



Large radicular cyst compressing the mandibular canal: a case report

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ABSTRACT

Objectives: To describe radicular cysts and differentiate them from radiographically similar cysts such as odontogenic keratocysts.

radiolucent lesion extending from the periapical area of tooth 35, with evidence of compression on the mandibular canal.

Case Report: A 21-year-old female patient presented to the Dental and Oral Hospital with a primary complaint of residual root fragments in the left mandibular region, for which she requested extraction. Extraoral clinical examination revealed no facial asymmetry, swelling, or tenderness, and the region was asymptomatic upon palpation. The patient reported no relevant systemic medical history. Panoramic radiographic examination demonstrated a well-defined unilocular radiolucent lesion extending from the apical third of tooth 36 to the periapical areas of teeth 35, 37, and 38. Given the limitations in diagnostic detail offered by conventional periapical radiography, a Cone-Beam Computed Tomography (CBCT) scan was subsequently performed. Multiplanar reconstruction images from the CBCT revealed a

Conclusion: Radicular cysts are the most common type of odontogenic cyst and are associated with dental inflammation. Radicular cysts and OKCs have a similar radiographic appearance, leading to confusion between the two. Cone Beam Computed Tomography (CBCT) offers three-dimensional imaging that allows a comprehensive assessment of the lesion's size, extent, and relationship to adjacent anatomic structures, allowing the characteristics of both radicular lesions and OKCs to be clearly demonstrated. The characteristics of each lesion can be clearly described, making CBCT a very helpful modality in these cases.

Keywords: Cone Beam Computed Tomography, odontogenic cyst, radicular cyst

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INTRODUCTION

Radicular cysts represent the most prevalent form of odontogenic cysts, accounting for approximately 52% to 68% of all jaw cysts, and may develop in any region of the jaws.¹ These lesions arise as a result of chronic inflammation or infection associated with non-vital teeth, specifically involving the proliferation of epithelial rests of Malassez located within the periodontal ligament. Clinically, periapical (radicular) cysts exhibit variable sizes and may remain asymptomatic for extended periods. However, when the lesion enlarges, it can manifest as extraoral swelling, potentially leading to diagnostic confusion with other types of odontogenic cysts.^{1,2} Due to their typically asymptomatic presentation, radicular cysts are frequently identified incidentally during routine radiographic evaluations.³

Radiographically, a radicular cyst typically presents as a well-defined, unilocular, round or oval radiolucency with a sclerotic radiopaque margin,

located in the periapical region of the involved tooth. In cases where the cyst becomes secondarily infected, the radiopaque border may be disrupted or absent due to fast expansion.¹ A key consideration in the differential diagnosis of a radicular cyst is the odontogenic keratocyst (OKC). OKC is the third most common odontogenic cyst, comprising approximately 12% to 14% of all jaw cysts.² It occurs more frequently in the mandible than in the maxilla, with a predilection for the posterior mandibular region, particularly the angle and ramus. OKC is notable for its high recurrence rate and locally aggressive behavior. Despite these characteristics, its clinical and radiographic presentations can closely resemble those of other cystic lesions, including radicular cysts, necessitating careful diagnostic evaluation.²

Histopathologically, radicular cysts are classified into two subtypes: true apical cysts and apical pocket cysts. A true radicular cyst is entirely

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encapsulated by an epithelial lining, which is believed to possess intrinsic proliferative potential contributing to cystic expansion. In contrast, an apical pocket cyst features an epithelial lining that remains contiguous with the root canal system, often exhibiting localized accumulations of histopathological findings. Radicular cysts are classified into two subtypes: true apical cysts and apical pocket cysts. A true radicular cyst is entirely encapsulated by an epithelial lining, which is believed to possess intrinsic proliferative potential contributing to cystic expansion. In contrast, an apical pocket cyst features an epithelial lining that remains contiguous with the root canal system, often exhibiting localized accumulations of inflammatory cells and microabscesses, forming a pocket-like structure. Progressive enlargement of both cyst types may be gradual, but it sustains bone resorption in the surrounding area.⁴

This case report presents a large radicular cyst exerting compressive effects on the mandibular canal. The objective of this report is to highlight the radiographic characteristics of radicular cysts and to distinguish them from other cystic lesions with overlapping features, particularly the odontogenic keratocyst (OKC).⁵ In the present case, the lesion was identified in the posterior region with antero-posterior expansion, causing displacement of the canalis mandibular inferiorly, mimicking the radiographic characteristics in OKC, which are commonly located in the posterior mandible.

CASE REPORT

A 21-year-old female patient presented to the Dental Hospital with a chief complaint of a retained root in the lower left mandibular region and requested its extraction. Extraoral examination revealed no facial asymmetry, swelling, or signs of inflammation, and the involved tooth was asymptomatic. Intraoral examination showed a retained root of tooth 36. The patient reported no history of systemic disease during the anamnesis. A periapical radiograph (Figure 1) revealed a well-defined radiolucent lesion with a homogeneously radiolucent internal structure in the periapical region of tooth 36. The lesion extends mesially and

distally, involving the apical third of tooth 35 and the middle third of mesial root 37. External resorption of the apical third of tooth 36 was found. However, the radiograph did not fully capture the extent of the lesion, necessitating further imaging with Cone-Beam Computed Tomography (CBCT). Panoramic reconstruction from the CBCT scan (Figure 2) showed complete crown loss of tooth 36 and a well-circumscribed, rounded radiolucency lesion involving the apical third of both the mesial and distal roots.

