DIAGNOSIS, TREATMENT, AND 3-YEAR FOLLOW-UP OF INFLAMMATORY DENTIGEROUS CYST IN PEDIATRIC DENTAL PATIENT: CASE REPORT

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Palavras-chaves: Odontopediatria, Cisto Dentígero, Dente Decíduo, Ortodontia

RESUMO

Os cistos dentígeros são cistos odontogênicos benignos de origem inflamatória ou de desenvolvimento que podem estar associados a um dente decíduo tratado endodonticamente, no qual a infecção periapical se expandiu para o folículo do sucessor permanente. A enucleação ou marsupialização é o tratamento indicado, dependendo do tamanho e localização da lesão, da idade do paciente e da distância da lesão cística às estruturas vitais. Este relato descreve um caso clínico de cisto dentígero inflamatório em uma criança de nove anos de idade que teve o dente 64 tratado endodonticamente. Primeiramente, a avaliação clínica revelou um inchaço duro associado aos dentes 23, 63 e 64. Ausência de sinais flogísticos. Os exames imaginológicos, com imagem hipodensa, bem circunscrita associada à coroa do dente 23, incluso. A hipótese diagnóstica foi de cisto dentígero. O tratamento escolhido foi a marsupialização com preservação do dente 23. Dois fragmentos de tecido mole foram coletados para avaliação histológica, de formato e superfície irregular, coloração castanho-esbranquiçada, consistência fibroelástica e confirmou-se a hipótese diagnóstica. Seis meses após tratamento, foi utilizado um aparelho Pendulum para obtenção de espaço para o dente 23. A paciente foi acompanhada clínica e radiograficamente até a erupção do sucessor permanente. O manejo conservador do cisto dentígero mostrou-se eficaz, permitindo a regressão da lesão e a manutenção das estruturas dentárias, além de favorecer o espaço necessário para a erupção espontânea do canino superior esquerdo.

Keywords: Pediatric Dentistry, Dentigerous Cyst, Primary Tooth, Orthodontics.

ABSTRACT

Dentigerous cysts are benign odontogenic cysts of inflammatory or developmental origin that may be associated with and endodontically treated primary tooth in which periapical infection expanded to the follicle of the permanent successor. Enucleation or marsupialization is the treatment indicated, depending on the size and location of the lesion, patient age and distance of the cystic lesion from vital structures. This report describes a clinical case of an inflammatory dentigerous cyst in a nine-year-old child that had tooth 64 endodontically treated. Firstly, a clinical evaluation revealed a hard swelling associated with teeth 23, 63 and 64. No inflammatory signs were observed. Imaging showed a well-defined hypodense lesion associated with the crown of the impacted tooth 23. The diagnostic hypothesis was dentigerous cyst. The treatment chosen was marsupialization with preservation of tooth 23. Two soft tissue specimens were obtained for histopathological evaluation, exhibiting irregular shape and surface, brownish-white coloration, and fibroelastic consistency. The findings confirmed the diagnostic hypothesis. Six months after treatment, a Pendulum appliance was used to obtain space for tooth 23. The patient was followed up clinically and radiographically until the permanent successor erupted. Conservative management of the dentigerous cyst was effective, promoting lesion regression, preservation of the dental structures, and adequate space for the spontaneous eruption of the maxillary left canine.

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INTRODUCTION

Dentigerous cysts are of odontogenic origin[1] from the dental follicle due to fluid accumulation between the reduced enamel epithelium and enamel, or, alternatively, between the individual layers of the enamel organ. These cysts involve the crown of permanent teeth and are attached to their cervical region.[2] They are classified as developmental or inflammatory, the latter are associated with periapical infections of non-vital primary teeth extending to the follicle of the permanent successor. This suggests a potential link with endodontically treated or severely decayed primary teeth may be involved in the formation of dentigerous cysts.[2-5]

Clinically, these cysts may present as delayed eruption of permanent teeth, with or without a slow-growing and asymptomatic swelling in the region where the cyst is.[3,6-8] The prevalence is 4-9% in pediatric patients, who are white male patients during the first and second decades of life, commonly affecting third molars, maxillary canines, and mandibular premolars.[8,9]

