

Management Of Large Radicular Cyst by Root End Resection

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ABSTRACT

A 45-year-old male patient who reported to the department with a chief complaint of pain, tenderness and swelling in upper front tooth region showed a soft, non-tender, non-fluctuant swelling on examination, between teeth #11 #12 and #13 with radiographic evidence of periapical radiolucency. Cone Beam Computed Tomography (CBCT) scans confirmed a well-defined radiolucency in the affected region, indicative of a Radicular cyst. Root Canal Treatment was completed with Bio-ceramic sealer obturation during the third visit. An Endodontic Surgery was performed to remove the cystic content, followed by retrograde filling and the placement of bone graft material, a platelet-rich fibrin (PRF) membrane, and sutures to facilitate bone regeneration. This comprehensive approach aimed to resolve the periapical pathology and promote tissue healing around the affected tooth.

Keywords: Radicular cyst, Bio-Ceramic Obturation, Endodontic Surgery, Retrograde filling, (PRF) membrane, Bone graft..

1. INTRODUCTION

One of challenges for practitioners in endodontic surgery is to accurate location and resection of root-end. To control infection better, reduce dentinal tubule exposure, minimize the possibility of microleakage and maximize the remaining tooth tissue, in modern endodontic surgery, 3 mm of the root end is generally removed, and the resection plane is made perpendicular to the long axis of the tooth.

Among all materials, the mineral trioxide aggregate (MTA®) stands out. It was originally formulated for the treatment of root perforations in endodontics. However, over the years, the use of MTA® has expanded [3].

It is right now considered the gold standard much appreciated to its bioactive properties, its osseo-inductive and conductive control that favours tissue recovery when it comes into contact with the pulp and peri-radicular tissues, its extraordinary fixing capacity, and its antimicrobial effect[4]. Moreover, much obliged to its radiopacity, it is effectively detectable on coronal radiographs[5].

This case report presents the management of a persistent radicular cyst associated with the upper anterior teeth (#11 #12 #13). The case highlights the importance of a multidisciplinary approach, incorporating advanced diagnostic tools such as CBCT, histopathological examination through biopsy, and innovative treatment modalities such as bio-ceramic sealers, MTA, bone grafts, and platelet-rich fibrin (PRF) membranes.

2. CASE PRESENTATION

A 45-year-old male patient presented with a complaint of apparently alright 2 months ago before he noticed pain and swelling in his upper front teeth region and anterior palate region. The pain is radiating to eye, ear and forehead region. Patient has history of alcohol and tobacco consumption. On examination A large bony bi-cortical expansion in the right maxillary labial vestibular region involving teeth #11 #12 #13) (figure 1). Greyish color fluid on aspiration with Tender on percussion positive in (tooth #11 #12 #13). Extra-oral examination revealed no swelling, lymph node enlargement, or sinus drainage. Intra-oral examination showed localized swelling in the vestibular region between teeth #11 #12 and #13, measuring approximately 3 cm x 1 cm. The swelling was tender, soft, non-fluctuant, and non-persistent, with sinus drainage observed.



FIGURE 1: Pre-operative intra oral photographs showing swelling in vestibular region

Radiographic examination revealed loss of lamina dura and periodontal ligament (PDL) widening around tooth #11#12#13, along with a well-defined periapical radiolucency. (Figure 2).

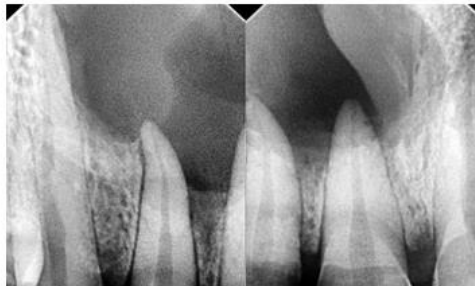


FIGURE 2: well defined radiolucency at the periapical region.

During the first visit, under rubber dam isolation, access opening was done on tooth #11 #12 #13, and the working length was determined using a #15k file. Pus discharge was present, irrigation done with 2% chlorhexidine and given open dressing.

In the second visit, patient came with a CBCT reports indicated a single well-defined radiolucency in the region of tooth #11 #12 #13, measuring approximately 3 cm x 1 cm (Figures 3).

