



## Surgical treatment of inflammatory periapical cyst: a clinical case report

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### Abstract

Among the odontogenic cysts, there are radicular cysts or also called periapical cysts, are the most common odontogenic cyst. They develop at the apex of a tooth with pulp necrosis, which may be the consequence of dental caries or trauma. they are asymptomatic, grow slowly, and are discovered on routine radiographs. With the proliferation of the ERM and its activation, there is an increase in osmotic pressure, causing the cyst to expand, normally this ERM is not activated, so only granulation tissue develops at the apex of the affected tooth. Granulation tissue is called periapical granuloma and, as such, histologically lacks an epithelial lining. In the present study, a case of a 65-year-old female patient with an inflammatory periapical cyst in the region of the lower incisors is reported.

**Keywords:** Inflammatory Periapical Cyst. Odontogenic cysts. Oral.

### Introduction

Root cysts, also known as periapical cysts, are inflammatory cysts located in the root region of a devitalized tooth [9]. By definition, they are a pathological cavity, lined by epithelium and a capsule consisting of connective tissue, containing a liquid or semi-solid material [5-9].

It is preceded by periapical granuloma, with preexisting epithelium, thus constituting a focus of chronically inflamed, intraosseous granulation tissue at the apex of teeth without pulp vitality. Cysts are the last diagnosis in the progression of inflammatory events secondary to pulp necrosis of a tooth. The epithelial source is commonly Malassez's epithelial remnants, derived from the apoptotic disorganization of Hertwig's sheath, but it can also be related to the crevicular

epithelium, the sinus lining, or the epithelial lining of the fistulous tracts [7].

According to the numerous lesions caused by cysts in the jaws, radicular cysts are the most common, covering about 52% to 68% of all cysts in the oral cavity, being more recurrent in men between 20 and 40 years of age [10-12] and are more prevalent in whites than in blacks [13-19].

Usually, those diagnosed with this cyst do not have symptoms, as long as there is no acute inflammatory exacerbation, as there may be pain and/or tenderness in the region. The greater the lesion, the more dangers such as swelling, and tooth mobility, and the affected tooth does not present a positive pulp test. On radiographs, the visual characteristics of the cysts consist of a radiolucent, rounded image associated with a necrotic and devitalized root apex and with rupture of the lamina dura at the apical level [12].

Histologically, the cyst exhibits a capsule of fibrous connective tissue, lined by stratified squamous epithelium, with a lumen containing fluid and cellular debris. There are several ways to treat root cysts, through endodontic treatment of the devitalized tooth, with or without apicectomy, surgical treatments such as tooth extraction, periapical curettage, marsupialization, decompression, and finally cystic enucleation [20].

Therefore, the general objective of this work was to report a successful clinical case, submitted to surgical treatment of an inflammatory periapical cyst in the mandible, where it was removed, local curettage, bovine collagen membrane was placed and a bovine graft was made. As specific objectives, it seeks to review the literature on diagnostic and surgical treatment of this type of cyst, emphasizing characteristics of these cystic lesions, both clinical and radiographic, and sharing the results achieved with this treatment and the follow-up of the case.

## Clinical Case Report

### Study Design

The present study was elaborated according to the rules of the CARE case report (<https://www.care-statement.org/>).

