

## SUCCESSFUL NON SURGICAL MANAGEMENT OF A LARGE PERIAPICAL LESION – TWO CASE REPORTS

### Dental Science

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### ABSTRACT

**Aim:** The aim of these case reports is to emphasize the successful healing of large periapical lesions using non surgical endodontic treatment with advanced techniques

**Background:** Periapical lesions of endodontic origin are common pathological conditions affecting the periradicular tissues. The primary objective of root canal treatment is to cure or prevent periradicular periodontitis and to retain natural teeth in function and aesthetics

**Case description:** Two case reports of large periapical lesions are described here which have shown favourable clinical and radiographic outcome following non surgical endodontic therapy

**Conclusion:** Size of a periapical lesion does not necessarily mandate surgical intervention always and has shown the potential to heal following conservative endodontic therapy. Assessment of healing of a large periapical lesion necessitates a long term follow up and has to be done periodically.

**Clinical significance:** The article highlights that present day endodontic treatment has become predictable and highly successful due to the advancements in diagnostic imaging techniques, rotary instruments, irrigants, intracanal medicaments and obturation systems which has in turn led to the fall in root end surgeries

### KEYWORDS

### INTRODUCTION

Periapical lesions develop as sequelae to pulpal infection which are generally diagnosed using routine radiographic examination or following acute pain in a tooth [1]. They can be classified as cyst, abscess and granuloma. However the definitive diagnosis can be made only by histological examination.

The purpose of endodontic treatment is to address the necrotic pulp and bacteria that serves as causative factors for occurrence of periapical lesions, thus effective disinfection and optimal filling of the instrumented radicular space is of significance.

Current literature has proven that even large periapical lesions can be managed non surgically as long as effective disinfection is achieved. The treatment modalities in the present have undergone a paradigm shift from conventional endodontic treatment to the use of technological advances like CBCT, NiTi rotary systems, advanced irrigation techniques, effective intracanal medicaments and novel obturation systems that have resulted in the retention of millions of teeth that would have otherwise been lost [3].

This has also led to the fall in number of teeth that will undergo surgical intervention. Surgery can possibly damage adjacent teeth, anatomical structures in the vicinity of the lesion, has long healing period with pain and discomfort and low patient acceptance. Patients medical conditions and age also favours a non surgical approach [7]. The success rate of present day endodontic treatment is 85-94.4% whereas success rate of traditional surgical procedures 79.7 -89.3 %. Considering the limitations associated with root end surgery, it should be considered only after the non surgical treatment or retreatment techniques have failed [4].

This report presents two cases treated using non-surgical treatment approach which have shown favourable clinical and radiographic outcome at the end of follow up period.

### Case report 1

A male patient in his late twenties reported to the Department of Endodontics with a complaint of pain in relation to the upper front tooth region since four days. Patient gave a history of trauma one year back and had got the emergency treatment done with respect to right central incisor which he did not follow up. On clinical examination fractured restoration was observed with respect to 11 (upper right central incisor) and discoloration with respect to 12 (upper right lateral incisor) (11,12-Federation Dentaire Internationale Notation). Pulp

sensitivity test was performed for 11 and 12 using cold test (Endo Frost-Coltene Whaledent, Pvt Limited) and electric pulp tester (Sybron Endo Vitality Scanner Pulp Tester; Kavo Kerr) which elicited no response. On radiographic examination incomplete root canal treatment was observed with respect to 11 and a large radiolucent lesion extending from the distal aspect of root of 11 to mesial aspect of root of 12 (Figure 1a). Following clinical and radiographic evaluation, non surgical endodontic treatment approach was planned. Treatment procedure was explained to the patient and informed consent was taken.

Following rubber dam isolation, the access cavity was prepared for 12 using Endo Access Bur & Endo-Z Tungsten Carbide (DENTSPLY Maillefer, Ballaigells Switzerland). Working length was determined for 11 and 12 using a #20 K file (MANI, INC JAPAN) (Figure 1b). Chemo mechanical preparation was done to a #50K file and irrigated with 10 ml of 3% sodium hypochlorite followed by 10 ml of saline in between instrumentation and further activated with Endo Activator (DENTSPLY, Maillefer Ballaigells Switzerland). Final irrigation was done using 5 ml of 17% EDTA according to irrigation protocol for non vital teeth [14]. The canals were dried with paper points and a mixture of Metronidazole, Ciprofloxacin and Minocycline (TAP) 0.5 mg of each (1:1:1) was prepared to a creamy consistency and spun down into the root canal using lentulo spiral. It was changed every week for a period of 2 weeks until the teeth displayed no symptoms. At the end of 2 weeks, TAP was flushed out by combination of 3% sodium hypochlorite with minor instrumentation and final irrigation was done with 17% EDTA solution to remove the smear layer. The apical fit of the master cone was checked and the obturation was completed using gutta percha and zinc oxide eugenol based sealer. The patient was recalled after 2 weeks and the access cavity was restored with glass ionomer cement (Fuji IX, GC Corp, Japan).

Following endodontic treatment, the patient was recalled for periodic clinical and radiographic evaluation. On recall appointments the patient was comfortable and the teeth were completely asymptomatic. Radiographic evaluation revealed successful regression of the initial large radiolucent lesion (Figure 1 e).



