



Management Of Large Maxillary Radicular Cyst By Conservative Surgical Approach Under General Anesthesia In Association With Apicoectomy Of The Involved Tooth

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<i>Article History</i>	<i>Abstract</i>
<p>Received: 26 March 2023 Revised: 12 July 2023 Accepted: 29 July 2023</p> <p>CC License CC-BY-NC-SA 4.0</p>	<p>Radicular cysts are among the most common odontogenic cysts, typically an inflammatory response occurs in the periapical tissue, resulting in resorption of bone and formation of granulation tissue that is infiltrated by acute and chronic inflammatory cells. This abstract provides an overview of the management strategies for radicular cysts. Diagnosing radicular cysts involves clinical and radiographic examinations. Treatment options include non-surgical and surgical approaches. Non-surgical methods often involve endodontic therapy, while surgical options include cyst enucleation, marsupialization, or decompression. The choice of treatment depends on the cyst's size, location, and associated symptoms. This abstract report a case treated successfully in Kolan British Hospital of Cyprus in collaboration with Oral and Maxillofacial surgery, and Endodontics departments of Cyprus Health and Social Sciences University.</p>

1. INTRODUCTION

According to the World Health Organization, cysts in the jawbone can be classified as developmental, neoplastic, and inflammatory origin (Lin et al., 2017) [1]. A radicular cyst, also known as a periapical cyst, is a common type of odontogenic cyst that originates from epithelial remnants of Malassez in the periodontal ligament as a result of inflammation or infection associated with a non-vital tooth (Cawson & Odell, 2008) [2]. Typically found at the apex of a tooth's root, this cystic lesion develops slowly and is often asymptomatic until it reaches a significant size. Understanding the characteristics and implications of radicular cysts is crucial for dental practitioners in diagnosing and managing these oral pathologies effectively. Radicular cysts cannot be clinically recognized using standard radiography or cone beam computed tomographic images and must be diagnosed histologically from biopsy specimens (Lin et al., 2017). Limited cysts less than 5 cm are usually managed by enucleation (total cystectomy), whereas larger ones (exceeding 5 cm) are often treated with decompression or marsupialization (AboulHosn et al., 2019) [3].

2. CASE REPORT

A 24-year-old female patient reported to the Department of Radiology, Cyprus Health and Social Sciences University of Cyprus and polyclinics, with chief complaint of pain with an onset of 3 days ago and swelling of the upper anterior region of the palate, which had occurred 7 months back.

Intraoral examination revealed a round to oval swelling which was located both over labial mucosa of maxillary anterior region in association with 22, and 23 and the anterior region of palatal mucosa of maxillary anterior region in association with 21, 22, and 23. The Swelling on the labial region was soft, localized, fluctuant, inflamed and nontender whereas it was hard and nontender on the palatal region. discoloration was also seen of the left upper lateral incisor.

Electric and thermal pulp vitality testing showed negative responses in 22, while 21 and 23 showed a delayed response. All teeth were non-tender to percussion test. A panoramic X-ray was taken, which revealed a large unilocular radiolucent lesion which involved periapical regions of 21, 22, and 23 respectively.

A Dental Cone-beam Computed Tomography (CBCT X-ray) taken for further exploration of the finding, to check for proximity or any involvement of lesion with nasal floor, since lesion was extensive. CBCT X-ray showed unilocular radiolucency with sclerotic borders, no cortical expansion and the nasal floor was intact and the radiolucency was seen in relation with 22 in sagittal and coronal planes. The dimension of the lesion was measured by using measurement scale which was around 20 X 16 mm. Based on the history, clinical examination and investigation, an initial diagnosis of infected radicular cyst in 22 was made.



Fig. 1 Panoramic view reveals radiolucency at the root apices of 22 and 23 teeth, lesion is often well circumscribed and demarcated by a peripheral radiopaque margin continuous with the lamina dura of the involved teeth.

Treatment plan was formulated and after explaining it to the patient, her informed consent was taken. Patient was prepared for surgery in next visit, which included surgical enucleation of cyst, apicoectomy and retrograde filling of involved tooth. The surgery performed in 1.5 hour under general anesthesia on the request of the patient as stress control procedure. A crevicular incision was made in labial region 21 to 23 followed by 2 relaxing incisions with no. 15 blade. A full thickness mucoperiosteal flap was reflected with periosteal elevator revealing a bony defect over apex of 22 was seen clinically that extended in the palatal direction and close to the nasal septum. Complete curettage, along with granulation tissue removal and enucleation of cystic lesion was done carefully with a Lucas curette and the entire pathological specimen was collected and immersed in a fixative solution for histopathological examination. Once, Root end of 22 was resected and retrograde filling was done with MTA as measure to preserve the lateral incisor as much as possible, simple interrupted suture technique used for the primary flap closure with 3-0 silk.



Fig. 2 Three-dimensional reconstructed CBCT image revealed palatal cortical plate perforation in relation to 22. Displacement of the roots of 22, and 23 was noted.

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Post-operative instructions were given to the patient to keep good oral hygiene and patient was kept on antibiotics and analgesics. Mouth wash was prescribed three times daily for the first week, then twice daily for a month to prevent infection. Currently, the patient is asymptomatic and she is under follow-up for 6 months.