Radiographs of a dentigerous cyst show a unilocular translucent lesion with well-defined margins, associated with the root of a vital or non-vital primary tooth and the crown of an unerupted permanent tooth. It may reach 40 to 50 millimeters in diameter in three to four years.[10,11] A cone-beam computed tomography (CBCT) scan should be requested when the lesion is very large and has a hypodense image with well-defined margins.[12,13]

Diagnosis of a dentigerous cyst is based on histological examination, which reveal a lesion circumscribed by stratified squamous epithelium, with intense inflammatory infiltrate and enveloped by connective tissue.[10,14,15] Treatment depends on lesion size, location, patient age, and proximity to vital structures.[10,13] Smaller lesions may be treated by enucleation, while larger lesions, especially those with bone loss or risk to adjacent structures, may require marsupialization.[16] This technique promotes gradual reduction of the cyst and bone regeneration, potentially avoiding further surgery. However, as marsupialization does not ensure complete removal of the lesion, it is recommended only for benign cysts due to the risk of residual pathological tissue.[16]

When the primary tooth must be extracted, the patient should be followed up until the successor erupts, so that possible malocclusion may be corrected by an orthodontist and a pediatric dentist, as the approach in group will determine treatment success for the affected teeth.[16]

CASE REPORT

A 9-year-old girl was referred to the Pediatric Dentistry Clinic of the School of Dentistry - Rio de Janeiro State University with the chief complaint of a swelling in the left quadrant of the maxillary arch.

In accordance with the CARE Statement guidelines, the patient's medical and dental history, as well as extraoral and intraoral examinations, were conducted following the institutional protocol. No systemic or dental conditions that could interfere with the diagnosis or treatment were identified. The intraoral examination revealed the presence of mixed dentition, a firm swelling without symptoms to palpation in the region of teeth 63 and 64 and change in the color of tooth 64 crown, without other relevant clinical findings (Figure 1).

The patient was referred to the Oral and Maxillofacial Surgery and Trauma Clinic of the Pedro Ernesto Hospital - Rio de Janeiro State University, where first a panoramic was made and then CBCT scans were acquired. The panoramic view showed a well-defined, unilocular hypodense lesion in the maxilla measuring about 12x13x23 mm, with a follicular space greater than 50 mm, involving the crown of tooth 23 and endodontic treatment of tooth 64 was confirmed. The sagittal slice exhibits the lesion size, as well as the measures of cortical plates both buccally and lingually (Figure 2).

Surgical treatment consisted of extraction of teeth 63 and 64, under local anesthesia, using 1 and a half tubes of 2% lidocaine with epinephrine 1:100,000, marsupialization of the cystic lesion and preservation of teeth 23. No presurgical or postsurgical medication was needed, only an analgesic was prescribed in case of pain. The specimen collected was placed into 10% formaldehyde and sent to histological examination, which confirmed the diagnosis of dentigerous cysts (Figure 3).

Six months later, a follow-up panoramic radiograph showed that the bony cystic cavity had healed. However, in this six-month interval, there was loss of space for tooth 23 eruption because of the mesialization of tooth 26 (Figure 4). Therefore, the Pendulum appliance was fabricated and placed to recover space for the eruption of tooth 23 (Figure 5A). The appliance, supported by the palatal mucosa and teeth 53, 16, 25 and 26, was used to move tooth 26 distally, which occurred in two months.

After the distal movement of tooth 26, a Nance appliance was fabricated and placed as a fixed retainer to maintain the recovered space with the distal movement resulting from the action of the Pendulum (Figure 5B). The patient was followed up clinically and with radiographs up to the complete eruption of tooth 23 and the other permanent teeth (Figure 6).



Figure 1. Swelling in the left quadrant of the maxillary arch.