### Ethical Aspects

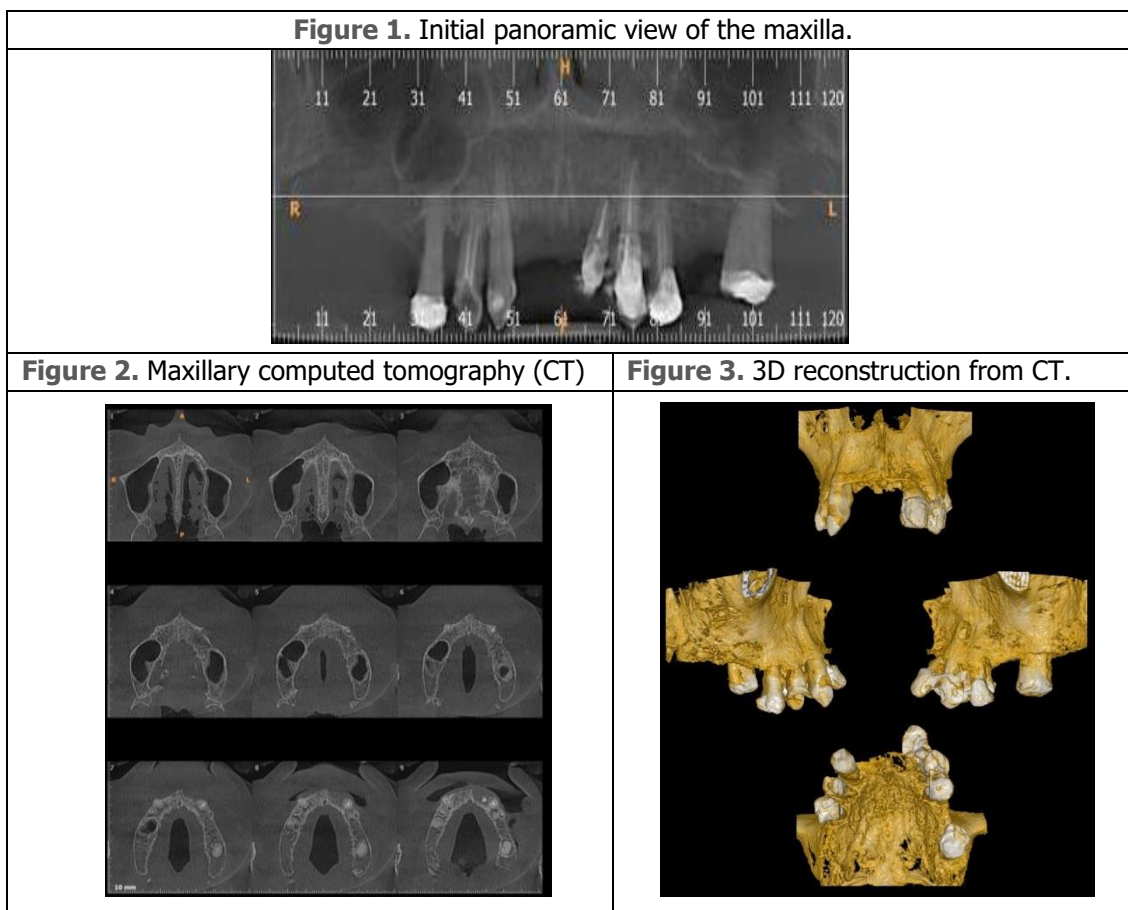
The present study preserved the patient's anonymity, as well as preserving the rights and care of the patient and her information as recommended by the Declaration of Helsinki of 1964.

### Patient Information and Clinical Findings, Timeline, Diagnostic Assessment, Therapeutic Intervention, and Follow-up

The patient, 65 years old, female, smoker, residing in the city of São Paulo/SP, attended the dental office in São José do Rio Preto, São Paulo, Brazil, complaining of swelling in the chin and mobility in the elements 31,41,32,42 and 43 denied allergies and previous trauma. During palpation, a rigid swelling was observed in the anterior region of the mandible. In the maxilla: there was absence of elements 18, 17,16,12,11,21,25,26,28 there was endodontic filling material partially filling the root canals of teeth 14,22,23

and 24. There was periapical bone rarefaction in teeth 14,22,23 and 24, suggesting apical scarring or periapical inflammatory disease. It was also verified that the periapical bone rarefaction of the 22 promoted discontinuity of the vestibular cortical in the region. There was a severe bone loss in the upper teeth, severe resorption of residual alveolar ridges, and, finally, a prosthetic base with an intraradicular retainer on teeth 22 and 23 (**Figure 1**). In the mandible: absence of elements 38,37,36,35,34,31,41,44,45,46,47 and 48, presence of endodontic material partially filling the root canal of tooth 33, there was no bone support on the buccal of the tooth 33, severe bone loss in the region of the lower incisors, detected the presence of a hypodense, circumscribed, well-delimited image in the anterior region of the mandible with the following dimensions (H: 15.6 mm, L: 17.2 mm, P: 11, 2mm) extending from the alveolar ridge to the mandibular base, from the root apex of tooth 32 to 43 and from the lingual cortex to the buccal cortex, promoting expansion, thinning and discontinuity of the same. There was the presence of bone rarefaction in the region corresponding to tooth 44 and available transversal bone height in the possible implant sites (**Figures 2 to 11**).

