



AN ENDODONTIC CHALLENGE MANAGED BY INTENTIONAL REPLANTATION: A CASE REPORT

Dr Alakesh Singha* MDS in Conservative Dentistry & Endodontics *Corresponding Author

Dr Prasanta Majumder MDS in Public Health Dentistry

Dr Saurabh Kaushik MDS in Orthodontics & Dentofacial Orthopedics

ABSTRACT

Non-surgical retreatment and surgical endodontics are not always applicable. Apicoectomy may be limited by anatomical variations, including buccal bone thickness and proximity to vital structures such as nerves and maxillary sinuses. Intentional replantation is considered as a procedure of last resort when non-surgical, or surgical endodontics are contra-indicated. The treatment described demonstrates intentional replantation to be considered a treatment option to preserve and maintain the tooth.

KEYWORDS : Intentional replantation, Retrograde preparation, Root-end resection

INTRODUCTION

Grossman defines intentional replantation as the purposeful extraction of a posterior tooth to perform the extra-oral endodontic treatment and the tooth's replacement in its socket. Minimizing the extra-oral time to the shortest period possible provides the best long-term prognosis. Atraumatic extraction is a crucial factor for the intentional replantation procedure's success by minimizing the damage to cementum and periodontal ligaments.

Specific indications to perform the intentional replantation procedure include limited access to the posterior mandibular molars with conventional apicoectomy procedures because of the buccal bone thickness, high risk of inferior alveolar nerve injury due to its proximity to the mandibular molars apices, root resorptive defects, which does not respond to conventional treatment, endodontic retreatment procedure is not possible due to iatrogenic canal obstruction (i.e., posts, separated instruments, ledges or perforation).

Case Report

A 29-year-old male patient was visited to clinic due to persistent dull pain at the mandibular right second molar (#47). His medical history was non-contributory, with no allergies.

Dental history showed that tooth #47 received non-surgical root canal retreatment.

Clinical examination revealed tenderness to percussion, no mobility with 3 mm pocket depth, and no obliteration of the vestibular depth.

The radiographic assessment showed apical radiolucency associated with the tooth (#47), widening periodontal ligament space, and extruded gutta-percha beyond the radiographic root apex (Figure 1). Since he had undergone root canal retreatment without any observable healing in the periapical tissue, the diagnosis is previously treated with symptomatic apical periodontitis.

The available treatment options included tooth extraction and dental implant placement, surgical endodontics, or intentional replantation. The surgical endodontics was contraindicated because of proximity to the inferior alveolar canal. Since the patient preferred to save the tooth, the intentional replantation technique was considered, and the patient accepted this option.



Figure 1 Pre-operative clinical photograph and periapical radiograph, intraoral photo with a mandibular occlusal view showing the symptomatic tooth (#47), periapical radiograph of tooth #47, showing a widening in PDL space, periapical lesion, and extruded gutta-percha beyond the radiographical root apex.

RESULTS

A preoperative 600 mg of ibuprofen was given to the patient. The anesthesia was achieved through an inferior alveolar nerve block, lingual nerve block, and buccal infiltration techniques with 2% lidocaine containing 1:100,000 epinephrine. Atraumatic extraction with lower molar forcep with no complications was performed (Figure 2). The tooth has mesial and distal roots with three canals (Mesiobuccal, mesiolingual and distal) with apparent 2 mm overextended gutta-percha in the mesiolingual canal. Held the tooth crown using sterile gauze soaked in isotonic saline; three millimeters were resected from both roots using a round-end taper diamond bur. The two roots' apices were retro prepared by P5 XS bled ultrasonic device removing 3 mm of gutta-percha under sterile saline irrigation. Root canals were dried with absorbent paper points. The spaces left in the canals were sealed with ProRoot™ MTA (Figure 3). The socket's apical part was carefully inspected, curetted with 12 Miller surgical curette, and irrigated with isotonic saline followed by tooth replantation and a semi-rigid splinting with the adjacent teeth using ligature wire (0.25 mm) (#44 and #45) (Figure 4). The extra-oral time was approximately twenty-three minutes. The patient was given oral hygiene instructions and asked to rinse with 0.12% CHX solution twice daily for one week, due to its antibacterial properties. Antibiotic coverage was given twice daily for 5 days and patient was advised soft diet. The follow-up appointment was scheduled two weeks later, where the tooth was evaluated, the splint was removed, and oral hygiene and gingival status was re-evaluated. The patient had good oral hygiene, and the gingiva showed good healing; the clinical symptoms subsided with no radiographic changes. At four weeks follow-up, no pain upon biting was noticed. At twelve weeks follow-up, the tooth was functioning without any signs or symptoms. At three months follow-up, the

radiographic examination revealed complete osseous healing of the periapical radiolucency (Figure 5).

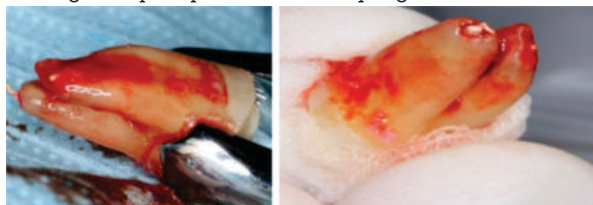


Figure 2 Clinical photographs, showing tooth #47 after extraction and illustrating the handling technique with a sterile gauze saturated with saline and held by the crown after atraumatic extraction with lower molar forceps.