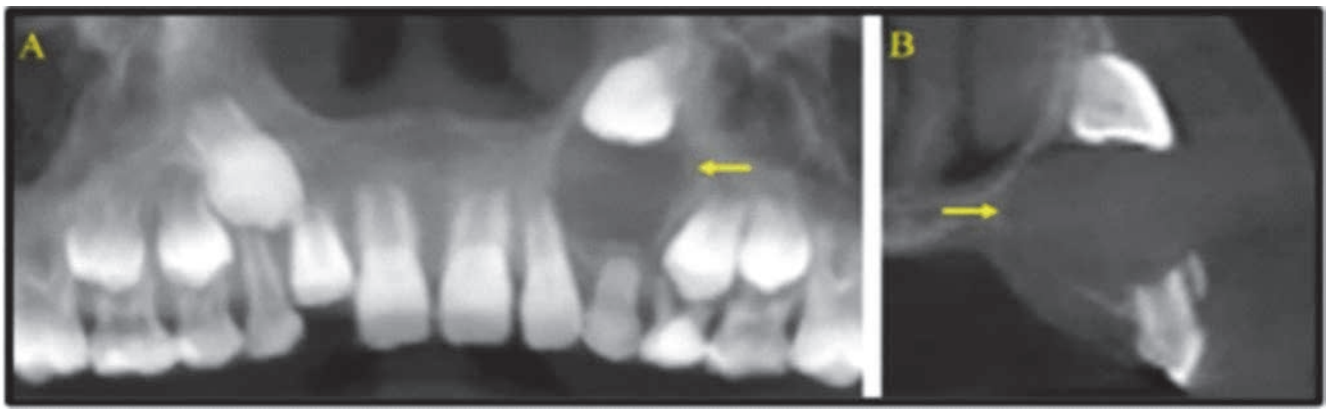


Figure 2. (A) Panoramic reconstruction- the yellow arrow demonstrates the hypodense image. (B) Sagittal view- the yellow arrow indicates the maxillary lingual bone thickness surrounding the hypodense image

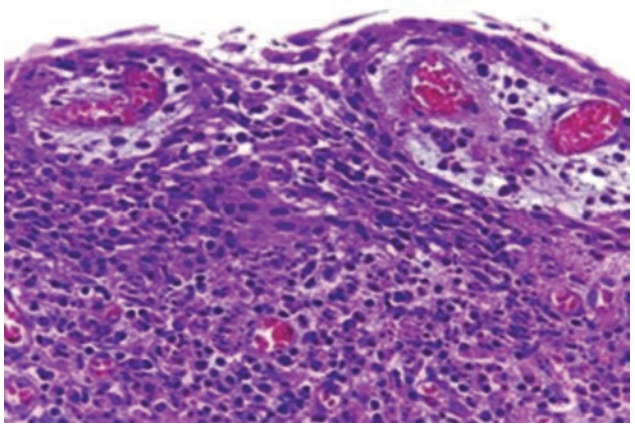


Figure 3. Dentigerous cysts with epithelial lining of variable thickness, hyperplastic epithelial crests, and diffuse chronic inflammatory infiltrate (HE, 40x).

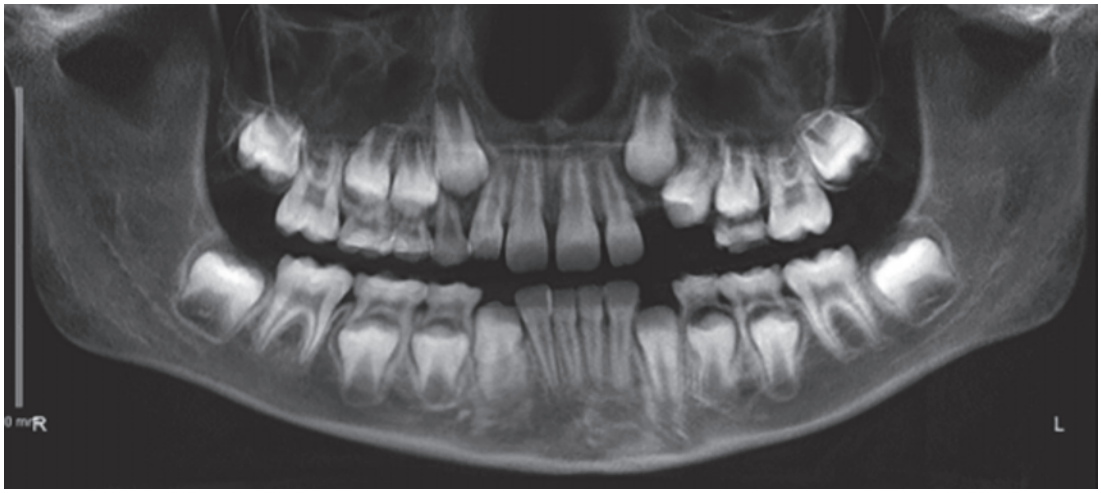


Figure 4. Control radiograph six months after lesion removal. Lack of space for eruption of tooth 23.