### Figures from 1 to 3.



Source: Own clinical case.

Figures from 4 to 10.

Figure 4. Initial panoramic view of the mandible.

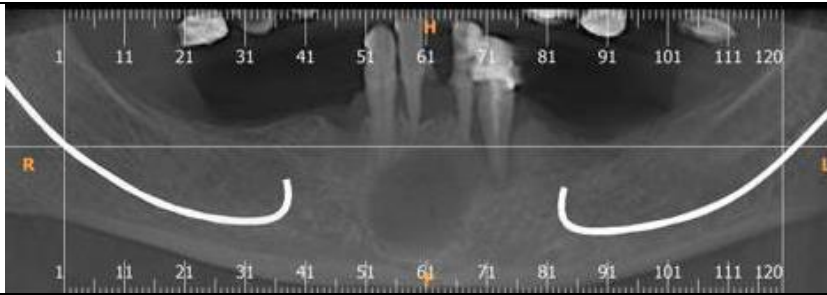


Figure 5. Axial sections of the mandible.

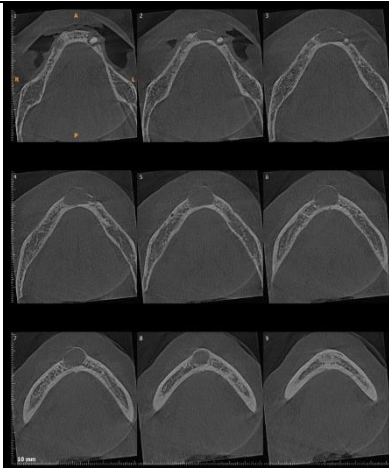


Figure 6. Transverse sections of the mandible.

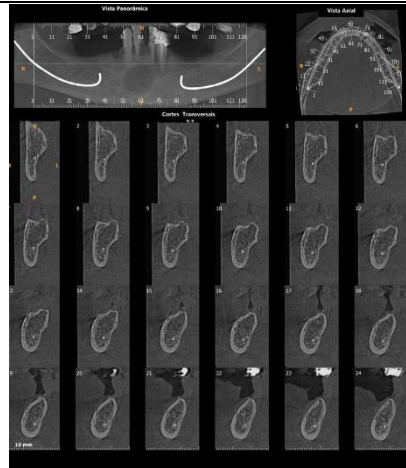


Figure 7. Cross-sections of the Mandible.

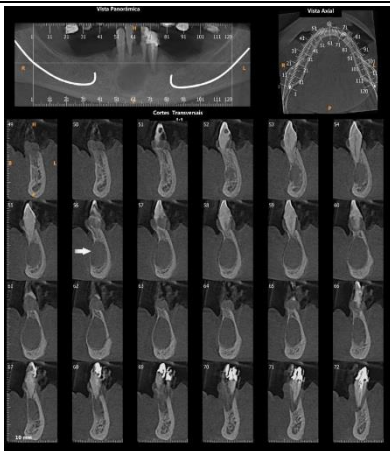


Figure 8. Cross-sections of the Mandible.

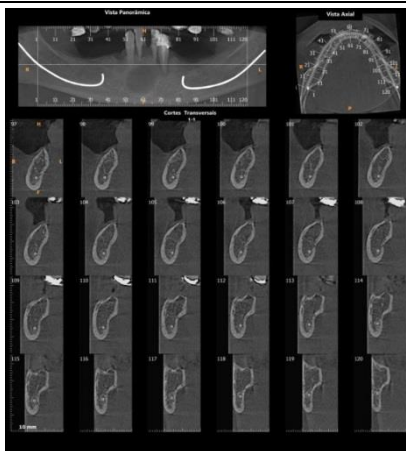


Figure 9. Cross-sections of the Mandible.