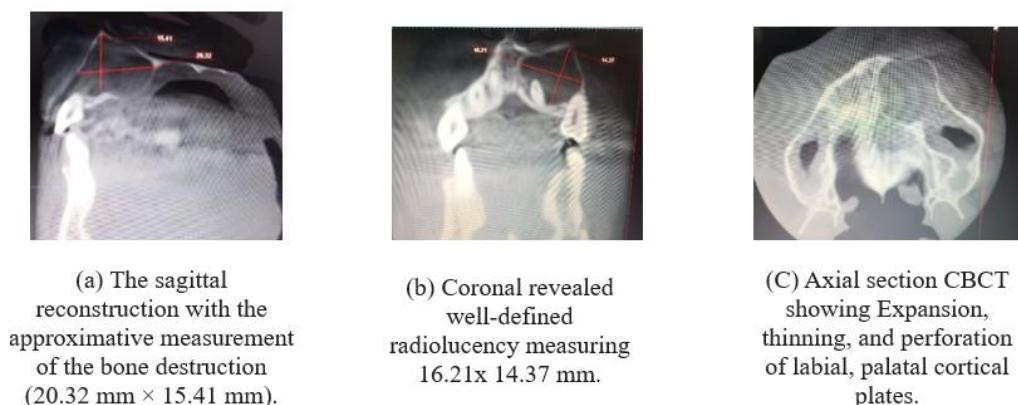


Fig. 3 CBCT reconstruction of the maxilla

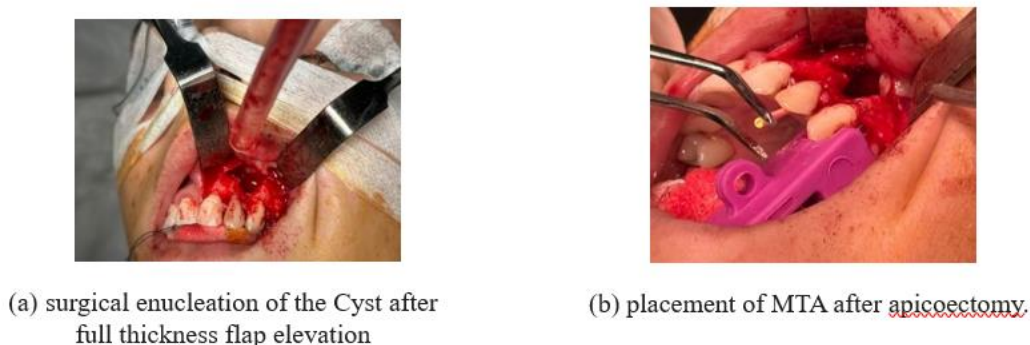


Figure 4: Surgical pictures

3. DISCUSSION

A cyst is an epithelium-lined cavity that is filled with fluid. Cysts are broadly classified according to their cell of origin: odontogenic and nonodontogenic [4]. A further classification into inflammatory and developmental was applied according to cysts' etiology. Inflammatory odontogenic cysts result from local inflammation. Developmental odontogenic cysts have an unknown etiology but known cells of origin [1].

Radicular cysts are the most cystic lesions observed in tooth-bearing areas comprising approximately 50% to 65% of all the cysts which affect jaws in human being (Kadam, 2014) [5]. It is most commonly linked with carious, nonvital, discolored, or shattered teeth. tooth caries is known to cause dental pulp inflammation, which eventually leads to pulp necrosis; infection then spreads to the periradicular space, creating periodontitis, which frequently precedes periradicular acute abscess, chronic granuloma. In some patients, proliferation of the epithelial rests of Malassez within the apical granuloma may lead to the development of a radicular cyst. The reasons why cysts develop in some granulomas but not others is unclear (A William Shafer et al., 2015) [11]. Other changes in the apical region include focal sclerosing (condensing) osteitis, root resorption, hypercementosis, and ankylosis (Robinson et al., 2018) [10]. Most of these cysts can be removed *in toto* or curetted out in multiple fragments. Occasionally cholesterol deposits can be seen. These cysts can also be

treated by conventional root canal therapy. Some will resolve while others can persist in the bone when the tooth is extracted which is referred to as a residual cyst (Dym et al., 2023) [7]. Decompression, marsupialization, and enucleation with primary closure is considered when the lesion is large (AboulHosn et al., 2019). Cortical expansion and root resorption of the affected tooth and displacement of the adjacent teeth are common features of radicular cysts [3]. The expansion of the alveolar bone is a result of the deposition of successive layers of new bone by the overlying periosteum. However, the rate of bony expansion (approximately 5 mm per year) exceeds the rate of sub-periosteal deposition, leading to progressive thinning of the cortex which eventually give the clinical signs of ‘oil-can bottoming’ and egg-shell crackling. Once the cortex is perforated, the cyst presents as bluish, fluctuant, submucosal swelling [10]. In the current case, there was cortical perforation and the involved tooth in relation to the cyst was non-vital. The use of root canal dressing (calcium hydroxide) between sessions of root canal treatment of teeth with periapical lesions has crucial role in reducing bacterial activity by changing the acidic medium into alkaline. Takahashi et al. determined that calcium hydroxide bactericidal activity required at least 2 weeks after evaluating the PH and calcium ion concentration in the periapical region [9].

4. CONCLUSION

The management of radicular cysts typically involves a combination of conservative and surgical approaches. Non-surgical methods such as endodontic therapy may be considered for smaller cysts, while larger or persistent cases may require surgical intervention, such as cyst enucleation or marsupialization. Regular follow-up and radiographic assessments are crucial to monitor treatment efficacy and ensure the resolution of the cyst. Individualized treatment plans should be based on the size, location, and clinical characteristics of the radicular cyst, with the overall goal of preserving tooth function and minimizing the risk of recurrence.

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