Paradental cyst: case report and review of the literature

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The origin of paradental cysts is related to inflammatory processes, especially pericoronaritis involving impacted or semi-impacted teeth. The authors present a case of paradental cyst related to lower second molar that did not show clinical evidence of inflammatory process. The main aspects related to its classification, diagnosis and clinical characteristics are also discussed.
J Clin Pediatr Dent 29(1): 83-86, 2004

INTRODUCTION

The first clinical and histological description of a paradental cyst was reported by Main[1] in 1970. The condition was initially described as an inflammatory collateral cyst, but the diagnosis has given cause to much controversy in the literature. The current nomenclature was suggested by Craig[2] in 1976.

The paradental cyst represents approximately 3% to 5% of all odontogenic cysts and the radiographic image indicates an osteolytic lesion in the distal or vestibular buccal region of partially or totally erupted lower third molars related to inflammatory processes or to a history of pericoronaritis.[3-6] The occurrence of paradental cyst in a lower second molar region is apparently much rarer, as indicated by the number of cases reported in the literature.[5,7,8]

The clinical case reported here refers to a cystic lesion in an impacted lower right second molar, diagnosed as paradental cyst due to the radiographic and histological characteristics, even though it did not present clinical evidence of inflammatory process and communication with the oral cavity.

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CASE REPORT

A 15-year-old Black female came to the Discipline of Surgery of the Dental School of the University of São Paulo, São Paulo, with a complaint of increased volume of the oral cavity. The clinical intraoral examination revealed swelling of the buccal vestibule fold in the region of the lower right molars and absence of the second and third molar on the same side. The lining mucosa on that side appeared normal and was consistent to palpation. No facial asymmetry was observed by extraoral examination. There was no report of any previous episode of septic inflammatory process and the anamnesis did not reveal any systemic alterations.

Panoramic and periapical radiography revealed that the right lower second molar was retained in a slightly mesioangular position, with the crown impacted under the distal surface of the lower first molar. A radiolucent lesion with defined margins associated to the mesial root of the impacted tooth surrounded the periapical region and extended to the region of the furcation, measuring about 1cm in the largest extension. The germ of the lower third molar was also present, showing one third of formed root. A tenuous radiopaque line under the occlusal surface of the impacted second molar suggested the presence of a thin bone lamina (Figures 1 and 2).

Tomography in lateral view of the right mandibular body revealed swelling in the buccal bone plate without bone fenestration located distally to the first molar. Axial computed tomography revealed the expansion of the buccal bone plate starting at the distal root of the first molar and surrounding the entire second molar and the germ of the third lower molar (Figures 3 and 4).

Surgery for removal of the lesion was performed under local anesthesia and a preoperative puncture resulted in negative aspiration. An incision was then made in the alveolar mucosa distal aspect to the first molar. After preparation of a mucoperiosteal flap it was possible to observe a bone defect on the mesial

Figure 1. Panoramic radiography showing a cystic lesion on the mandibular right side.

Figure 2. Magnification of the cystic lesion. Note the involvement of both mesial and distal root of the second molar.

Figure 3. 3D reconstruction in lateral view. Note the buccal swelling on the mandibular body.

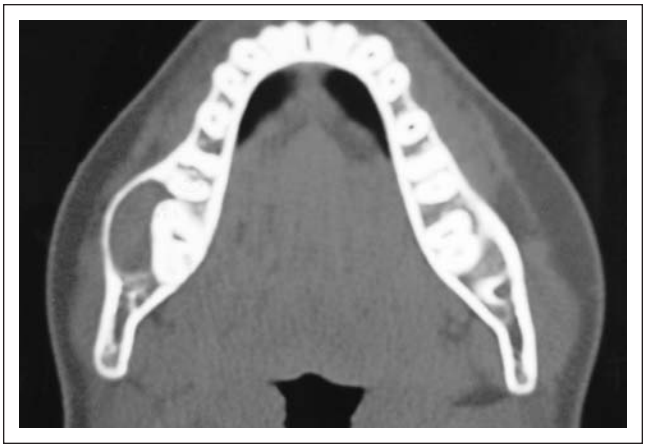

Figure 4. Axial tomography of the mandible.

portion of the occlusal surface of the impacted tooth and the puncture was repeated, again with no aspiration of cystic content.

