



INTENTIONAL REPLANTATION- “LAST RESORT TREATMENT”: A CASE REPORT

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ABSTRACT

Intentional replantation is a procedure in which an intentional tooth extraction is performed followed by reinsertion of the extracted tooth into its own alveolus. In this article, intentional replantation is described and discussed as a treatment approach for grossly carious immature mandibular second molar with periapical pathology. A 1 year follow up revealed the patient to be asymptomatic, the tooth to be functional and a recall film showed no evidence of root resorption. The indications for and limitations of intentional replantation as well as recommended literature on the subject are discussed.

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INTRODUCTION

Intentional replantation is an accepted endodontic treatment procedure in which a tooth is extracted and treated outside the oral cavity and then inserted into its socket to correct an obvious radiographic or clinical endodontic failure. Historically, intentional replantation was deemed a treatment modality with limited success and a “plan Z” treatment consideration. In reality, intentional replantation is highly predictable and should be considered before condemning select teeth as having a “hopeless” prognosis (1, 2). From a biologic perspective, removal of the apical segment of the tooth along with the attached granulation tissue, retro-sealing with bio-ceramic putty and reinsertion of the tooth into its socket should ostensibly minimize rejection. The procedure mandates atraumatic removal of the tooth, extraoral retro-section of the apical segment, retro-preparation and retro-sealing all the while, bathing the tooth in an isotonic solution that preserves the PDL. Reinsertion of the tooth in its socket and manually compressing the bone (after determining the tooth is out of occlusion) will suffice to facilitate reattachment. Often, splinting is not required, as the tooth demonstrates limited mobility minutes after replantation.(3)

IR has been proposed as an alternative to routine extraction by many researchers; however, it should be considered a last resort because the root may be fractured during extraction. It should not be suggested for routine use because its success rate is far below than routine RCT or apical surgery.

Some indications have been proposed for IR, including as follows: 1. When routine RCT is impossible or impractical, as with some patients who cannot keep their mouth open for the necessary time. 2. When a previous RCT has been failed but orthograde retreatment or apical surgery is impractical. When there is an obstruction of the canal, such as a broken file or canal calcification. 4. In situations surgical access would be inadequate, such as a shallow buccal vestibule or short roots. 5. Where blunderbuss molar roots or open apices exist, apexification has been failed, and the canal walls are divergent. 6. When an iatrogenic perforation or a perforating internal or external resorption is present, but surgery is impractical. 7. When a foreign body is present in periapical (PA) tissues or PDL, but surgery is impractical. 8. When a PA radiolucency exists but routine surgery is impractical. 9. If PA radiographs show a large region of rarefaction or a large cyst. 10. When the root canal is furcated as it approaches the apex. 11. For RCT of immature teeth. 12. For primary teeth, as an alternative to extraction and placement of a space maintainer. 13. Management of vertical root fractures by reconstructing with dentin bonding agents or management of complicated crown-root fractures. 14. For RCT of teeth with certain anatomical malformations such as radicular groove or double teeth. 15. Maintenance of the alveolar bone. 16. Progressive destruction of periodontal tissues and management of teeth with advanced endodontic-periodontal lesions. 17. Management of maxillary sinusitis.(4)

Case selection

The tooth must be extractable without fracturing any of the root structure. Teeth with fused roots are good candidates for extraction; however, they will often require a splint to stabilize them after replantation. A splint can be as simple as placing 2

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sutures either straight across the occlusal surface of the replanted tooth or crossing the tooth like the letter X. A more rigid mechanism is provided by GlasSpan Splint (GlasSpan Inc., Exton, PA) which is a hollow fiberglass rope filled with flowable composite which is placed into a groove connecting the tooth being extracted with a proximal tooth. The perfect candidate for replantation is a tooth with relatively straight roots and a substantial volume of inter-septal bone. These teeth can be removed easily and when replanted will not need to be splinted. Splints should be avoided if possible, as they can promote replacement resorption which could lead to failure. Teeth with dilacerated roots are not suitable candidates for replantation. (3)

Advantages of Ir

IR handles both the root end infection and the extraradicular infection. In this respect it provides the combined benefits of retreatment and periradicular surgery. It is a less invasive procedure compared to apical surgery. Periradicular surgery has its risks when there is proximity to anatomical structures like nerves, blood vessels, sinuses or adjacent roots. This type of surgery requires considerable manipulation and is usually performed by oral surgeons or endodontic specialists with special instruments and microscopes.

