

Intentional Replantation: an Approach to Save Hopeless Natural Teeth (A Case Report)

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Abstract

Introduction: Non-surgical endodontic retreatment and surgical endodontic therapy may not be practical for the treatment of endodontic diseases. Intentional replantation is considered as a procedure of last resort when nonsurgical or surgical endodontics is contraindicated. **Case report:** A 35 year- old female attended the endodontist office with pain and apical lesion in endodontically treated tooth #47. Access preparation for retreatment is a problem due to the posts and crown and surgical endodontic therapy was limited by anatomical features including nerve proximity and bone thickness. In addition, the patient could not afford to pay for non-surgical re-treatment or implant therapy **Conclusion:** This report demonstrates intentional replantation as a treatment that can be considered when other options such as endodontic retreatment or apical surgery are impossible.

Keywords: Intentional Replantation, Endodontic Treatment, Surgical Approach

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Introduction

Post-treatment apical periodontitis, which is persistent intraradicular infection, and in some cases a secondary intraradicular infection due to coronal leakage or an extraradicular infection is a challenging issue for endodontists.

Existence of microorganisms in the root canal system or the periradicular tissue is the primary reason of endodontic disease, although other etiologies, such as

foreign bodies, cysts and cholesterol crystals, have also been indicated (1). It can be managed by either nonsurgical endodontic retreatment or apical surgery with varying success rates (2). However, in some cases due to complex anatomy of the canals or presence of post-core and crown restoration, nonsurgical retreatment of the tooth is not possible. Moreover, surgical treatment is also impossible for the following reasons:

- Difficulty with surgical access, due to the position of the teeth and inadequacy of lips and soft tissues retraction.
- A lingually inclination of the tooth that needs a large amount of bone removal; a median average of bone covering the roots is 7.34 – 8.51mm (3).
- Structures Proximity: Mandibular teeth roots may have spatial relationship with mental foramen or impinge the Inferior Alveolar Nerve (IAN) as a microsurgical intervention may induce a partial or permanent paresthesia. The roots of maxillary molars especially second molar are often in the maxillary antrum. Surgical operation can push debris into the sinus and cause post-operative disease (4)
- Patient limitation: the patient who are physically unable to sit on dental chair; physically handicaps, medically compromised or patient with limited opening of the mouth or trismus muscles or patient with anxiety disorders are not good candidate for endodontic surgery.

- Sometimes defective areas are not accessible through surgical repair (4).

Intentional Replantation (IR) has been considered as a further procedure to eliminate post- endodontic root canal infection in selected cases. It has been proposed as the last resort for the teeth that needs to be extracted. It is one of the oldest methods introduced for the treatment of endodontic infection, and described by Albulcasis in 11th century (5). The reported success rates has been in a wide range, however recent studies have shown higher predictable success at a rate of 88% to 95% (6). According to these findings, intentional replantation should now be considered as a more acceptable treatment option. Intentional replantation is defined as the purposeful extraction of the tooth, root surfaces evaluation, endodontic interventions and correction and place back the tooth to its socket . In more recent years numerous indications as well as, the evolution of the procedure, has introduced including techniques modification around tooth extraction, preparation and root-end resection, manipulation of the tooth during surgical procedure and root-end filling materials. It has been used for many purpose in recent years such as management of endodontic mishaps, correction of anatomical anomalies, treatment of external root resorption and correction of root perforation(7-12).

This study describes a case with a complaint of pain in an endodontically treated mandibular second molar that seemed hopeless regarding retreatment and apical surgery.

Case report

A 35-year-old female patient was referred to private office with a complaint of pain in her mandibular right molar when chewing. After examination the tooth #47 was found tender to percussion. There was no tenderness when touching and no swelling of soft tissue was observed. Examination of the periodontal tissues of the decayed tooth No. 46 did not provoke the patient's chief complaint. Further examination showed no sign or symptoms in adjacent or opposite teeth. History revealed that the patient has received root canal treatment for this tooth last year and further clinical and radiographic examination showed the tooth underwent root canal therapy with amalgam post and crown restoration. Distal root showed signs of asymptomatic apical periodontitis. (Figure 1a)

All different treatment options were explained to the patient including endodontic retreatment, implant therapy, periradicular surgery, tooth extraction and

intentional replantation. Endodontic retreatment and implant placement were refused by the patient. Surgical endodontics was contraindicated as bone thickness and proximity to the IAN canal.

The risks and benefits of all alternative options were completely explained to the patient and an informed consent form was taken. The clinical procedure for IR was as follows: Prior to the procedure 2% Chlorhexidine (CHX) mouth wash was carried out to decrease the oral microflora. After achievement complete local anesthesia, using a suitable forceps the tooth was gently extracted then was carefully inspected extra-orally. Granulation tissues and other irritants were removed from the root surfaces using periodontal cures. The sample was sent for histopathologic evaluation, which implied the diagnosis of periapical granuloma. The crown of the tooth was held in hand by a wet gauze, The tooth was carefully examined by loupe and light, and no evidence of a furcal perforation, crack or root fracture was observed. Root resection was done using high speed handpiece, and then 2-3 mm of root-end was resected using a diamond bur (size#2) and coolant spray. Root-end cavities were shaped with a low-speed round carbide bur (size #2) (Dentsply/Maillefer) to 2- 3 mm depth and Biodentine (Septodont, Saint Maur des Faussés, France) retrograde filling was placed in prepared cavities.