The lesion extended from the periapical region of tooth 36 to the apices of adjacent teeth 35, 37, and 38, with evidence of inferior displacement of the superior wall of the mandibular canal. The alveolar bone crest appeared within normal limits. Sagittal CBCT images (Figure 3a) revealed that the lesion measured approximately 32.8 mm × 20.5 mm, extending in both superior-inferior and anteroposterior dimensions, involving the apices of teeth 35, 37, and 38. Notably, external root resorption was observed at the apical region of tooth 36, and the superior wall of the mandibular canal was displaced toward the inferior border of the mandible. Coronal CBCT views (Figure 3b) demonstrated buccolingual expansion of the lesion with associated thinning of the lingual cortical plate.

Radicular cysts can be mistaken for an Odontogenic Keratocyst (OKC) due to their similar radiographic appearance, especially when an OKC is located in the periapical region. The lesion was identified in the posterior region, demonstrated an antero-posterior pattern of expansion, and displaced the mandibular canal inferiorly, mimicking the radiographic characteristics typically observed in OKCs, which are commonly located in the posterior mandible. Despite these similarities, a fundamental distinguishing feature lies in their etiology: radicular cysts are most often associated with non-vital teeth and chronic inflammatory processes, whereas OKC usually occurs in association with vital teeth and is frequently linked to impacted teeth.^{6,7} These radiographic findings are consistent with a suspected radiodiagnosis of a radicular cyst, with a differential diagnosis of an Odontogenic Keratocyst (OKC).



Figure 1. The periapical radiographic image of tooth 36 revealed an expanding radiolucent lesion involving the roots of teeth 35 and 37 with external root resorption in apical 36. The lesion was not fully captured in the periapical.



Figure 2. Panoramic radiographic image revealed a well-defined radiolucent lesion extending in the anteroposterior direction and involving the apical roots of teeth 35, 37, and 38. The lesion also caused displacement of the mandibular canal toward the inferior border

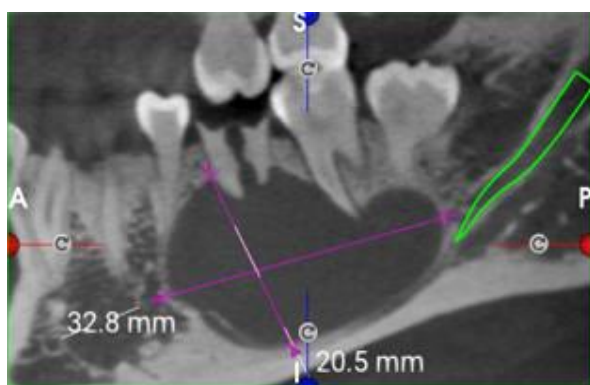


Figure 3a. CBCT Sagittal View

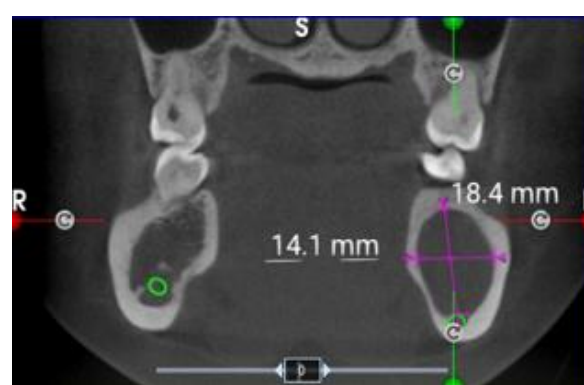


Figure 3b. CBCT Coronal View

DISCUSSION

A radicular cyst is an inflammatory odontogenic cyst that commonly arises in association with carious, non-vital, discolored, or fractured teeth. According to the literature, it represents the most frequently occurring cystic lesion of the jaws.⁸ Radicular cysts are predominantly diagnosed in individuals between the ages of 30 and 50 years and exhibit a higher prevalence among male patients. Anatomically, these cysts show a predilection for the anterior maxillary region, although they can occur in any area of the oral cavity.⁸

Pathophysiologically, radicular cyst development is initiated by the inflammatory stimulation of the epithelial rests of Malassez located within the periodontal ligament. This chronic inflammation induces epithelial proliferation, culminating in cyst formation. The pathogenesis of radicular cysts typically progresses through three distinct phases: initiation, cyst formation, and cyst enlargement. Clinically, radicular cysts are often asymptomatic and may remain undetected for extended periods. However, in long-standing cases, acute exacerbation may occur, manifesting as swelling, tooth mobility,

displacement of adjacent unerupted teeth, and resorption of the roots of affected teeth.²