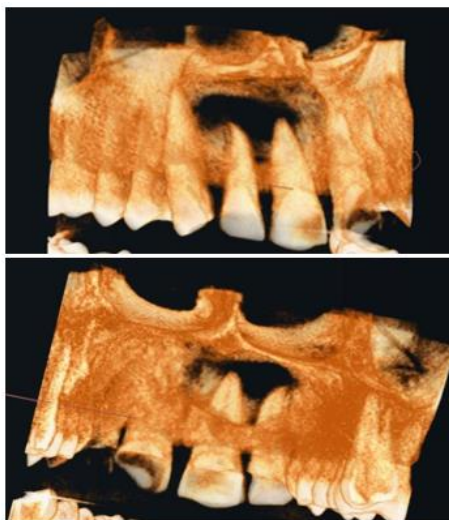
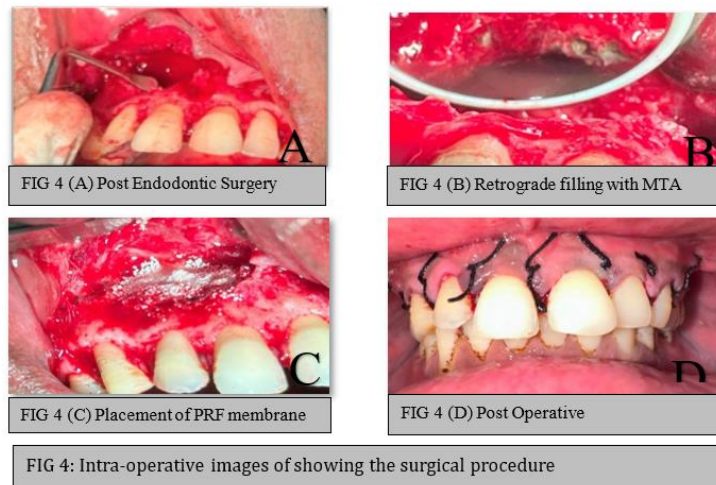


FIGURE 3: Three Dimensional view of CBCT

The lesion had perforated the palatal cortical plate in the region of tooth #11 #12. Histopathological examination confirmed the diagnosis of an inflammatory(radicular) cyst associated with tooth #11 #12 # 13. The histopathological report is attached as a supplementary file in the appendices section for reference.

Patient was symptomatic and presented with pain, pus drainage was reduced and yet oozing was present cleaning and shaping done followed by chlorhexidine irrigation and calcium hydroxide dressing has been placed. During third visit, obturation on tooth #11 #12 #13 was performed using Bio-ceramic sealer, followed by the placement of moist cotton and temporary restoration. The patient was recalled after 24 hours for an Endodontic Surgery on tooth #11 #12 #13.

The cystic content was removed, and an surgery was performed. Synthetic bone graft material (Bio-Oss) was placed, followed by the placement of an A-PRF membrane and sutures (simple interrupted and vertical mattress using Prolene) (Figure 4).



The patient was prescribed postoperative antibiotics three times a day for five days and analgesics twice a day for five days. The patient was recalled for follow-up reviews at one-month, three, and six-month intervals (Figure 5).