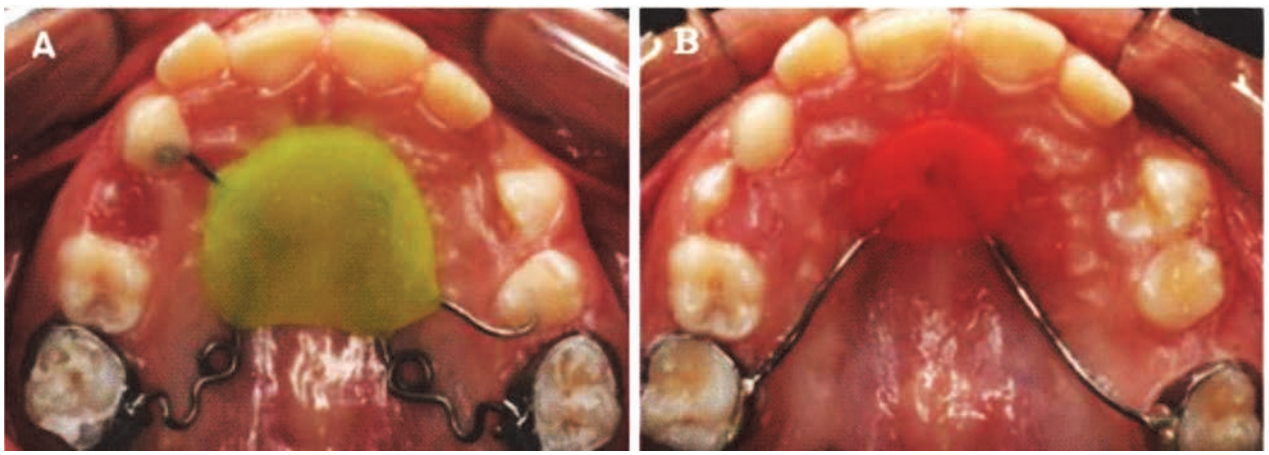


Figure 5. (A) Pendulum appliance to move tooth 26 distally and recover space. (B) Nance appliance to retain recovered space after use of a pendulum appliance

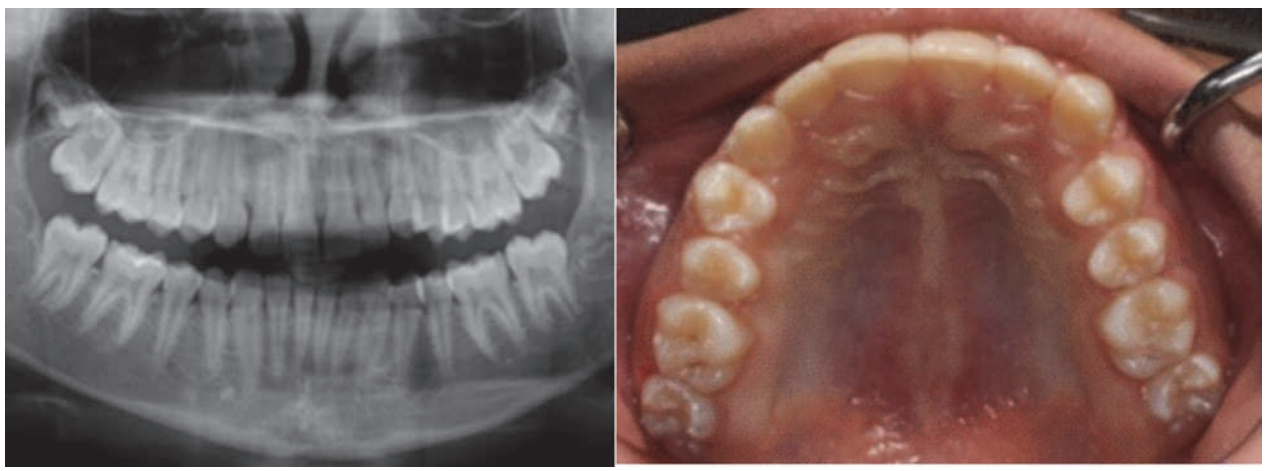


Figure 6. Radiographic and clinical follow up images respectively three years after dentigerous cyst removal.

