

## Management of a Large Periapical Cyst: A Case Report

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### Abstract:

Traumatic injuries commonly affect the anterior teeth leading to slow death of the pulp. This may give rise to a periapical or radicular cyst which results from the proliferation of cell rests of Malassez following pulpal necrosis of a non-vital tooth. This condition is usually asymptomatic but can result in a slow-growth tumefaction in the affected region. On radiography the lesion can be seen as a round or oval, well circumscribed radiolucent area involving the apex of the infected tooth. Nonsurgical management should be the treatment of choice of a periapical cyst. However, periapical surgery can be considered, if the lesion is extensive and fails to respond to a nonsurgical approach.

**Key Words:** Dental pulp necrosis, Non-vital tooth, Radicular cyst, Surgical cyst enucleation.

### Introduction:

A periapical or radicular cyst arises from epithelial cell rests of Malassez which proliferate by an inflammatory process originating from pulpal necrosis of a non-vital tooth. This condition is usually asymptomatic but can result in a slow-growth tumefaction in the affected region.

Bhaskar<sup>1</sup> and Shear<sup>2</sup> reported that the incidence of radicular cysts is found to be highest among patients in their third decade of life and greater among men than women. Shear<sup>2</sup> also reported that they have particularly high incidence in the maxillary anterior region, presumably as a result of trauma. A case report is presented of an individual with a large radicular cyst.

### Case Report:

A 23 year old male patient reported to the Department of Conservative Dentistry & Endodontics, People's College of Dental Sciences & Research Center, Bhopal with the chief complaint of pain and swelling in the upper front teeth region of jaw. He gave a history of trauma 15 years back for which no treatment was sought. Post trauma, he had pain in relation to maxillary central incisors which subsided after 1 week on its own. He gave a history of swelling along with pus discharge from gums since last 2 years. On clinical examination, 21 was found to be discolored (Fig. Ia) and a diffuse palatal swelling (Fig. Ib) of

approximately 3 x 2 cms in size, extended 2 cms on the left and 1 cm on the right from the midline of the palate. Anteroposteriorly, it extended 0.5 cm from the incisive papilla to 2 cms posteriorly. The swelling was tender and fluctuant on palpation.

Vitality test gave a negative response in relation to 11 and 21. An Intra Oral Periapical Radiograph (IOPA) in relation to 11 & 21 (Fig. IIa) and Occlusal view radiograph of the maxilla (Fig. IIb) revealed large well defined periapical radiolucency involving central incisors and an open apex in relation to 21. On FNAC, about 0.8 ml of straw colored, shimmering fluid, serous in consistency was aspirated and sent for cytological examination which revealed numerous cholesterol crystals and RBCs along with few inflammatory cells.

On the basis of clinical, radiological and cytological examination, a provisional diagnosis of Radicular cyst was made. Differential diagnosis included Nasopalatine cyst, Median palatal cyst, Traumatic bone cyst, and Globulomaxillary cyst.

An endodontic therapy was planned with respect to 11 & 21. Patient became extremely apprehensive whenever an effort was made to apply rubber dam, which contraindicated its usage. Repeated calcium hydroxide dressings were given at an interval of 5 days for 1 month. However, there was continuous fluid drainage through the canal of 21; hence surgical enucleation of the cyst (Fig. IIIa, b) through a buccal approach was adopted, full thickness flap was raised. Cystic fluid was clearly visible through the perforation. Cyst enucleation was carried out in toto. Enucleated cystic lining (Fig. IVa) was sent for histopathological examination which revealed 6-7 cell layered thick, non keratinized stratified squamous epithelium. Connective

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Fig. I: a) Discolored 21, b) Diffuse palatal swelling.

