

Case Report

Endo-surgical management of radicular cyst in anterior maxilla approaching the nasal floor- A case report

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Abstract

Radicular cyst is the most common odontogenic cystic lesion of inflammatory origin. It is also known as periapical cyst, apical periodontal cyst, root end cyst, or dental cyst. This condition is usually asymptomatic but can result in a slow-growth tumefaction in the affected region. In the management of these lesions the endodontic treatment only is not sufficient and it should be associated with surgical management. This case report highlights the endo-surgical management of long-standing trauma that led to a radicular cyst with respect to two maxillary anterior teeth in a young adult. The clinical and radiographic examination led to a provisional diagnosis of a radicular cyst, which was confirmed by biopsy. Non-surgical root canal treatment was performed with Gutta-Percha as the apical barrier and surgical enucleation of the cyst was performed thereafter. Follow-up of one year was done, which revealed the successful management of the case.

Keywords: Radicular cyst, Intracanal medicament, Calcium hydroxide, Non-surgical root canal treatment, Periapical lesion, Apicoectomy, Maxillary nasal floor

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1. Introduction

A common consequence of long-standing tooth decay or injury is the radicular cyst, which originates from Malassez's cell rests.¹ The primary occurrence site is typically the tips of the affected teeth.² According to Shear (1992), a higher prevalence has been noted in the maxillary front area, with a preference among males.¹

Small-sized periapical granulomas can often be managed conservatively through non-surgical endodontic procedures, which serve as the primary approach for addressing these conditions.³ Oztan M (2002) has shown that larger periapical lesions, like cysts, respond well to non-surgical treatment with calcium hydroxide paste.⁴ However, when root canal therapy is not feasible or proves ineffective, periapical surgery becomes a viable and dependable alternative.⁵ Lee et al. (2014), in their retrospective observational study, found that the most common treatment method for radicular cysts involved removing the cyst through enucleation along with apicoectomy.⁶

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This case report presents a large radicular cyst involving two maxillary anterior teeth, i.e., teeth #21 and #22 with tooth #21 having an open apex. Advanced radiological methods like Cone Beam Computed Tomography (CBCT) and histopathological investigation like biopsy, along with bioceramic restorative materials contributed to successful endo-surgical management of the case.

2. Case Presentation

A male Patient aged 16 years reported with a chief complaint of pain, swelling and pus discharge in upper left front region of mouth since 3 to 4 months. He revealed a past incident of trauma that occurred 6 years ago. On radiological examination, there was large periapical radiolucency in relation to 21 and 22. On probing and radiograph examination there was extensive bone loss in relation to the same teeth. Vitality testing by heat test with a hot gutta-percha stick and electric pulp testing revealed no response in these teeth. Affected teeth 21 and 22 were slightly tender on percussion and showed grade 1 mobility. There was a presence of

swelling/sinus tract on labial vestibular region (**Figure 1, Figure 7**).

The patient's informed consent was obtained, and he was subjected to limited field of view (FOV) CBCT to determine the extent of the lesion. The images revealed maxillary teeth #21 and #22 having well-defined peri-apical radiolucency measuring approximately 20.0 mm × 20.2 mm at maximal dimensions with dehiscence in the buccal and palatal cortex and floor of nasal cavity. Bucco-palatal extension of the lesion caused remarkable expansion and thinning of the palatal cortex followed by a breach in the palatal and buccal cortical plates (**Figure 2**).

After obtaining informed consent, non-surgical endodontic treatment was initiated (**Figure 3**). An 18-gauge syringe was used to aspirate the cystic contents and cystic lining (**Figure 4, and Figure 5**). The enucleated lining was transported in 10% formalin in an air-tight container for histological examination. Palatal splint was given from tooth #14 to #24 followed by access opening and biomechanical preparation (**Figure 6**). Due to continuous pus drainage through the root canal, the open dressing was given to the patient. The patient was recalled after 24 hours to review the clinical condition. Cotton was removed and the canals were irrigated using normal saline. Then the canals were dried using sterile paper points and a closed dressing with calcium hydroxide was given as there was no pus discharge (**Figure 8**). The patient went through a complete oral prophylactic procedure before the next visit. The patient was recalled after one week for obturation and periapical surgery.

During the subsequent appointment, the interim restoration was taken out, and the canals were flushed with chlorhexidine (CHX) 2% as a cleansing solution. Tooth #21 and #22 were carefully dried, and obturated with gutta-percha using bioceramic sealer and the patient was prepared for the surgical procedure (**Figure 9**). A complete mucoperiosteal flap was then raised, extending from tooth #11 to #23. Upon elevating the flap, the cystic contents were clearly visible at the apex of tooth #21 (**Figure 4, Figure 5**). To excise the cyst, wet gauze was employed to create a separation between the cyst and the surrounding bone. With the utilization of utmost surgical skill and expertise, the cyst was fully extracted and preserved in formalin for subsequent analysis. The flap was then carefully repositioned, and sutures made of 3-0 black silk were used to close the incision.

The patient was instructed to use a 0.2% chlorhexidine gluconate mouthwash for five days to maintain oral hygiene. The removed lining of the cyst was submitted for histopathological analysis, which revealed a stratified squamous epithelium covering a connective tissue stroma. This underlying stroma had collagen fibres and a fibro cellular composition. Notably, there was a pronounced infiltration of chronic inflammatory cells and fibroblasts. This histopathological finding definitively supported our diagnosis of an infected radicular cyst. The patient was

recalled at intervals of 3, 6, 9, and 12 months for follow-up reviews (**Figure 10**).