Figure 3 Clinical photographs, showing the root resection and canal preparation steps. 3 mm root resection with round- end taper diamond bur. retrograde cavity preparation by the ultrasonic device. retrograde filling with ProRootTM MTA

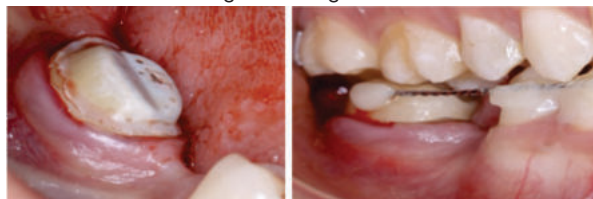


Figure 4 Clinical photographs, showing tooth #47 after replantation and splinting

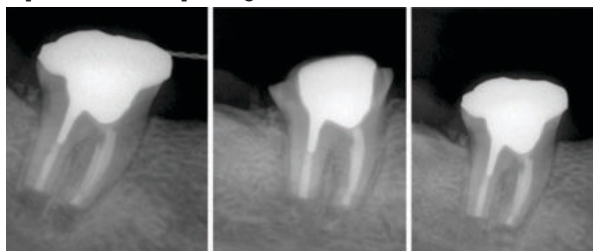


Figure 5 Periapical radiographs of tooth #47 in the postoperative follow-up appointments. A: postoperative periapical radiograph; B: after one-month follow-up; C: after three months follow-up.

DISCUSSION

Systematic review of the literature by *Torabinejad et al* found an overall 88% survival rate for intentionally replanted teeth, with more contemporary studies demonstrating success rates as high as 95% . Intentional replantation can now be considered among more commonly accepted treatment options compared to other treatment modalities such as endodontic surgery. Surgical options in certain areas are filled with risks such as increased chances of damage to Inferior alveolar nerve due to the close proximity of root to the inferior alveolar canal in mandibular molar region and excessive removal of buccal cortical bone due to lingual inclination and external oblique ridge in mandibular second molars. There is an median average of 7.34 – 8.51mm of bone

covering the roots in mandibular molar region . This makes it a troublesome step if surgical treatment is considered. Intentional replantation is indicated in cases such as failed root canal treatments, developmental anomalies, anatomic limitations, difficulties in access, accidental exarticulation, patients with objections to surgery and trismus. In the present case, intentional replantation was done with mandibular second molar because of the typically thick overlying buccal bone, shallow vestibular depth and proximity of the root apices to the mandibular canal. Also the tooth had convergent roots hence atraumatic extraction was able to be performed without causing too much damage to the roots.

The prognosis for successful healing after replantation is closely related to avoiding trauma to the PDL and cementum during extraction, to maintain the viability of the PDL cells and avoid resorption and ankylosis of the tooth. During extraction, use of elevators should be avoided and the beaks of the forceps should be placed coronal to cement-enamel junction. The extra oral time should be kept as minimum as possible as drying of PDL cells take place with delay of 8 minutes or more. The chances of bony ankylosis increases as the extra oral time increases. *Jang et al* reported higher success rates for those teeth in which the extraoral time was 15 minutes or less compared with those kept out for more than 15 minutes. *Choi et al.*, reported the use of physics forceps as a reliable extraction instrument . A new technique of using orthodontic extrusion 2 to 3 weeks before the extraction can increase the periodontal ligament volume permitting an extraction with a low risk of tooth fracture .

Performing a routine endodontic treatment before the tooth extraction can reduce the extra-oral time;; According to *Kratchman*, the extra-oral time should not exceed 20 minutes . *Cho et al.*, considered an extra-oral time greater than 15 minutes increases ankylosis occurrence.. *Pohl et al.*, reported that if extraoral time is greater than 25minutes for replanted teeth, root resorption is expected to occur, and the risk of complications is 1.7-fold increased, thus reducing the survival rate of the replanted tooth . During the replantation procedure, the surface root may get damaged, raising the risk of postoperative complications. As reported by *Andreassen et al.*, ankylosis comes about when more than 9 mm² of the surface root is damaged . When periodontal ligaments' vitality is preserved by adequately managing the extra-oral time and storage conditions, favorable healing occurs. The periodontal ligament's complete regeneration along the root surface takes about 7 to 10 days .

Commonly used root-end filling materials are Super EBA, GIC, composite, and MTA. MTA's sealing ability and marginal adaptation have proven superior and not adversely affected by blood contamination. Besides, MTA promotes new cementum deposition and stimulates osteoblastic adherence to the retro-filled surface.

A recent evidence-based literature review indicates that splint type and duration were not significant variables with healing outcomes . It should be performed if indicated, such as in teeth with short roots or lack interseptal bone . Other studies show that suture splint appears to be more favorable than wire composite splint. Indeed, suture splinting provides physiological loading on the replanted teeth, which might facilitate periodontal healing . The success rate ranges from 50% to 95% . The clinical criteria for success include normal function, no mobility, and healthy periodontium. Also, the periapical radiograph should reveal no apical radiolucency or resorption .

CONCLUSION

Various treatment modalities which can be used in case of extruded instrument or root canal filling material include conventional endodontic surgery, intentional replantation or

extraction of the tooth. Based on various criteria and indications either the surgical option or intentional replantation can be thought of. In present case, due to favourable root morphology and systemic condition of the patient, intentional replantation was considered. Patients acceptance to intentional replantation when indicated is favourable, due to less invasive nature of the treatment and lesser time needed for the procedure as well as healing..

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