The whole process of root-end preparation and filling took about 5 minutes. The socket was carefully checked for the removal of remnant granulation tissues. Then the tooth was gently replanted followed by gentle pressure on the buccal and lingual plates. The patient bit the gauze gently afterwards in order to help stabilizing the tooth. Periapical radiograph showed the accurate repositioning. Stabilization of the tooth with splints did not require because the roots were somewhat parallel. Antibiotics (oral Amoxicillin, 500 mg) and an anti-inflammatory drug (Ibuprofen, 200 mg) were prescribed for 3 days (3 times per day) postoperatively. The patient recommended eating soft food and rinsing her mouth with CHX and doing regular oral hygiene. The patient was asked for a recall after 7 days, 6 months, and thereafter for each year.

After 6 months the replanted tooth was firmed in its socket and the patient was asymptomatic and the tooth was functional. Radiographic examination showed a decrease in apical radiolucency which indicates progressing healing and bone formation and no evidence of resorption was noticed on the periapical radiograph (figure 1 b). After 5 years the tooth was asymptomatic and functional (figure 1c).

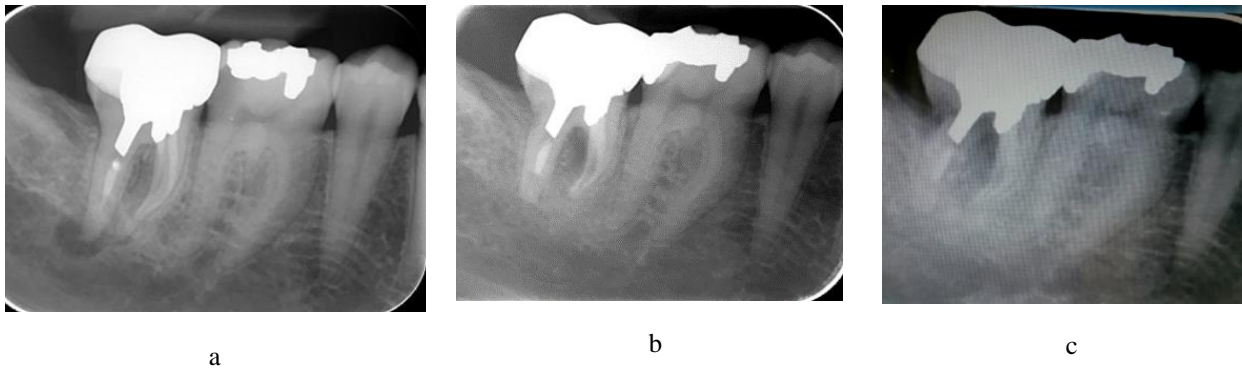


Figure 1: (a) Periapical radiograph revealed apical radiolucency. (b) A 6-month postoperative view and (c) 5 years follow-up.

Discussion

IR is considered as an alternative treatment option when there are persistent and recurrent periapical symptoms after root canal therapy meanwhile root canal retreatment or apical surgery is impossible. This procedure can be used as an alternative to extraction and is less popular than implant and endodontic retreatment.

The patient, came from a rural area, she could not afford CBCT and non-surgical re-treatment or implant therapy due to financial problems. Two main principles in IR are atraumatic extraction and the short extraoral time which recommended to be less than 10 minutes (13). In this case, extra oral time manipulation was less than 5 minutes. Proper planning and teamwork is the key.

IR includes the atraumatic extraction of the diseased tooth, root-end resection/preparation/filling and replantation of the extracted tooth. Case selection for IR is very important. Selected tooth should have conical roots so that not be fractured during extraction, lack of periodontal problem and the crown restoration be intact and well-sealing (4). In the present case the two roots were close to each other and were not diverged so it could be removed easily and after the treatment it easily placed in the socket and the curve of the mesial root made it secure and no need to be sutured or splinted.

We do not use the elevator or cow-horn forceps for extraction as it would damage the furcation area. Root inspection was done carefully under loupe and light in terms of the presence of any fracture, accessory canals or path of exit, isthmi, and any specific anatomy requiring attention. Survival of periodontal (PDL) cells on the root surface have been emphasized as a critical factor that influences successful healing(14).

Since viable remaining PDL through the inner walls of the socket help re-attachment of the replanted tooth;

curettage of the socket wall is avoided. Root resection has been shown to remove 93% of lateral canals and 98% of apical ramifications (15).

The insertion of suitable restorative material into the root end cavity is also of paramount importance. When choosing a root-end filling material several characteristics are necessary including antibacterial activity, sealing ability, and more importantly, cementogenesis; (16). We used Biodentine a new calcium silicate-based material which has been proposed as a favorable root-end filling material since it can be placed in permanent and primary teeth and can form close contact with periradicular tissue due to its biocompatibility and bioactivity (17) and its adequate marginal adaptation at the apex was inspected carefully. A systematic review in comparison of MTA and Biodentine found that Biodentine has favorable biological properties along with a good sealing ability and in clinical practice both of them can be used as a root end filling material (18). Biodentine handling is easy and needs much less time for setting. Moreover, discoloration with MTA has been reported, which is not seen with Biodentine (18).

In a systematic review from 1966 – 2014, Torabinejad et al. found a success rate of 88% for intentional replantation (19). After one year most failures are generally diagnosed which occurred due to some form of resorption or periodontal problem. However after 1-2 months failures such as inflammatory resorption and replacement resorption (ankylosis) can be usually observed (20, 21). In this case report, the tooth remained asymptomatic and functional after 5 years follow-up.

Conclusion

Regarding the high success rate of dental implants and endodontic treatment, intentional replantation is not routinely the treatment of choice in endodontic failures.

However, where nonsurgical retreatment, surgical treatment or dental implant is not possible, intentional replantation may be a suitable treatment option.

Conflict of Interest

The authors declare no conflict of interest.

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