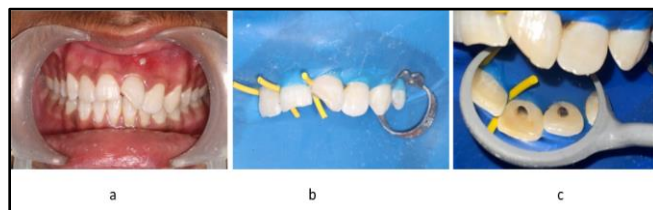


Figure 1: a; Pre-operative b; Rubber dam c; Access opening



Figure 2: CBCT reconstructed images



Figure 3: Non-surgical RCT

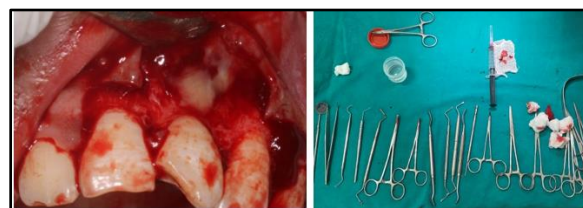


Figure 4: Flap reflection/cystic content



Figure 5: Cystic lining

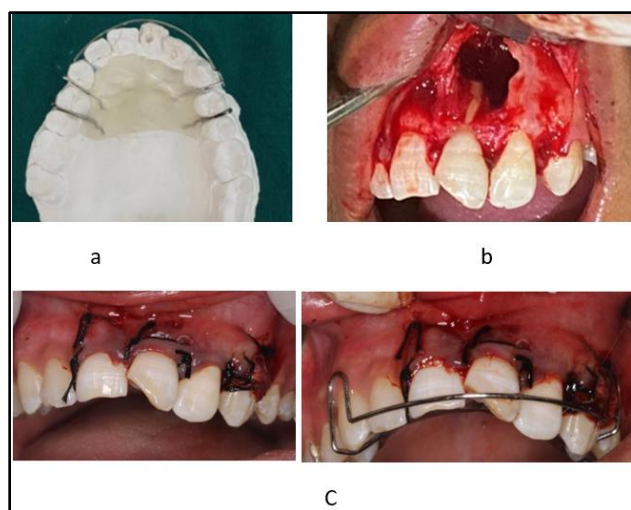


Figure 6: a; Splint for palatal support b; Root resection & curettage c: Post-operative



Figure 7: Pre-operative

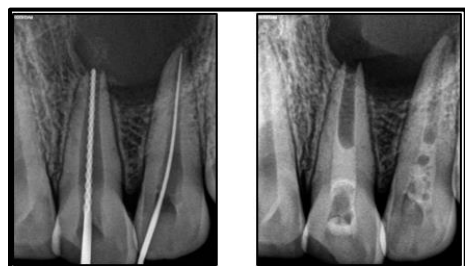


Figure 8: Working length + calcium hydroxide dressing



Figure 9: Master cone



Figure 10: Post-operative

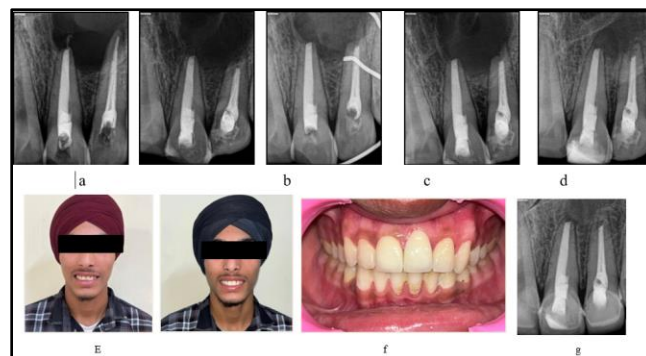


Figure 11: a: Post-operative b: 3 Month Fu c: 6 Month Fu d; 9 Month Fu e: Pre-Operative f: Post-operative

3. Discussion

The radicular cyst is typically characterized as a fluid-filled cavity that arises from epithelial remnants (known as rests of Malassez) within the periodontal ligament.¹ It commonly develops as a result of inflammation, often following the necrosis of the dental pulp. While these cysts are frequently asymptomatic and identified through routine radiographic assessments, cases with prolonged existence might exhibit sudden aggravation of the cystic lesion, leading to symptoms like swelling, tooth mobility, and displacement of neighbouring unerupted teeth⁷. In such cases, surgical intervention is the preferred treatment approach.⁸

The process of bone regeneration following periapical surgery hinges on crucial factors such as primary wound closure, angiogenesis for blood supply, a source of undifferentiated mesenchymal cells, maintaining space, and ensuring wound stability (referred to as the PASS principle).

4. Conclusion

This case report illustrates the successful management of a complex radicular cyst involving multiple maxillary anterior teeth. It emphasizes the critical role of a multidisciplinary approach, advanced diagnostics, precise surgical and non-surgical interventions, and the strategic use of materials. This case highlights the challenges in treating such cysts and stresses the importance of collaborative efforts among dental specialists. Long-term follow-up confirms treatment effectiveness, emphasizing the need for ongoing monitoring to assess healing and stability over time.

5. Source of Funding

None.

6. Conflict of Interest

None.

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