

## EXTENDED APICAL PERIODONTAL CYST IN MAXILLA: CASE REPORT

### CISTO PERIODONTAL APICAL EXTENSO EM MAXILA: RELATO DE CASO

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#### ABSTRACT

The apical periodontal cyst represents the most common inflammatory pathology among odontogenic cysts, corresponding to about 60% of the maxilla and mandible cysts. It is associated with the apex of a devitalized tooth and is generally asymptomatic, affecting more frequently the anterior region of the maxilla. A 44-year-old leukoderma patient presented with a large asymptomatic lesion located in the anterior region of the maxilla. On clinical examination, it was possible to observe an increase in volume associated with the erasure of the gingivolabial fold, in addition to a negative pulp vitality test in dental units # 13, # 12, # 11, # 21 and # 22. Radiographically, it appears as a well-defined unilocular radiolucent image surrounding the apexes of the respective dental units. An aspiration puncture was performed, showing bloody secretion, reinforcing the suspected suspicion of apical periodontal cyst. The proposed treatment was two aspirations per week for 15 days followed by enucleation, the 45-day postoperative panoramic radiograph showed bone neoformation. Thus, it is possible to verify that the surgical approach consists of a resolutive therapeutic option, mainly in extensive lesions.

**Keywords:** Apical periodontal cyst. Oral Surgery. Oral Pathology.

#### RESUMO

O cisto periodontal apical representa a patologia de natureza inflamatória mais comum entre os cistos odontogênicos, correspondendo a cerca de 60% dos cistos da maxila e mandíbula. Está associado ao ápice de um dente desvitalizado e geralmente é assintomático, acometendo com mais frequência a região anterior da maxila. Paciente 44 anos, leucoderma, apresentou uma lesão de grande proporção assintomática localizada em região anterior da maxila. Ao exame clínico foi possível observar aumento de volume associado ao apagamento do sulco gengivolabial, além de teste de vitalidade pulpar negativo nas unidades dentárias #13, #12, #11, #21 e #22. Radiograficamente, apresenta-se como uma imagem radiolúcida unilocular bem definida circundando os ápices das respectivas unidades dentárias. Foi realizada uma punção aspirativa, evidenciando secreção piossanguinolenta, reforçando a suspeita diagnóstica de cisto periodontal apical. Foram realizadas duas punções aspirativas por semana, durante duas semanas, seguidas de injeção intralesional de Rifocina. Após a quarta sessão, foi realizada abordagem cirúrgica para enucleação da lesão. A radiografia panorâmica pós-operatória de 45 dias evidenciou neoformação óssea. Desta forma, é possível constatar que a abordagem cirúrgica consiste em uma opção terapêutica resolutive, principalmente em lesões extensas.

**Palavras-chave:** Cisto Bucal. Cisto Periodontal Apical. Patologia Bucal.

## INTRODUCTION

The apical periodontal cyst, one of the types of root cyst, is defined as a pathological cavity internally lined by epithelium and externally by fibrous connective tissue, containing within it a semi-fluid or fluid material and is associated with the apex of a devitalized tooth. It is classified as an inflammatory odontogenic cyst due to its coating derived from the proliferation of Malassez epithelial remains, induced by an inflammatory stimulus, resulting from the infection of the root canals due to a pulp necrosis (LIN; RICUCCI; KAHLER, 2017; MARTINS *et al.*, 2018).

Root cysts correspond to 60% of odontogenic cysts, with the anterior region of the maxilla being the most affected. There is a predominance of males between the third and sixth decade of life, with leukoderma patients being more affected than melanoderms in a 2: 1 ratio (JUNQUEIRA *et al.*, 2011; DANTAS *et al.*, 2014; COMIM *et al.*, 2017).

As for the pathogenesis of the root cyst, three phases are described: initial, cystic formation phase and growth phase. The formation of the cystic cavity originates from a pre-existing periapical granuloma due to the degeneration and central death of fibroblast cells, collagen fibrils, endothelial and capillary cells (SANTOS *et al.*, 2011).

