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INTENTIONAL REPLANTATION OF A LOWER PREMOLAR: 15 MONTH FOLLOW-UP

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ABSTRACT

The term intentional replantation is the act of purposeful extracting a tooth to perform extra-oral endodontic treatment, curettage of apical soft tissue if present and replacing the tooth in its socket. This article explains the use of intentional replantation as a technique to successfully treat a case where conventional endodontic retreatment and apical surgery were considered impossible.

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Introduction

Surgical endodontics and nonsurgical retreatment are not always durable solutions to endodontic disease. Accessing retreatment may be limited by posts. Surgical endodontics may be limited by anatomical features including bone thickness, nerve and sinus proximity. Anatomical limitations and complex restorations may prevent implant placement.

Intentional replantation is described by Grossman as the "removal of a tooth and its almost immediate replacement, with the object of obturating the canals apically while the tooth is out of the socket." (1)

It is used mainly as an alternative to extraction when periapical surgery is impossible or is high-risk because of the close presence of delicate anatomical structures or conventional endodontic treatment or retreatment is not successful.

Intentional replantation is recommended as the first choice:

1. When all other surgical and nonsurgical treatment have been performed and failed.
2. When all other surgical and nonsurgical treatment is supposed impossible.
3. When apical surgery is contraindicated because of anatomic factors such as the mandibular canal, mental foramen, thick bone or some medical conditions.
4. Perforation root defects and inaccessible resorption

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5. Obstructions
6. To identify root perforation or crack

It is important to know that significant contra-indications for this therapeutic approach are:

1. Teeth with curved and long roots
2. Poor periodontal support
3. Mobility
4. Divergent roots
5. Non-restorable caries

Its advantages include less time consuming and more cost-effective than the alternatives. And the disadvantages include a possibility of root fracture or root resorption. Bender and Rossman reported a success rate of 81% of 31 teeth followed for up to 22 year (2). Kingsbury and Weisenbaugh reported a success rate of 95% for 151 teeth followed for 3 year (3). The majority of frequently success and failure studies comparing the outcomes of surgical treatment with that of nonsurgical treatment since 1970 are case series (4).

Case Report

A 32 year old woman referred to the Department of Endodontics at Kerman University of Dentistry because of the apical pathosis of tooth #20. Her medical history was noncontributory with no allergy or medication. Dental history included endodontic therapy on tooth #20 with a post, core and crown 3years ago. Clinical examinations revealed no significant signs or symptoms. There was no evidence of stoma. Tooth #20 was restored by a metal ceramic crown with an appropriate marginal and occlusal integrity. Teeth #19 and #21 were present in a proper contact with #20. Periodontal examinations revealed mobility, probing depths and gingival tone within normal limits. Radiographic evaluations showed large periapical radiolucency associated with the apex of tooth #20 (Fig. 1). Crestal bone levels appeared to be within normal limits. The patient was presented with the treatment options of extraction and a dental implant or extraction without replacement. Endodontic retreatment, surgical endodontics and implant therapy were refused by the patient. After explaining the risks and benefits of all treatment options to the patient, she made an informed decision to have the tooth removed. Based on her decision due to extracting the tooth, the intentional replantation with associated risks and benefits was offered and the patient accepted.

Figure 1. Radiograph illustrating a large periapical radiolucency associated with the apex of tooth #20.

Procedure

An hour before the procedure, the patient rinsed with chlorhexidine gluconate 0.12% and was given 600 mg ibuprofen. Two operators were presented during the operation. The patient was prepared for the surgery. Profound inferior alveolar and lingual nerve blockage was achieved with 2% lidocaine containing 1:80,000 epinephrine. A mucoperiosteal flap was elevated to access the apical to the crown margin to prevent damage of the crown. The tooth was extracted by forceps with minimal trauma.

The crown of the tooth was wrapped in gauze moistened with normal saline. And the root surfaces also bathed with normal saline. Root grinding accomplished perpendicular to the long axis of the root with the high speed fissured bur with irrigation.

The appropriate high speed fissured bur used to create the small 2-3 mm deep Class I root end preparation. Then CEM cement was replaced as an appropriate root end filling material (Fig. 2).

Figure 2. Photo of the tooth #20 illustrating the apical seal with CEMcement

The intended socket was irrigated with normal saline and gently suctioned to remove any blood clot. Then the tooth was carefully reinserted into the socket so that the replantion of the socket took less than 15 minutes from extraction. Then the patient was asked to bite to see if the tooth is fully seated back into the socket. We used Copack as a periodontal dressing (Fig. 3).

A postoperative radiograph was taken (Fig. 4) and the following postoperative instructions were given: chlorhexidine gluconate mouth wash 0.12% twice a day for 7 days, Amoxicillin (Cap) 500 mg (QID) for a week, Gelofen (Cap) 400 mg on demand and soft diet for 2 weeks.

