

CASE REPORT



Extensive chronic peri-radicular cyst and its non-surgical management

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ABSTRACT

This report presents a case of an extensive chronic peri-radicular cyst in a 50-year-old male patient. The patient presented with swelling and tenderness in the upper anterior region, with a history of trauma to the 11 and 12 teeth approximately 20 years prior. Radiological assessment revealed a significant periapical lesion involving teeth 11 and 12, with extensive labial and palatal bone lysis. Intraoral examination indicated tenderness and second-grade mobility in the affected teeth. The chosen management approach was Non-Surgical Root Canal Treatment (NSRCT), with root canal treatment. After 21 days of dressing with DAP and three months of calcium hydroxide placement, follow-up imaging showed the regeneration of labial and palatal cortical bone. One-year and two-year follow-ups demonstrated appreciable healing progress.

KEYWORDS

Peri-radicular cyst;
Non-surgical management;
Calcium hydroxide;
Enucleation; Apical surgery;
Root canal treatment

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Introduction

Peri-radicular cysts, also known as periapical cysts, are benign epithelial-lined lesions. Peri-radicular cysts are commonly associated with apical periodontitis and arise from the remnants of Malassez cells [1]. These cysts often originate following trauma or dental decay. These cysts are typically associated with non-vital teeth, as a result of chronic inflammatory processes stemming from pulpal infection or necrosis. Peri-radicular cysts are often asymptomatic until they grow to a significant size and impinge on adjacent structures. Inflammatory cysts are chronic peri-radicular lesions that develop as a result of multiple inflammatory reactions, primarily triggered by pro-inflammatory interleukins and growth factors [2]. These substances initiate the proliferation of epithelial cells derived from epithelial cell rests of Malassez present in the granulomatous tissue, leading to cyst formation and growth. Diagnosing peri-radicular cysts can be challenging based solely on radiographic criteria. Recent advancements propose Cone-Beam Computed Tomography (CBCT) diagnostic criteria, which include location, well-defined corticated limits, lesion shape, internal structure, effect on surrounding structures, and cortical plate perforation [3].

There are various treatment modalities for peri-radicular cysts [4]. Nonsurgical endodontic therapy involves root canal treatment to eliminate the source of infection within the tooth. Surgical endodontic therapy is necessary when nonsurgical treatment proves inadequate. It entails the surgical removal of the cystic lesion through procedures like apicoectomy. Marsupialization refers to a technique that creates an opening in the cystic lesion, facilitating drainage and reduction in the cyst's property, followed by subsequent endodontic therapy. Enucleation involves surgically removing the entire cyst,

followed by endodontic therapy for restoration. Decompression reduces the internal pressure of the cyst by creating a drainage pathway and is generally followed by endodontic treatment. Orthograde MTA Apical Plug is an endodontic approach that uses mineral trioxide aggregate (MTA) to seal the apical end of the canal system of the tooth, preventing further infection and promoting the resolution of the cystic lesion [5]. Calcium hydroxide as an intracanal medicament is employed in the treatment of peri-radicular cysts due to its alkaline properties, which facilitate microbial disinfection and cyst regression [6]. Periodic radiographic monitoring is essential, regardless of the chosen treatment, to assess the progress and eventual resolution of the peri-radicular cyst [7].

Herein, we report the case of a 50-year-old patient with a peri-radicular cyst associated with two teeth, who was managed successfully using non-surgical approaches.

Case Report

Drug shortages are becoming an increasingly common problem in healthcare, even prior to COVID-19, especially for medication used in the management of cardiovascular disease. With the further disruption of the global supply chains due to the pandemic and the current economic upheaval, this shortage has been expected to be even more evident, causing therapeutic turbulence and the need to switch among drugs within the same class, which has had a negative impact on patient adherence and outcomes. A 50-year-old male patient who reported with symptoms in the upper anterior region, likely due to a peri-radicular cyst associated with teeth 11 and 12. The initial presentation of the patient

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included swelling and tenderness, with a history of trauma to teeth 11 and 12 two decades earlier. Intraoral examination indicated tenderness on percussion and second-grade mobility in these teeth. Radiological assessments, which included CBCT and Intraoral Periapical Radiographs (IOPAR), were employed to evaluate the extent of the lesion. They confirmed the presence of an extensive periapical lesion involving teeth 11 and 12, with substantial labial and palatal bone loss (Figures 1 and 2).

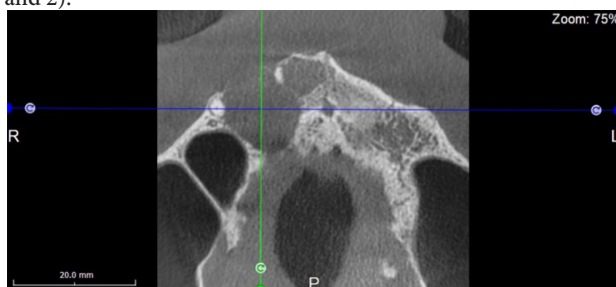


Figure 1. CBCT axial view shows resorbed labial & palatal cortical bone.