In IR, access to the root tip is easy. The root end preparation and filling are done better extraorally, thus achieving a more hermetic apical seal of the root canal system. In IR, there is marginal bone loss, less risk of perforating the lingual plate or causing bone dehiscence and of course no soft tissue injury or scars. In most cases of periradicular surgery, there may be postoperative discomfort such as pain and swelling, while IR is usually uneventful. (5)

Disadvantages of Ir

It is not suitable for teeth with curved or flared roots because there is risk of tooth fracture during manipulation and extraction. It cannot be performed with abutment teeth and requires removal of fixed prosthesis prior to considering IR. There is risk of root resorption and ankylosis in IR. Finally, IR, is still an uncommon procedure and is therefore perceived as a 'last resort' treatment with less experience. (5)

Case Report

A 13 year old male patient reported to the department with complaint of pain in lower left back region since 8-10 days. On clinical examination, a grossly carious mandibular second molar of left side was seen (Fig 1). On radiographic examination, it was found that just half of the root of the involved tooth was formed with attached periapical pathology (Fig 2). The patient was interested in getting the tooth extracted as was convinced by some private practitioner. The patient was explained the procedure of intentional replantation and was made aware of the pros and cons of the procedure. Local anaesthesia was administered and the tooth was removed without complication (Fig 3). Using a sterile gauze sponge, the tooth was held by hand on the crown and the granulation tissue was removed and root end bevelling was done with high speed handpiece. Extraoral root canal preparation was done and instead of retrograde filling whole of the root length was filled with biodentin as the root length was very short. The procedure took 10 minutes. The tooth was stabilised with cross suture placed over the occlusal surface of the tooth and with the help of composite wire splint (Fig 4 and 5).

The patient was instructed to use chlorhexidine mouth wash starting 48 hours before the procedure and was advised to continue for 7-10 days postoperatively. A 3-day course of postoperative antibiotics and analgesics was prescribed. A follow up of 1 year is presented at which the patient was found to be asymptomatic and the tooth was functional (Fig 6 and 7).



Fig 1 Preoperative photograph



Fig 2 Preoperative radiograph



Fig 3 Tooth after extraction and attached granulation tissue



Fig 4 Tooth repositioned and secured with suture



Fig 5 Suture and composite wire splint in place



Fig 6 Postoperative radiograph



Fig 7 Postoperative radiograph after 1 year

DISCUSSION

As reported by Kratchman (6), there are some advantages in performing intentional reimplantation when periapical surgery is refused. The procedure is typically less time consuming and invasive as compared to periapical surgery. He reported that indications included limited access, anatomical limitations, and perforations in areas not accessible to surgery, failed apical surgery and persistent chronic pain. With proper case selection, the procedure is simple and straightforward. There is less chance of damage of vital structures adjacent to the teeth. The second molar had straight conical shape roots which made the extraction and the manipulation during the procedure simple and less time consuming. In the present case report, the tooth was outside the mouth for approximately less than 15 minutes, manipulation was kept minimal, and the periodontal ligament was not removed as recommended by most authors. The best reimplantic prognosis is directly related to the amount of time the tooth is maintained extraorally during the procedure. From some reports, the potential for resorption in replanted teeth increases if they remain outside the mouth for more than 30 minutes (7).

Kratchman (6) also listed contraindications of this procedure like preexistent moderate to severe periodontal disease, curved or flared roots, a non restorable tooth and missing interseptal bone. Fortunately, teeth in the both cases did not fall into any of these categories. Dryden and Arens (8) cited refusal of the patient for periapical surgery as a viable indication for the intentional replantation. Patient compliance and lack of periodontal disease (9) in this area were also important factors in the decision to perform the procedure. Certainly the risks of intentional reimplantation were considered and acknowledged and conveyed to the patient. Their desire to save the tooth was made with all these issues in the mind, fortunately to date; this procedure resulted in the continued retention of the tooth.

Establishment of a proper fracture resistance to the root dentin, when obturated with different obturating materials, is an important key point for clinical success. In a study by Girish K *et al*, 2018, the mean fracture resistance were higher for root canals obturated completely with MTA when compared to Biodentin, but the difference was not statistically significant. (10) This finding was in accordance with the results of the study conducted by Elnaghy and Elsaka. Biodentin has high compressive strength, reduced setting time, less solubility and better handling characteristics when compared to MTA. A specific feature of Biodentin is its capacity to continue improving the compressive strength with time over several days. It reaches upto 300 MPa after 1 month, which is almost equal to the compressive strength of natural dentin (297 MPa). A finite element analysis study showed that the materials with similar elastic modulus to dentin could reinforce the weak roots. This hypothesis can explain the failure of gutta-percha to reinforce immature roots. The elastic modulus of Portland cements is around 15-30 GPa and dentin which is about 14-18.6 GPa and for Biodentin is 22 GPa, and thus reinforcing the effect of MTA and Biodentin may be explained by their similar elastic modulus to dentin. (11)

CONCLUSION

Some authors consider intentional replantation to be a last option; whereas others consider it as another treatment modality. However, in cases where a dental implant,

nonsurgical treatment or surgical treatment is not possible, intentional replantation may be a viable treatment option. Recent case reports have demonstrated that with good case selection, intentional replantation can be a reliable and predictable procedure. IR can have a high success rate with different bio-regenerative materials and be far less expensive than other treatment options, though further long term follow ups are needed to study the longevity of the procedure.

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