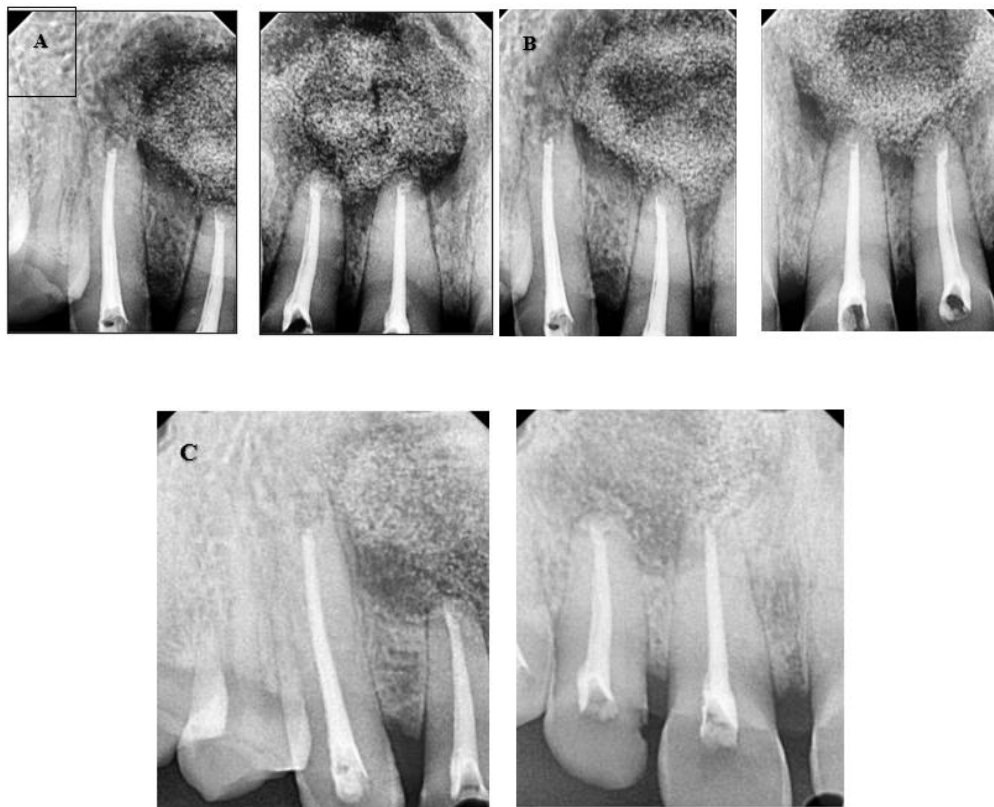


FIG 5: A) Post operative Radiograph

B) 3 Month Follow up

C) 6 Month Follow up

3. DISCUSSION

The most prevalent cystic lesions affecting the jaw are radicular cysts. They arise from epithelial remains that are stimulated to proliferate, from an inflammatory process resulting from the pulpal necrosis of a non-vital tooth. The natural history begins with a non-vital tooth that remains in place long enough to develop chronic periapical pathology [11].

Root cysts are most often located at the edges of the affected teeth. However, they can also be located on the lateral surfaces of the roots in relation to the lateral channels of the lateral accessories [12]. They are asymptomatic and are diagnosed during routine radiological examinations. Treatment of root cysts includes conventional non-surgical root canal treatment when the lesion is localized or surgical treatment such as enucleation, marsupialization or decompression when the lesion is extensive [13].

Cortical expansion of affected teeth and displacement of adjacent teeth are common features of radicular cysts. In the present case, there was cortical perforation and the teeth adjacent to the cyst were not vital, which is not common. It has been shown that as the cyst expands, the adjacent teeth may become non-vital [12].

Because the lesion was so extensive, a conservative surgical strategy was intended. In contrast to techniques like En bloc resection, which remove both the diseased tissue and the normal structure, the conservative method removes only the infected tissues. Either marsupialization or enucleation are the surgical techniques used to treat cystic lesions of the jaws. The lesion's size and location, the cystic wall's bone integrity, and its closeness to important structures all influence the best course of treatment. MTA is frequently utilised as a filler for root ends [13]. Its strong biocompatibility encourages a positive tissue response, and its good marginal adaptation reduces leakage. Additionally, MTA has proven to be effective over the long term in treating teeth with significant periapical lesions [13,14]. In the current case, the lesion was enucleated along with curettage, followed by Endodontic Surgery and placement of MTA as root end filling material followed by bone graft and PRF.

Synthetic bone grafts, with their porous interconnected structure that mimics cancellous bone, offer several advantages. Its absorbable nature allows for better vascularization and an increased surface area for cell attachment, leading to faster healing and effective bone formation. The predictable rate of resorption ensures gradual replacement with native bone, promoting smooth integration with the surrounding tissues. In addition, its radiopacity facilitates the radiographic monitoring of bone healing [14].

Growth factors such as insulin-like growth factor (IGF), transforming growth factor- β 1 (TGF- β 1), and platelet-derived growth factor (PDGF) are abundant in PRF [15]. The healing process is accelerated and modulated by these growth factors, which are essential for cell migration, attachment, proliferation, and differentiation [14]. PRF has demonstrated promise in the regeneration of the pulp-dentin complex in endodontics, highlighting its capacity to support tissue healing.

4. CONCLUSION

Currently, nonsurgical methods are being used to treat periapical cysts. However, surgical management may be required for success, depending on the size and extent of the lesion. The successful management of the current case involved endodontic therapy, which included extensive irrigation, canal space cleansing, shape, and obturation, followed by surgery. According to our study, the use of regenerative techniques in apicoectomy using different materials aids in the current improved healing following endodontic surgery. It is recommended to combine the components for better results than to apply them separately.

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