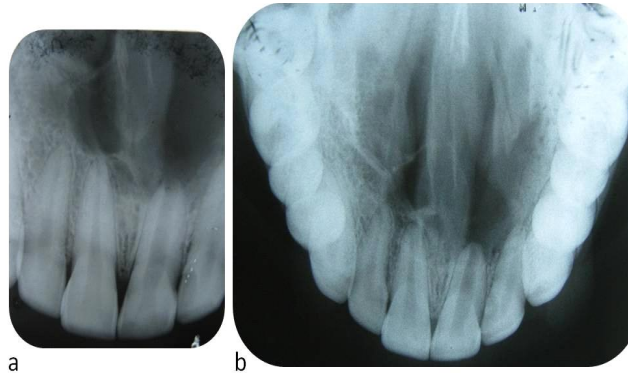


Fig. II: Preoperative IOPA in relation to 11 & 21, b) Occlusal view radiograph of the maxilla.

tissue capsule showed the presence of cholesterol crystals along with acute & chronic inflammatory cells which confirmed the diagnosis of an Infected Radicular cyst (Fig. IVb). Absorbable Gelatine Sponge (ABGEL) a haemostatic agent was placed in the cystic cavity and flap was secured in position with sutures. After 1 week the sutures were removed. A marked reduction in palatal swelling could be appreciated after one month.

Non vital / Walking bleach using a mixture of hydrogen peroxide and sodium perborate was done in relation to 21 with a successful outcome and aesthetically pleasing patient smile (Fig. Va, b).

At the end of one year, palatal swelling subsided completely. An Intra Oral Periapical Radiograph in relation to 11 and 21 (Fig. VIa) and Occlusal view radiograph of the maxilla (Fig. VIb) showed marked reduction in the size of radiolucency appreciating post operative healing.

**Discussion:**

The periapical cyst is the most common odontogenic cyst (52.3-70.7 percent) followed by the dentigerous cyst (16.6-21.3 percent) and odontogenic keratocyst (5.4 - 17.4 percent).<sup>3</sup> The choice of treatment may be determined by factors such as the extension of the lesion, relation with noble structures, evolution, origin, clinical characteristic of the lesion,

systemic condition and cooperation of the patient.<sup>4</sup>

The treatment of these cysts is still under discussion and many professionals opt for a conservative treatment by means of an endodontic technique.<sup>5,6</sup> However, in large lesions the endodontic treatment alone is not sufficient and it should be associated with decompression or marsupialisation or enucleation.<sup>7</sup>

In the present case, endodontic treatment was carried out in multiple visits with interim calcium hydroxide dressings. The use of root canal dressings between sessions in root canal treatment of teeth with chronic periapical lesions is important for reducing levels of bacteria better than that obtained with mechanical preparation, particularly by penetration of areas that are unreachable by instruments or irrigation solutions, such as dentinal tubules and ramifications. Calcium hydroxide has also shown clinical efficiency in reducing exudate due to its hygroscopic properties. Studies have shown that at least 2 weeks are necessary for calcium hydroxide bactericidal activity.<sup>8</sup>

Calcium hydroxide intracanal medicament created a more favourable environment leading to healing of periapical lesion in the right central incisor which was obturated by lateral condensation using zinc oxide eugenol sealer and gutta percha before the surgery. The periapical lesion on the left side, however, did not respond to the intracanal medicament because of the causative factor being located beyond the root canal system, viz., within the inflamed periapical tissue, thus requiring surgical intervention. After the surgery a plan for long term treatment of 21 with intracanal medicament was made. Metapex (Calcium hydroxide with Iodoform, META BIOMED CO. LTD) was used this time. At the end of 6 month follow-up, patient was free from all symptoms and signs with optimum tissue healing. Radiographic examination revealed a decrease in the size of periapical radiolucency bilaterally. Tooth 21 was obturated using Inverted cone technique and lateral condensation of gutta percha with zinc oxide eugenol sealer. A definite apical stop could be felt at the end of canal during obturation.

By filling the canal with calcium hydroxide, a physical barrier is created that prevents migration of multipotent undifferentiated mesenchymal cells into the canal and regeneration of tissues at the lateral dentinal walls.<sup>9</sup> Moreover, use of Calcium hydroxide medicaments for apexification is cost effective when compared to other materials like Mineral Trioxide Aggregate.

