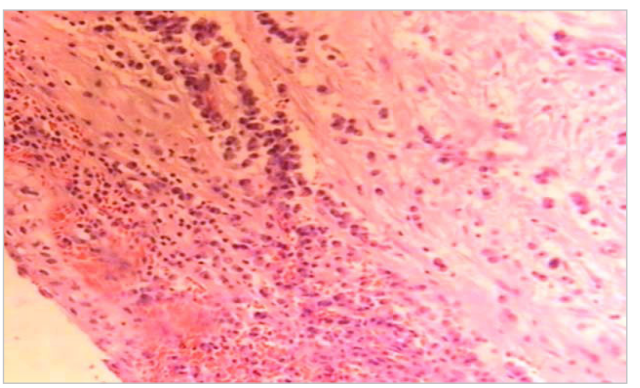

Figure 3. Histological photograph of a dentigerous cyst. Original magnification 100×. Staining method: hematoxylin and eosin.

Decompression of a cyst involves any technique that relieves the pressure within that makes it grow. Cyst growth is believed to occur by a combination of osmotic and resorption pressure, coupled with release of prostaglandins and growth factors.[4] Several studies have shown that decompression—by making a small opening into the cyst and inserting a drainage tube—can result in substantial reduction in the cyst's size. This is recommended to remove the cyst from important structures such as teeth and the inferior alveolar nerve and to reduce the chance of a pathologic fracture or bony discontinuity with definitive treatment. After this decompression technique, subsequent enucleation of the smaller lesion is usually performed.[7]

Figure 4. Panoramic radiographic after decompression.

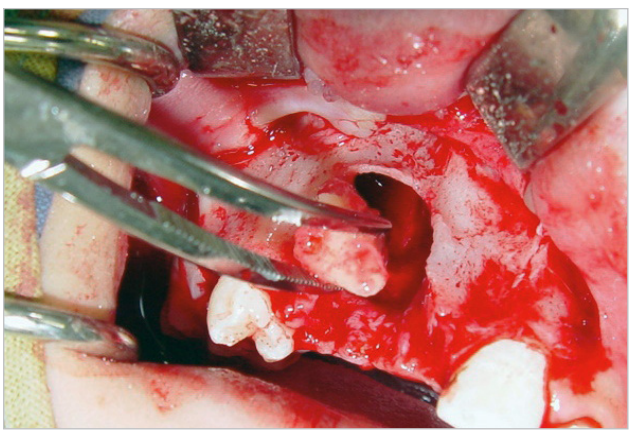

Figure 5. Surgical removal of the lesion and involved teeth.

Figure 6. Panoramic radiographic after 2 years.

In a study involving 20 patients with large mandibular cysts,[6] decompression was successful. Cysts shrunk by a mean of 81%, and there were no recurrences. The authors demonstrated the advantages of this approach, including: simplicity; immediate gathering of information on the type of cyst with simultaneous start of treatment; low morbidity; and low incidence of complications during the treatment.

In large lesions, another treatment option is decompression in combination with late secondary enucleation.[10] After a significant decrease in lesion size after decompression, the enucleation of the residual lesion becomes a simple surgical procedure. It is also safer than only enucleation, due to the reduction of complications caused by damage to adjacent structures in the maxillo facial skeleton.

The present case shows the evolution of a decompression, the movement of permanent teeth into a DC and late secondary enucleation. The choice for decompression was based mainly on the position of the central incisor (the roof of the maxillary sinus) in the DC and its large size and the number of involved teeth.

Children have a greater capacity to regenerate the bony structures than adults, and the teeth with open apices have great eruptive potential. These factors should make large DCs in children entities distinct from those in adults, with a much better prognosis for the teeth involved.[11] The behavior of involved teeth is difficult to predict, because it may be affected by a number of factors such as patient's age, cyst location, tooth position in relation to the cyst, and the degree of axial inclination and root formation.[12] Tooth eruption does not always occur. The actual eruption rate after marsupialization is 72%.[13]

Most patients with DCs in the maxillary sinus lose all their unerupted teeth during treatment. Only one known report described the eruption of an impacted tooth in the maxillary sinus, and it erupted in the expected site after 5 years.[14] In the present case, decompression moved part of the teeth involved. The central incisor parallel to the roof of the maxillary sinus moved approximately 90° but impacted the unerupted canine, which moved toward the stent. Both teeth presented radicular reabsorption. No change was observed on the lateral incisor, which was explained by its totally horizontal position in relation to the other teeth. All the teeth were removed due to their poor prognosis. No other treatment technique (ie, orthodontic traction or simple eruption) could be performed.

One issue related by several authors is the availability of an ideal drain. In one study,[15] the author indicated that an ideal marsupialization stent should have several important characteristics, including: a design

that prevents it from falling into the bone cavity or coming loose at the end of the procedure; a small size; ability to be easily affixed with sutures to the soft tissue; ability to easily clean the cystic cavity daily through its opening; and being hygienic. The stent used in the patient's cavity had nearly all the characteristics described by the author. The used stent's only problem was the hardness of its material.

The major disadvantage of marsupialization is that the pathologic tissue is left in situ, without going through histological examination. Although the tissue taken in the window can be submitted to pathological examination, there is still the possibility of a more aggressive lesion in the residual tissue.[16] In the case presented, a second procedure to enucleate the residual tissue and the impacted teeth was performed. For this reason, the recurrence was decreased in the case.

Decompression and secondary enucleation of cystic lesions constitute an alternative treatment for large cystic lesions of the jaws, mainly when the cyst is located in the maxillary sinus. This technique is especially appropriate for young patients, as there will be less damage to important structures like unerupted teeth. Decreased lesion size after decompression makes complete enucleation a safer and more predictable procedure.

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