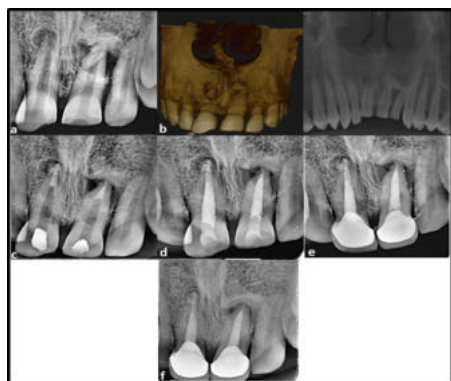
**Figure1. a) Preoperative radiograph depicting periradicular radiolucent lesion surrounding the apices of 11 and 12;b) Working**

length determination ; c) 1 month Post treatment radiograph ; d) 12 months follow up ; e) 18 months follow up showing healing of a large radiolucent lesion

### Case report 2

A male patient in his late twenties reported to the Department of Endodontics with a complaint of discoloured tooth in the upper front tooth region. Patient gave a history of trauma fifteen years ago. On clinical examination Ellis Class IV fracture was observed with respect to 11 (upper right central incisor) and 21 (upper left central incisor) (11, 21-Federation Dentaire Internationale Notation). Pulp sensibility test performed on 11, 21 using cold test (Endo Frost-Coltene Whaledent, Pvt Limited) and electric pulp tester (Sybron Endo Vitality Scanner Pulp Tester; Kavo Kerr) elicited no response. Radiographic examination revealed open apex in relation to 11 and a well defined periapical radiolucency in relation to both the teeth (Figure 2a). To know the exact size and extent of the lesion, CBCT was advised. CBCT revealed well defined radiolucent lesion with respect to 11 and alveolar bone dehiscence i.e. buccal cortical bone loss with respect to 21 (Figure 2b). Following clinical and radiographic evaluation, it was planned to place MTA as apical barrier followed by thermo plasticized obturation. Treatment options were explained to the patient and informed consent was taken. Following rubber dam isolation, access cavity was prepared for 11 and 21 using Endo Access Bur & Endo-Z Tungsten Carbide (DENTSPLY Maillefer, Ballaigells Switzerland). Working length was determined using a # 20 K file (MANI, INC JAPAN).

Chemo mechanical preparation was done to #80K file and irrigated with 10 ml of 3% sodium hypochlorite and 10 ml of normal saline in between instrumentation and further activated with Endo Activator (DENTSPLY, Maillefer Ballaigues Switzerland). Final irrigation was done with 5 ml of 17 % EDTA. The canals were dried with paper points and triple antibiotic paste (Metronidazole, Ciprofloxacin and Minocycline) was prepared and placed for a period of two weeks. At the end of 2 weeks, the patient was asymptomatic and TAP was flushed out by combination of 3% sodium hypochlorite with minor instrumentation and final irrigation was done with 17% EDTA solution to remove the smear layer. The canals were dried with paper points and the apical closure was obtained using MTA (Angelus, Londrina). MTA was mixed according to manufacturers' instruction, carried in to the canal and gently condensed using a plugger to obtain a uniform thickness of 5mm and confirmed radiographically (Figure 2c). All procedures were performed under a surgical operating microscope (Labomed Dental Microscope Prima DNT, USA). A moist cotton pellet was placed in the canal followed by a temporary filling. The patient was recalled after two days and the canal was obturated using thermo plasticized obturation (System B, Sybron Dental, Orange, CA, USA). After 2 weeks the access cavity was restored with glass ionomer cement (Fuji IX, GC Corp, Japan). The patient was recalled periodically for clinical and radiographic evaluation. On recall appointments the patient was comfortable and the teeth were completely asymptomatic. Radiographic evaluation revealed successful regression of the initial large radiolucent lesion (Figure 1 d,e).



**Figure 2. a) Preoperative radiograph depicting periradicular radiolucent lesion surrounding the apices of 11 and 21; b) CBCT depicting buccal cortical bone loss ; c) MTA apical plug; d) Back filling using thermo plasticized obturation ; e) 1 month Post treatment radiograph ; f) 12 months follow up showing healing of a large radiolucent lesion**

### DISCUSSION

The precise mechanism behind the formation of periapical lesion is not fully understood. When the pulp becomes necrotic, the environment becomes suitable to harbour microorganisms to multiply and releases toxins into periapical tissues, initiating an inflammatory reaction and leading to the formation of periapical lesion [4]. Surgical intervention for large periapical lesions is unpredictable and has several limitations [4] hence non surgical approach should be the first choice to treat such lesions. Outcome predictor for non surgical endodontic therapy depends on proper diagnosis, thorough disinfection and three dimensional obturation. In addition to the chemo mechanical preparation the use of intra canal medicament is pertinent. Calcium hydroxide has been commonly used as an intracanal medicament, however it has limited effectiveness in eliminating bacteria from human root canals when assessed by culture techniques [13]. Moreover, the removal of calcium hydroxide is frequently incomplete, which can affect the setting time of zinc oxide eugenol based sealers. In this study TAP (Metronidazole, Ciprofloxacin, Minocycline) was used as an intracanal medicament due to its proven efficacy in the healing of large periapical lesions and superior bactericidal effect compared to calcium hydroxide. However the major drawback of this material is bacterial resistance and tooth discoloration due to the presence of Minocycline [11].

MTA apical plug method is an effective treatment option for open apices which helps to prevent extrusion of filling materials due to its good sealing ability and limiting bacterial infection in the teeth [13]. MTA is proven to have high marginal adaptation, excellent bioactivity and biocompatibility. With the use of various advancements like CBCT, Endo activator, Surgical operating microscope and MTA the clinical and radiographic success obtained in this study substantiates that periapical inflammatory lesions should be treated first by conservative means and surgical procedures should be considered only when the conventional methods fail [11].

### CONCLUSION

These case reports highlight the fact that large periapical lesions can be conservatively managed by present day endodontics. Technology and advances in biomaterials have contributed to the effective disinfection and sealing of the root canal system which are the important factors that contribute to the success of root canal treatment. Therefore every effort should be made to treat even large periapical lesions by conservative means.

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