Osteotomy of the buccal bone plate and distal bone was performed, exposing the impacted tooth. The lesion was found to surround the two roots of the lower second molar, with distal and mesial extension, as suggested by panoramic radiography and computed tomography. The lesion was enucleated and the cavity submitted to curettage. The second molar was extracted and the germ of the third molar was preserved. The mucoperiosteal flap was repositioned and sutured.

Histological sections of the removed material revealed fragments of a cystic capsule lined with stratified, non-keratinized pavement epithelium consisting of few layers and exhibiting areas of acanthosis. The capsule consisted of loose connective tissue presenting a moderate mononuclear inflammatory infiltrate and congested blood vessels. Trabecular bone was also present.

DISCUSSION

The etiopathogeny of paradental cysts of an inflammatory nature has been widely discussed in the literature. Initially, all reported cysts involved lower third molars with inflammatory processes[9] and when the lower first permanent molars of children aged 6 to 8 years were involved these cysts were called mandibular infected buccal cysts.[6] This type of cystic lesion was considered as a distinct clinical entity by some authors,[10,11] but this concept was never fully accepted.[9]

In 1990, Wolf and Hietanen[3] reported six cases of cystic lesions in a lower first or second molar diagnosed as mandibular infected buccal cysts and observed the similarity of the histological characteristics as compared to those of paradental cysts, suggesting that they were the same entity. However, they stated that the histological characteristics would not be sufficient to establish the diagnosis and that further clinical and radiographic characteristics suggesting the presence of an inflammatory process were required. Vedtofte and Praetorius,[12] in 1989, were the first to consider cystic

lesions in first and second molars with participation of inflammatory process in the development as paradental cysts. However, not all lesions showed evidence of participation in these processes, further adding to the difficulties as to the pathological classification.[9,10,13]

Later, Kramer *et al*,[4] in 1992, considered the mandibular infected buccal cyst and the inflammatory collateral cyst as the same clinical entity as the paradental cyst.[2] The World Health Organization classified the paradental cyst as epithelial cyst of inflammatory origin located near the cervical border of a tooth in the lateral portion of the root as a result of periodontal inflammatory processes.[10,14]

The prevalence of paradental cysts is low compared to other cysts, representing 3% to 5% of all odontogenic cysts.[6,11,14,15] In the mandible, this lesion was detected in only 26 (0.9%) of the 2,700 cyst cases studied by Magnusson and Borrman[5], who ascribed the low prevalence to several possible misdiagnoses. Specifically in regard to the lower third molars, this can be considered the second most frequent cyst, representing up to 25% of the cystic lesions associated with these teeth, although they represented only 1.6% of the cystic lesions analyzed by Colgan *et al.*[11]

The etiology of paradental cysts is of an inflammatory nature, as shown by the histological findings of odontogenic epithelium proliferation, presence of an inflammatory infiltrate, and occasional hyaline changes in blood vessel walls.[5,8,10,11,14] However, there are controversies surrounding the origin of the lining epithelium. According to Souza *et al*[14] most cases of paradental cysts stem from the proliferation of reduced epithelium of the enamel organ, probably caused by inflammatory stimuli originating from the junction of the epithelium of the cystic capsule with the gingival epithelium. Colgan *et al.*[11] and Lim and Peck[8] also believe that this cyst arises from reduced epithelium of the enamel organ. The epithelial remnants of Mallassez seem to be the most unlikely origin, although they may reasonably explain cysts located near the roots.[14]

In most cases, the epithelial proliferation is usually the result of chronic inflammatory stimuli associated with a history of pericoronaritis.[9,11,14,15] This mechanism can be easily understood when the molars are partially or totally erupted, a clinical picture usually presented by the lower third molars. On the other hand, according to Bohay *et al.*[13] and Annibal *et al.*,[10] this theory apparently does apply to unerupted teeth, as the periodontium does not suggest communication with the oral cavity and consequent absence of periodontal disease. In such cases, the existence of microscopic communication is suggested,[9] a hypothesis that might explain the case reported here in which we did not observe clinical communication of the second molar with the oral cavity. However, the radiographic analysis did not identify the bone defect on the occlusal and mesial surface of the impacted tooth that was visualized during surgery (Figure 4). It is thought that this area might have allowed a microscopic opening into the oral cavity, resulting in the inflammatory process that triggered the development of the cyst.