Goulart et al. reported that in certain cases, radicular cysts may expand significantly, resulting in more complex clinical presentations, including secondary infection and pain.⁹ Buccolingual expansion of the cortical bone is commonly observed in such cases, contributing to extraoral swelling. Initially, this swelling may present as firm due to intact cortical bone. However, as the cyst enlarges, progressive resorption and thinning of the bone lead to a softer, more fluctuant swelling, often accompanied by a characteristic "egg-shell crackling" sensation upon palpation. In advanced cases, where the cortical plate is completely resorbed, the swelling exhibits a rubbery consistency with fluctuation.¹⁰

Accurate diagnosis of a radicular cyst necessitates a combination of clinical, radiographic, and histopathological evaluations. Advanced imaging modalities such as Cone Beam Computed Tomography (CBCT) provide essential diagnostic insights regarding the size, extent, and anatomical relationships of the lesion, facilitating effective treatment planning.¹¹ In the present case, the cyst was asymptomatic with no evidence of extraoral swelling, consistent with the findings reported by

Shivhare et al., who emphasized the typically asymptomatic nature of radicular cysts. Preoperative CBCT imaging was instrumental in delineating the full extent of the lesion and its impact on adjacent structures.

Radiographically, the lesion appeared as a well-defined radiolucency extending from the apical third of tooth 36 and involving the periapical regions of teeth 35 through 38. Notably, the lesion caused inferior displacement of the mandibular canal. Such displacement can potentially result in neurosensory disturbances due to compression of the inferior alveolar nerve. Clinically, this may present as altered sensation in the mandibular teeth, lower lip, and chin, as well as functional impairments such as difficulty in chewing, speaking, and unintentional biting of the lip or tongue.¹²

Among the differential diagnoses for this radiographic presentation is the odontogenic keratocyst (OKC), which may closely resemble a radicular cyst. The characteristic of an OKC appearance is an unilocular radiolucency surrounded by a thin sclerotic border, an expansible, solitary, lucent lesion with a smooth and often scalloped border, most commonly in the posterior mandible surrounding the crown of the third molar; it may displace teeth, causing malocclusion.^{13,14,15}

Another case was found, a 26-year-old male presented with swelling in the anterior mandibular

region for one month. The lesion was initially detected through panoramic radiography as a well-defined unilocular radiolucency extending from the apical third of tooth 36 to the periapical areas of teeth 35, 37, and 38. A CBCT scan was performed for a more detailed assessment, revealing that the lesion caused compression of the mandibular canal.¹⁴

The main differences between these cases are location and clinical presentation. The first case involved the anterior mandibular region with noticeable swelling, whereas the second case was located in the posterior mandible and was entirely asymptomatic. Additionally, the second case emphasizes the crucial role of CBCT in defining lesion boundaries and their relationship to vital structures, which greatly aids in treatment planning. Both cases underscore that the diagnosis of a radicular cyst should not rely solely on clinical findings but requires radiographic evaluation and, when necessary, histopathological confirmation.

Ameloblastoma is also considered a key differential diagnosis in such cases. This lesion typically presents as a well-defined, aggressive radiolucency with a multilocular internal structure resembling a soap bubble, honeycomb, or spider-web pattern.⁵ A summary of various radiographic differential diagnoses of radicular cysts is provided in Table 1.⁸

Table 1. Differential diagnosis of radicular cyst and its differences.^{10,16,17,18}

Lesion	Different Features
Odontogenic Keratocyst	Buccolingual cortical expansion is unusual Can cross the facial midline
Central giant cell granuloma	Thin Septa
Odontogenic myxoma	Tennis racket appearance
Ameloblastoma	Scalloped margin Wispy septa
Dentigerous Cyst	Radiolucency around an unerupted/non-erupted tooth
Periapical Granuloma	Radiolucency with a well-defined but indistinct border
Odontogenic Fibroma	Radiolucent appearance, sometimes with a mixed radiolucent/radiopaque pattern

Several treatment modalities are available for the management of radicular cysts, including non-surgical endodontic therapy, extraction of the involved tooth, enucleation as the primary surgical approach, and marsupialization followed by delayed enucleation. The selection of an appropriate treatment strategy is influenced by multiple clinical factors, including the size and anatomical location of the cyst, as well as its proximity to vital structures such as the mandibular canal or adjacent teeth.^{5,19,20}

CONCLUSION

Radicular cysts are the most common type of odontogenic cysts and are associated with dental inflammation. Radicular cysts and OKCs have a similar radiographic appearance, leading to confusion between the two. Cone Beam Computed Tomography (CBCT) offers three-dimensional

imaging that allows a comprehensive assessment of the lesion's size, extent, and relationship to adjacent anatomic structures, allowing the characteristics of both radicular lesions and OKCs to be clearly demonstrated. The characteristics of each lesion can be clearly described, making CBCT a very helpful modality in these cases.

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FOOTNOTES

All authors have no conflict of interest to declare for this article.

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