Periapical cysts are usually asymptomatic, however, when the lesion reaches large proportions, signs of tenderness may be observed. The lack of response to pulp tests is a characteristic of all apical periodontal cysts. Radiographically, a radiolucent unilocular image is observed, rounded or oval, circumscribed by a well-defined radiopaque line that surrounds the apex of the tooth. Difficulty in differentiating radicular cyst from apical granuloma has been observed on radiography (LIN; RICUCCI; KAHLER, 2017; RESENDE *et al.*, 2017)

It is necessary for the diagnosis of the root cyst the absence of pulp vitality of the involved unit. Other complementary methods can also be used for the differential diagnosis, such as electrophoretic analysis, computed tomography and aspiration of the cystic content. All surgical specimens must be sent for histopathological examination to define the definitive diagnosis (JUNQUEIRA *et al.*, 2011; LIN; RICUCCI; KAHLER, 2017). Treatment varies from the endodontics of the dental unit involved to the surgical approach (PINTO *et al.*, 2016; SILVA *et al.*, 2018).

The aim of the present study is to report the clinical case of a large radicular cyst, treated with decompression followed by enucleation.

## CASE REPORT

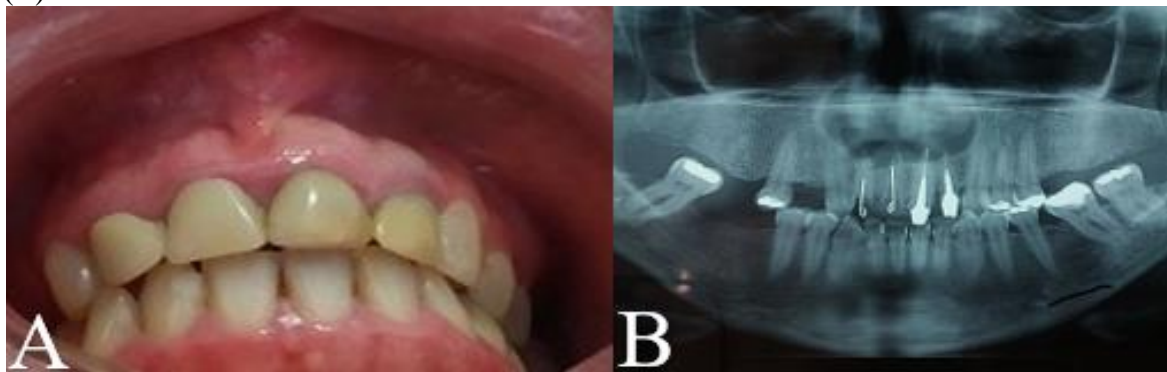
Female patient, leucoderma, 44 years old, attended a private dental office in the city of Salvador-BA complaining of an increase in volume in the anterior region of the maxilla, lip and nasal base for two months, progressing with dyspnea. On intraoral physical examination, the gingivolabial sulcus was erased due to the presence of softened swelling (Figure 1a).

On intraoral examination, there was an increase in volume in the anterior region of the maxilla, with normal mucosa color and smooth surface. The presence of intraoral fistula was observed, with drainage of purulent secretion. The sensitivity test was negative for units # 13, # 12, # 11, # 21 and # 22.

Panoramic radiography showed a radiolucent, unilocular lesion, with regular contours, between units # 13 and # 22 (Figure 1b). It is possible to observe that the root canal of the unit # 12 is subobtured, an inadequate intra-root pin in unit # 11, as well as external root resorption in units 11, 21 and 22.