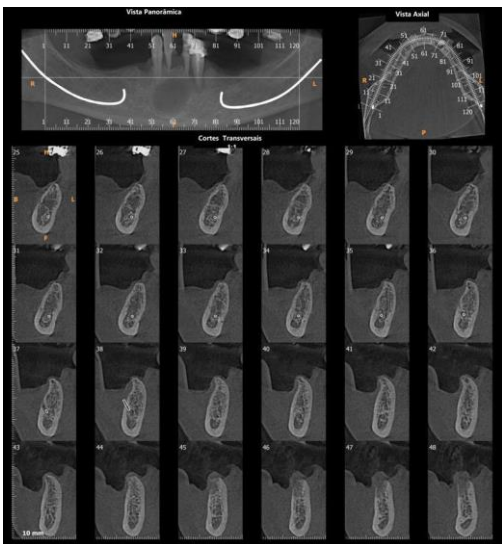
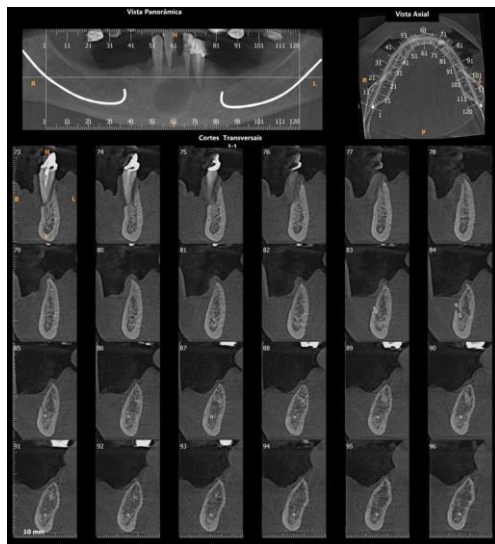
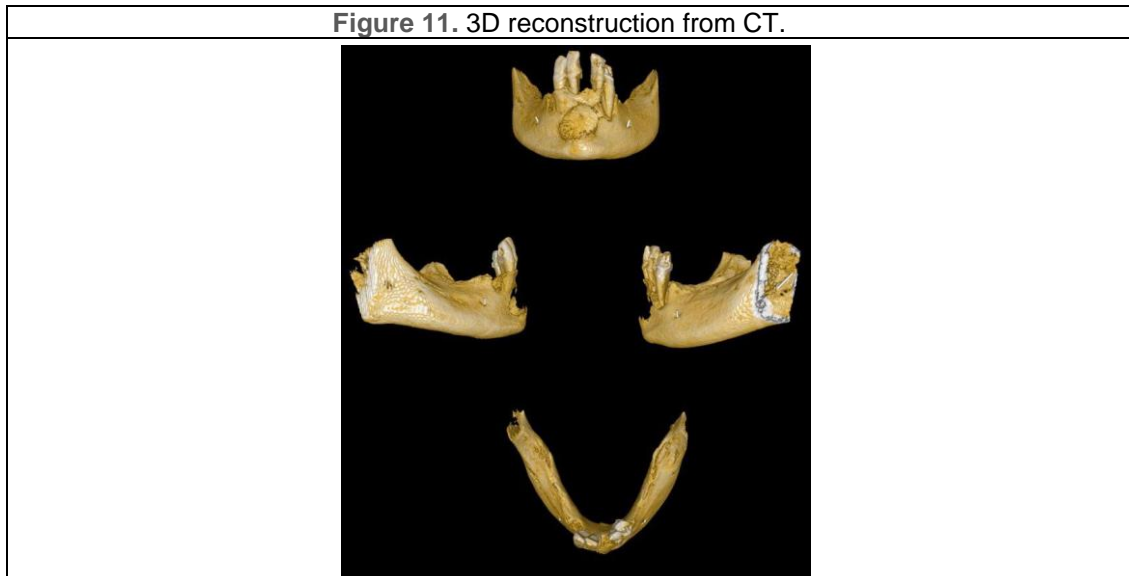


Figure 10. Cross-sections of the Mandible.



Source: Own clinical case.