Figure 2. (a) Pre-op Panoramic view, (b) Pre-op sagittal view, (c) CBCT volumetric view of the defect, (d) IOPA IRT of teeth 11, 12, 13.

After a thorough evaluation and discussion with the patient, a Non-Surgical Root Canal Treatment (NSRCT) approach was chosen. The treatment protocol involved, root canal treatment. To ensure proper healing, DAP was placed for 21 days, followed by a calcium hydroxide dressing for three months. CBCT imaging performed three months after treatment showed thin but well-defined regeneration of the labial and palatal cortical bone (Figure 3). One-year and two-year follow-up radiographs indicated appreciable progress in healing (Figure 4). This report demonstrates the efficacy of the chosen non-surgical approach in the management of a chronic case of peri-radicular cyst.

Discussion

Peri-radicular cysts originate from the epithelial cell rests of Malassez within the alveolus. These cells proliferate in response to periapical inflammation caused by root canal system



Figure 3. (a) IOPA IRT of teeth 11 and 12 after 3 months post-management, (b) CBCT after 3 months showing thin but defined labial and palatal cortical bone regeneration, (c) Sagittal view of tooth 11, (d) Sagittal view of tooth 12.

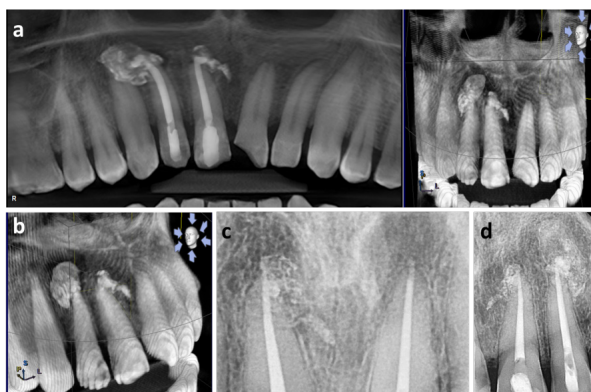


Figure 4. (a) Post-obturation panoramic view, (b) CBCT showing the volumetric view, (c) Post-RCT one-year follow-up shows appreciable healing, (d) Post 2 years follow-up radiograph shows the healing progress.

infection. These cysts are more frequently found in the anterior maxilla, likely due to traumas and the presence of epithelial cells. The morphological characteristics of the cyst cavity can render the host's defense mechanisms ineffective. The continuous release of microorganisms and their by-products from within the cystic lumen may contribute to the persistence of peri-radicular inflammation even in properly treated root canal systems.

Many reports have suggested the effectiveness of non-surgical endodontic procedures in the treatment of peri-radicular cysts. Shelke et al. reported the use of sodium hypochlorite (5%), chlorhexidine (2%), and normal saline and calcium hydroxide intracanal medicament for successful management of the cyst in a 14-year-old female [8]. Maral et

al. reviewed 73 cases of peri-radicular cysts and concluded that intracanal application of calcium hydroxide could effectively resolve large persistent periapical lesions and should be considered as the first approach in all such cases [9].

In a prospective cohort study, Saini et al. used CBCT to evaluate the outcomes of NSRCT in the management of large periapical lesions. The study involved 54 subjects with 77 permanent maxillary anterior teeth affected by the condition. The radiographic assessments were conducted at 6, 12, and 24 months, with CBCT scans taken at the 24-month mark. The results showed an 82.2% success rate for RCT, with 8.9% of cases resolved and 73.3% exhibiting reduced lesions. The study also showed that the presence of preoperative cortical bone defects and the apical extent of obturation negatively affected the reduction in lesion volume [3].

In the current case, the extensive nature of the cyst, involving both labial and palatal bone lysis, presented a challenge in terms of management. The decision to opt for non-surgical root canal treatment was based on a comprehensive assessment of the case. The use of DAP followed by calcium hydroxide dressing, proved effective in promoting the regeneration of the labial and palatal cortical bone. This approach aimed to restore the structural integrity of the affected region and ultimately achieve healing. The treatment protocol effectively promoted healing and regeneration of the affected bone, highlighting the efficacy of NSRCT in managing such cases.

Conclusion

This case report emphasizes the efficacy of NSRCT in managing complex peri-radicular cysts, even when extensive bone loss is involved. The use of diagnostic techniques like CBCT aids in accurate assessment and monitoring. This report elucidates the potential of non-surgical endodontic procedures as a conservative and effective treatment modality for peri-radicular cysts and should be considered as the first management approach in such cases.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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