Figure 3. Photo of the tooth #20 illustrating the Copack as a periodontal dressing.

The patient was recalled 1 week later for suture removal and evaluation of the surgical site. In a week, the soft tissues appeared pink in color with minimal inflammation, and the pain associated with bite had diminished. The patient was recalled 1 month later. Healing was uneventful and the patient's symptoms had subsided. Tooth mobility was normal. The patient was recalled again in 15 month and clinical examinations revealed no response to percussion or palpation, and soft tissue probing depths and mobility were within normal limits (Fig. 5). Radiographic examinations showed complete osseous healing of peri-apical radiolucency (Fig. 6).

Figure 4. Radiograph of tooth #20 immediately after replantation.

Discussion

Currently, tooth replantation procedures are supported by the extensive researches focused on replantation of avulsed teeth (5). Intentional replantation is indicated when the apex of the involved tooth is close to mental nerve, the inferior alveolar nerve, or the maxillary sinus. Because rigid splinting may cause bacterial overgrowth, delay healing and promote replacement resorption by not allowing physiological mobility, Suture splinting is used to protect the reimplanted tooth (6).

Extra-oral time in this treatment was less than 15 minutes. Extending the extraoral time beyond 15 minutes increases the risk of post-treatment complications, primarily ankylosis, by 1.7-fold. Thus, when a contemporary treatment protocol is used in intentional replantation, including careful extraction, extraoral manipulation and replantation of the tooth, 3-mm apical resection, effective root-end cavity depth, and filling performing, the prognosis in regard to periapical and periradicular healing depends on the extraoral time. Radiographic analysis, before replantation and after retrofill is an option that can be used for further apical evaluation. This radiograph enables the operator to ensure the apical fill adequately extends from the gutta-percha to the apex.

In 1999, Adamo found no significant differences between amalgam, composite, MTA, and super EBA as retrograde sealing materials (7). Unlike most previous studies with Intentional replantation, we used a bioregenerative material with comparable properties to MTA (8, 9). Several properties are necessary when choosing a root-end filling material including sealing ability, antibacterial activity, and more important, cementogenesis; CEM cement is reported to induce cementogenesis as a root-end filling and furcation perforation repair material (10). It is thought that subsequent to periradicular surgery, mesenchymal cells initiate the healing process by differentiating into mature cells such as osteoblasts, fibroblasts, or cementoblasts thus inducing osseous regeneration and apical attachment healing (10, 11). The favorable treatment outcomes for CEM cement in this study can be due to its good sealing ability (12), antibacterial activity, high alkalinity (11), hydroxyapatite formation (13), low cytotoxicity (14), biocompatibility (15), and induction of hard tissue formation (16, 17).

Figure 5. Photo of the tooth #20 illustrating normal Conditions after 15 month.

Biomaterials may help making Intentional replantation a more standard form of therapy. This method can be suggested as a routine treatment if the long term prognosis proves to be good, and the success rate of it got better than other treatments and modalities.

With the high success rate of dental implants and endodontics, intentional replantation is not frequently the choice treatment. However the Intentional replantation has some advantages for the patient include decrease in clinical time, complications and expenses compared to non/surgical endodontic (re)treatment. Furthermore, with a good case selection, the skilled general practitioner may find Intentional replantation simpler to perform than endodontic (re)treatment or periradicular surgery. The greatest advantage is the spectacular view and the control, the clinician has to all aspects of the tooth, challenging the last resort treatment argument (18).

Conclusion

With a careful case selection, suitable training, and bioregenerative materials, Intentional replantation has a high success-rate and can be less expensive than other treatment options. At last we should notice that longer follow up is required.

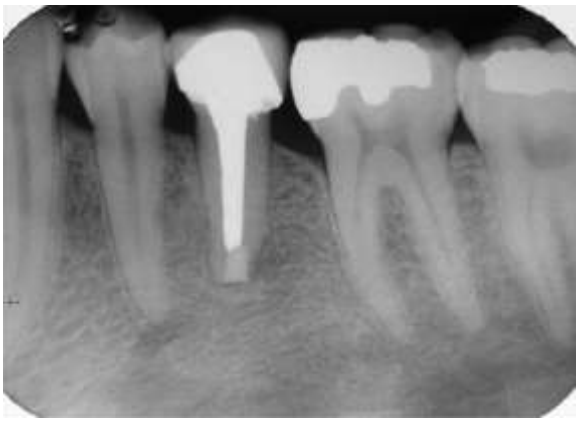

Figure 6. 15 months postoperative radiograph reveals complete osseous healing of the peri-apical radiolucency.

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