DISCUSSION

In this report, clinical characteristics and patient history revealed that the lesion developed slowly. One of the clinical signs of the condition, revealed during palpation, was swelling in the region affected, as mentioned in the literature. [6,8,10] In addition, CBCT scans provided a three-dimensional evaluation of the lesion, and provided also better evaluation of its proximity to adjacent teeth.[10,11] The lesion, a well-defined unilocular radiolucent structure with a follicular space greater than 50 mm, involved the crown of tooth 23.

Some authors found an association between primary teeth with a necrotic pulp or endodontic treatment and the development of this type of lesion. This may be the result of periapical infection, which may remain even after endodontic treatment due to the complex anatomy of the root canals of these teeth and even due to physiological root resorption, which limits the results of the endodontic treatment.[2,3,17] In this brief report, the endodontically treated tooth 64 with crown color change, the root of tooth 63, were connected to the radiolucent lesion involving the crown of tooth 23. Therefore, both hypotheses on the cyst's development should be taken into account.

In this study, the choice of lesion decompression technique was determined by the stage of development of the permanent tooth involved, as the main advantage of this technique is to stimulate bone formation after the reduction of cystic pressure.[18]

It is important to consider the clinical and imaging aspects for the differential diagnosis of dentigerous cysts, which may be enlarged dental follicles, radicular cysts, inflammatory paradental cysts, odontogenic keratocysts, unicystic ameloblastomas, mural ameloblastomas, ameloblastic fibromas, Pindborg tumors, odontogenic fibromas and adenomatoid odontogenic tumor.

Histological examination is fundamental to define the diagnosis of dentigerous cysts because of the histological and radiographic similarity between radicular and dentigerous cysts.[10,14,15,19] In this case, a specimen was sent for histological examination after excision and diagnosed as dentigerous cysts with epithelial lining of variable thickness, hyperplastic epithelial ridges, and diffuse chronic inflammatory infiltrate (HE, 40x and 10x).

The time to perform any preventive and interceptive orthodontic treatment should be defined to preserve or recover space for the eruption of the permanent tooth. The potential eruption of a permanent tooth is associated with how much root of the permanent tooth has already been formed. Therefore, a tooth without complete root formation and open apex has potential to erupt without corrective orthodontic treatment.[20] This patient was treated with two types of fixed interceptive orthodontic appliances, which have the advantage of not requiring patient's compliance. After cyst surgery, space was recovered for tooth 23 eruption, with the use of Pendulum. A second appliance, a button of Nance, was placed two months later, after the Pendulum had already achieved its goal.

The Pendulum has an acrylic button in the palate for anchorage, and two 0.032" titanium-molybdenum alloy springs that are fit into the palatal tube and soldered to the bands in the permanent maxillary first and second molar to release a light, continuous force. It is supported by 0.7 mm steel wires bonded with composite to the occlusal surfaces of the primary molars or premolars, or even banded premolars, which provided additional anchorage for the appliance and provided stability to the acrylic button.[21]

After the use of the Pendulum, the tooth 23 could demand surgery traction with braces to erupt but, the permanent canine erupted spontaneously. Thus, patients and their legal guardians should be aware of the need of periodic follow-up visits until the permanent successor has completed eruption and reached adequate position in the oral cavity to discard any need of surgery attempt traction of the tooth.[3,15]

Attention to the patient's oral and general health during follow-up visits is essential for a good prognosis.[13,22] Consequently, the case described here underwent clinical and radiographic follow-up until the permanent successors had erupted, three years after the surgery.

Marsupialization is an ideal technique to treat large inflammatory dentigerous cysts in pediatric patients, whereas the extraction of the permanent successor is not mandatory. Management of dental arch space and radiographic follow-up should continue until the eruption of the permanent successor.

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