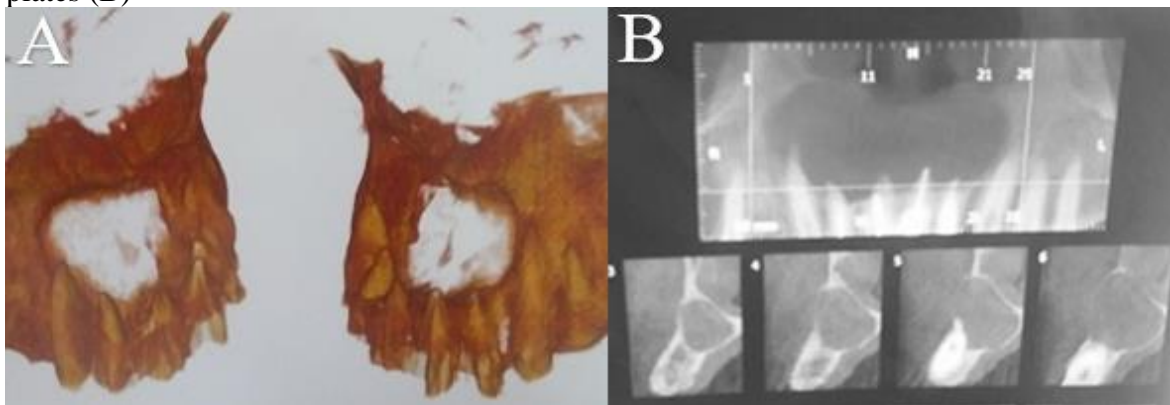
3D computed tomography showed an extensive lesion in the anterior region of the maxilla, without compromising the nasal cavity or maxillary sinus. The contours are regular, with partially defined limits, measuring about 3.4 x 3.1 x 0.5 cm (Figures 2a and 2b).

**Figure 1** - Swelling in the anterior region of the maxilla, with erasure of the gingivolabial sulcus (A). Panoramic radiography: lesion involving the dental apices of unit # 13 and # 22 (B)



Source: the authors.

**Figure 2** - 3D tomography of the maxilla, showing the limits of the lesion (A). Computed tomography showing the size of the lesion and involvement of the buccal and palatal bone plates (B)



Source: the authors.

An aspiration puncture was performed with a 20ml syringe to check the nature of the lesion's content, resulting in 15ml of purulent and bloody content, with the diagnostic hypothesis of an apical periodontal cyst being extensive. The therapeutic approach was four aspiration punctures (two per week) using a 20 ml syringe with a 40 x 12 needle, promoting a decrease in osmotic pressure, followed by intralesional injection of Rifocin, in order to avoid infectious complications at the site. In the last section, the presence of liquid content was noted, which was collected and sent to the laboratory for culture with antibiogram, showing a negative result. The patient was then submitted to enucleation of the lesion (Figures 3a, 3b and 3c), and the piece was sent for histopathological analysis.

**Figure 3** - Transoperative cystic enucleation



Notes: Semi-lunar flap for access to the lesion (A). Surgical store after enucleation (B). Synthesis of the flap, providing closure by first intention (C)

Source: the authors.

Histopathological examination showed fragments of a cystic capsule covered by stratified squamous epithelium, showing several irregular Rushton corpuscles. The capsule consisted of fibrous connective tissue with variable density, well vascularized and exhibiting a chronic inflammatory infiltrate. In view of these findings, the histopathological diagnosis of apical periodontal cyst was issued.

A new thermal test with Endo Ice spray was performed on the dental elements involved, showing the absence of pulp vitality in elements 11, 12, 13, 21 and 22. The patient was instructed on the need to perform endodontic treatment of the units involved.

Panoramic radiography was performed 45 days after the operation, where it was possible to observe radiopacity compatible with bone neoformation in the region (Figure 4). The patient is being monitored and maintained with the team.

**Figure 4** - Panoramic radiography (45 days control)



**Source:** the authors.

**Note:** Image suggestive of new bone formation.

## DISCUSSION

The apical periodontal cyst behaves as an inflammatory response due to an infection of the root canals. Radiographically, the image is described as a circumscribed, oval radiolucent, involving the apex of the devitalized tooth (KESHARWANI *et al.*, 2020). Epidemiological data show that women over the third decade of life are more affected, with a prevalence of the maxillary region of 52% to 68% (DANTAS *et al.*, 2014; LIN; RICUCCI; KAHLER, 2017). This information coincides with the diagnosis, location of the lesion and the patient's age in the reported case.