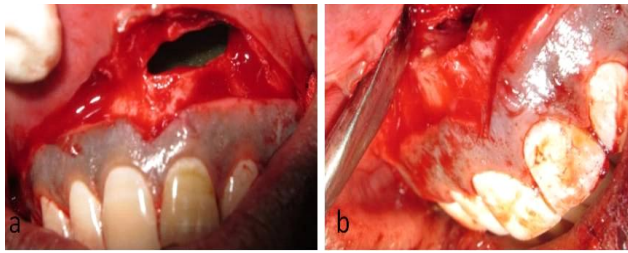


Fig. III: a) Cystic fluid visible through the perforation, b) Cyst enucleation.

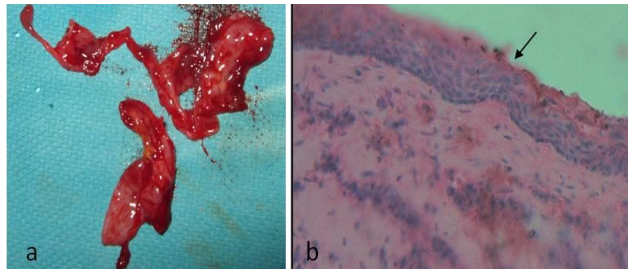


Fig. IV: a) Enucleated cystic lining, b) Photomicrograph showing 6-7 cell layered thick non keratinized stratified squamous epithelium (H & E stain, 400 X).



Fig. V: a) After Non Vital Bleaching in relation to 21, b) Aesthetically pleasing patient smile.

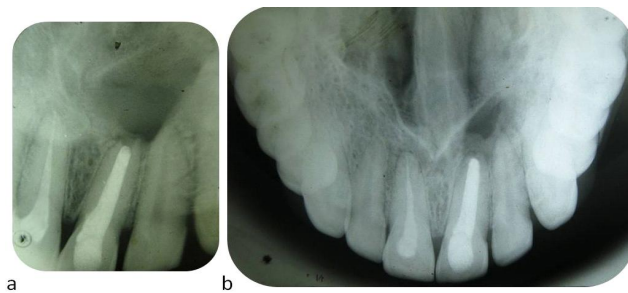


Fig. VI: a) IOPA in relation to 11 & 21, b) Occlusal view radiograph of the maxilla after a follow up of 1yr

In this case, a root end resective procedure followed by retrograde filling would have resulted in a compromised crown root ratio, thereby excluding it from the treatment plan. Thus a maximum cemental covering on the root surface and original root length to help tooth stability could be maintained. Frank<sup>10</sup> reported the treatment of 3 cases based on the normal physiologic pattern of root development that brings about the resumption of apical development so that the

root canal can be obliterated by conventional lateral condensation techniques. Likewise, the technique described here brings about an interesting phenomenon: The interrupted process of apical development continues to its potential, subsequently allowing for the obliteration of the root canal by routine endodontic procedures. The role of the epithelial sheath of Hertwig in root formation has been well established. The fact that root formation can be resumed after a period of inactivity caused by infection, leads to the assumption that epithelial rests of Malassez, which are the remnants of Hertwig's sheath, persist throughout life and resume their function of cementum deposition resulting into obliteration of root apex, once the source of infection has been removed. Considering patient's young age and good health, bone graft was not used. This case is a good example of a large lesion been treated with conventional RCT and cyst enucleation without the use of materials which enhance bone regeneration like Platelet Rich Fibrin (PRF) G-bone (Synthetic Granules and blocks made of Multiphasic Calcium Hydroxyapatite in low crystalline form).

**Conclusion:**

The clinical case reported was managed successfully by endodontic therapy with emphasis on thorough debridement and disinfection of the root canal system which was followed by surgery. The authors recommend non surgical management of large periapical lesions in view of clinical evidence present. However in specific situations where the size and extent of the lesion is of critical importance, surgery is a viable option with good prognosis. An endodontist should have thorough knowledge about materials and various treatment options involved in management of such a case.

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