Figure 11. 3D reconstruction from CT.



Source: Own clinical case.

Given the clinical and radiographic findings, a complete blood count, coagulogram, and PT (prothrombin time) were requested to perform the surgery in the office and all of them were within the normal range.

### Literary review and discussion

A cyst can be defined as a pathological cavity, lined by the epithelium of odontogenic origin, normally containing, in its interior, fluid or semi-fluid material [21,22]. The periapical cyst is an inflammatory odontogenic cyst that can be a consequence of trauma or dental caries, thus causing dental devitality [8,9,19]. Odontogenic cysts have two classifications, according to the WHO (World Health Organization), the first being of inflammatory origin and the second being developing cysts [15].

There are three explanations for the formation of periapical cysts, the first being the nutritional theory that says that with the inflammatory stimulus, epithelial development occurs in the region, and the most central cells, far from the nutritional source, undergo necrosis by liquefaction, thus giving rise to the cystic cavity, the second theory defends that with the growth of the abscess, the epithelial cells proliferate forming cords that cover it. And finally, the last theory says that the epithelial rests of Malassez proliferate forming cords that join and give rise to a cavity, with the desquamation of cellular rests, the protein content inside the cavity increases, consequently, there is the entry of liquid to cause osmotic stabilization, thus causing the development of the lesion [20].

Periapical cysts are the most common inflammatory odontogenic lesions found in the jaws, originating from a periapical granuloma. The epithelial

lining of the periapical cyst originates from the development of Malassez epithelial cells, present in the periodontal ligament, which undergoes apoptosis and gives rise to the cystic cavity, in response to continuous antigenic stimulation coming from the root canal system, the presence of microorganisms being decisive. and its products, thus maintaining the local inflammatory process [1,13,14].

With local inflammation, secretion and cytokines are stimulated, which induce an increase in the amount of inactive Malassez epithelial rests, initiating a process of periapical inflammatory hyperplasia [23]. Cysts are more frequent in men aged between 20 and 40 years [10], and concerning race, more cases were seen in leukoderma than in melanoderma, so there are more cases in whites than in blacks [13, 19]. The radicular cysts can have considerable sizes, which can cause the expansion of the bone cortical and a hard and painless swelling, breaking this thin cortical and the swelling is soft, but with a good demarcation, at that moment the mucosa that covers the cyst may have characteristics of a bluish color, but normal consistency [7].

Radiographs and CT scans are very important in verifying the regions of the dental periapex and all the bone tissue that surrounds it, showing lesions that may be there, especially when they do not present symptoms, so radiographs are extremely necessary to reach a diagnosis, since behind them, in addition to seeing the lesions, their size, relationships, and possible origins can be determined [18].

The treatment indicated for periapical cystic lesions is surgical enucleation associated or not with the extraction of the affected element, which consists of removing the cyst completely, without rupture of the fibrous capsule so that the risk of recurrence is reduced.

curettage of 1 to 2 mm of bone around the affected region is necessary, removing any epithelial cell that may be present [11].

There are other forms of treatment such as marsupiation in which a surgical window is created in the cyst wall, removing all the cystic content, thus reducing intracystic pressure, decreasing size, and resulting in the bone filling. first, it is necessary to wait for the healing of the site, reduction of the cyst, and then its removal with enucleation, being a way to maintain the cystic structures and remove them completely. There is also root canal treatment, decompression, which consists of placing a tube or catheter and draining the cyst, reducing intracystic pressure, and consequently reducing the size of the cyst, and then surgical removal is performed [4,16,17,21].

## Conclusion

According to the authors, each technique for treating cysts has an exact indication, and it is up to the specialist to analyze the type of cyst, size, location, and general condition of the patient, to decide on the best treatment.

## Acknowledgement

Not applicable.

## Ethical aspects

The present study preserved the patient's anonymity, as well as preserving the rights and care of the patient and her information as recommended by the Declaration of Helsinki of 1964.

## Informed consent

The patient signed the consent form.

## Funding

Not applicable.

## Data sharing statement

No additional data are available.

## Conflict of interest

The authors declare no conflict of interest.

## Similarity check

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