The treatment of the root cyst is widely discussed, with alternatives being endodontic treatment with or without apicectomy, extraction of the involved tooth, decompression, marsupialization or enucleation with primary closure, for example. The treatment of choice depends on a number of factors such as size and location of the lesion, proximity of the cyst to vital teeth and adjacent noble structures (lower alveolar canal, mental foramen, infraorbital foramen, nasal cavity and maxillary sinus), as well as behavior cyst, its aggressiveness and expansion. It is worth mentioning that computed tomography is an important ally that helps to identify these aspects (JUNQUEIRA *et al.*, 2011; ABOULHOSN *et al.*, 2019).

In the pathogenesis of the root cyst three phases are considered. The mechanisms involved are not yet widely known, however, in the initial phase, bacterial infectious agents irritate the periapex giving rise to periapical granuloma. On the other hand, during the deposition of root dentin, Hertwig's

epithelial sheath is disorganized, leaving the epithelial remains of Malassez. The presence of inflammatory cytokines seems to stimulate the division of these epithelial cells in order to separate the inflammatory stimulus from the surrounding bone (LIN; RICUCCI; KAHLER, 2017; CARVALHO *et al.*, 2020).

In the stage of cystic formation, the central region of the granuloma ends up not receiving the necessary nutrients for the metabolism of the lesion, which triggers the degeneration and death of the cells causing a cavity inside the proliferative tissue. The growth of the lesion results in an increase in osmotic pressure, causing the products of necrosis and epithelial desquamation to lead to the accumulation of albumin proteins within the cystic cavity, promoting the attraction of liquids from tissue spaces into the cavity (OLIVEIRA *et al.*, 2011; SANTOS *et al.*, 2011; CARVALHO *et al.*, 2020).

In the growth phase, the interstitial enlargement that compresses the cystic fibrous wall, blood vessels and cells, resulting in metabolic and mechanical stress. This results in the release of products derived from arachidonic acid, such as prostaglandins, being important inducers of peripheral bone resorption. With this bone resorption, the cyst stabilizes, hydrostatic pressure decreases, resuming a new cycle of protein accumulation, fluid attraction and new peripheral bone resorption (CARVALHO *et al.*, 2020; GUARALDI; HERINGER, 2020).

True cysts are lesions that have complete lining epithelium, and the cystic cavity is detached from the teeth. They are self-sustaining lesions and it is unlikely that their repair will occur only with endodontic treatment, requiring surgical complementation, especially in cases where endodontic treatment did not promote tissue repair. When the extraction of the unit involved is chosen as a form of treatment, curettage of the apical tissues should always be performed (JUNQUEIRA *et al.*, 2011; LIN; RICUCCI; KAHLER, 2017; MENDONÇA *et al.*, 2017; COSTA *et al.*, 2020).

In this case, the conservative approach was recommended through aspiration puncture because a drain for maintaining the surgical window could cause discomfort for the patient, in addition to becoming a site for the accumulation of bacterial plaque, and anti-aesthetic in the case of the patient in question. Decompression stands out in the surgical field for the treatment of large injuries; it can reduce internal pressure by removing fluid from the lesion, triggering the gradual reduction of the lesion. Usually performed when there is a risk to the adjacent noble structures (RODRIGUES *et al.*, 2017; ABOULHOSN *et al.*, 2019; GUARALDI; HERINGER, 2020).

The treatment instituted in the present case proved to be satisfactory, since there was bone repair verified on the panoramic control radiography.

## FINAL CONSIDERATIONS

Periapical lesions are commonly found in the dental surgeon's clinical practice. Therefore, the professional must be able to detect and treat these lesions, and a detailed anamnesis, knowledge of the clinical, radiographic, histopathological and etiopathogenic characteristics of the disease is essential. We can consider that the treatment instituted was satisfactory, minimizing the risk of damage to anatomical structures, in addition to facilitating the bone repair mechanism.

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