Most paradental cyst cases involve lower third molars and occur during the third decade of life, regardless of gender or race.[6,11,14] The predominance of this age range is because the eruption of the third molar occurs at the end of the second decade. Delayed eruption leads to predisposition to pericoronaritis during the third decade of life.[14] According to the chronology of eruption, involvement of the first molars occurs in children younger than 10 years and involvement of the second molars occurs between 11 and 15 years,[5,9,12,14,16] according to the case described here. The rare occurrence of paradental cysts in upper molars and in single root teeth has not yet been explained.[9]

The most common signs and symptoms are increased volume, pain and suppuration, with the patient occasionally complaining of sensitivity in the region, delayed tooth eruption and even facial asymmetry.[7,13,17] However, vestibular bone expansion is definitely the most significant clinical finding, representing an important signal for the diagnosis of a paradental cyst in the first and second lower molar, which has a thinner cortical bone as opposed to the third molar.[9] This expansion of the buccal bone plate in the region of the second lower molar was the first detectable clinical sign that led to the investigation of the reported lesion.

The tooth involved in the described cyst presented mesioangular inclination and the largest portion of the lesion was located near the mesial root of the tooth. These positions support the theory advocated by Colgan *et al*,[13] whereby the position of the cyst may be closely related to the angulation of the impacted third molar. According to these authors, the lesions are located in the mesial portion of mesioangular teeth, in the buccal portion if the teeth are verticalized, and in the distal or distobuccal portion when the teeth are distoangular. Aspects of local anatomy, such as shape of the gingiva and the crown, may affect the localization of the lesion.

Radiographically, paradental cysts present a well-defined radiolucent image with a radiopaque halo on the mesial or distal aspect of a partially erupted lower molar.[9,14] Another important characteristic is the loss or thinning of the lamina dura in the region of the apices and furcation of the tooth involved, with or without root dislocation.[7]

The differential radiographic diagnosis should include a dentigerous cyst, lateral root cyst, localized periodontitis, keratocysts, and unilocular ameloblastoma.[6,13] The relationship between the dentigerous cyst, especially the lateral one, and the paradental cyst has been extensively discussed in the literature due to the radiographic similarity,[14] however, they are histologically distinct entities.[1] According to Damante and

Fleury,[18] the differential diagnosis between paradental cyst, dentigerous cyst and pericoronal follicle depends on clinical and/or surgical findings as well as presence of cystic content and cystic bone cavity.

The recommended treatment for paradental cysts is enucleation of the lesion and preservation of the tooth involved.[7,9,13] Thompson *et al.*[17] recommend extraction of the third molars if they are involved. According to Annibali *et al.*[10] the appropriate treatment of the dental element depends on involvement or non-involvement of dental papilla and papillary lamina dura. If they are not involved, the lesion should be submitted to curettage and the tooth should be preserved; otherwise, extraction would be indicated if the tooth is impacted or if it could be treated endodontically, if erupted.

In the case reported here, lesion enucleation and extraction of the second right lower molar were performed due to lack of bone support. According to Bohay *et al.*,[13] if involved, the first molar should always be preserved, except in case of radiographic evidence of absence of bone support and/or associated infection. No reports of recurrence of paradental cysts have been published in the literature.[14]

As paradental cysts usually result from recurrent episodes of pericoronaritis, it is important to control radiographically unerupted teeth that cannot be extracted for local or systemic reasons and, in the presence of symptoms, to reduce the interval between controls.[14]

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