CASE REPORT

INTENTIONAL REPLANTATION OF MANDIBULAR FIRST MOLAR WITH TWO YEARS FOLLOW UP- CASE REPORT

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Backgrounds: Intentional replantation (IR) is a reliable and predictable treatment option for cases with failed non-surgical root canal treatment. The success of IR is found to be 52–95%. The current case is of 35years old female who presented with severe pain and swelling in lower right first mandibular molar with previously initiated non-surgical root canal treatment that resulted in instrument separation in mesio-buccal canal. Periapical radiograph showed rarefactions at furcation area, mesial and distal root apices. It was decided to complete the non-surgical root canal treatment followed by intentional replantation and retrograde filling with MTA. The tooth was found to be asymptomatic after two years follow up and periapical radiographs depicted complete healing. Intentional replantation with careful case selection is a successful, easy and reliable treatment option for hopeless cases. Atraumatic extraction, minimum extra-alveolar time and aseptic techniques during the procedure are the key factors for success of the procedure.

Keywords: Mineral Trioxide Aggregate; Root Canal Therapy; Tooth Replantation

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INTRODUCTION

Non-surgical root canal treatment is used to prevent and resolve the pulpal and periapical pathosis and to re-establish the integrity of peri-radicular structures. Despite having high survival rate[1], teeth with fractures, broken non-retrievable instruments, persistent apical periodontitis, subgingival caries have been deemed non-restorable[2]. In such cases, the dentist may try to restore the tooth function by peri-radicular surgery, intentional replantation, auto-transplantation or extraction followed by implant placement.

Intentional replantation has been defined as the deliberate extraction of a tooth and after evaluation of root surfaces, endodontic manipulation, and repair, placement of the tooth back to its original socket.[3] Retention rate of teeth after intentional replantation is reported to be 52–95% with the follow-up of 1–22 years.[4]Intentional replantation was introduced ten centuries ago by Abu Al-Qasim who described the procedure by using ligatures to splint the replanted tooth.[5] Initially it was thought to be 'the last resort' but with the passage of time the indications have been modified. One of the most important indications is the failure of an endodontic treatment or retreatment when periapical surgery is not feasible due to anatomical obstacles such as mental foramen or thick buccal bone in mandibular molars. Other indications include iatrogenic or natural canal obstruction, large root perforation, vertical root fracture or periodontal disease.[6]Success of this treatment depends on many factors especially the aseptic conditions maintained during the procedure and the amount of extra-oral time when procedure is carried out.

This case report includes non-surgical endodontic treatment of mandibular first molar with the separated instrument in the mesio-buccal canal which later underwent intentional replantation with the follow-up of 2-years.

CASE REPORT

A thirty-five years old female patient presented to the Department of Endodontics at Islamic International Dental College with swelling and pain on lower right side of the face. Patient was undergoing root canal treatment of lower right first molar by a general dental practitioner. Pain in the treated tooth started four days ago after her last dental visit. The pain increased in intensity during preceding 24 hours concomitant with the swelling.

Medically patient was fit and well. Clinical examination revealed temporary filling placed in the lower right first molar. Tooth was tender to percussion and palpation. Sensibility testing showed negative response with cold test (Endo Ice, Coltene), heat test (Hot GP stick) and Electric pulp test (Kerr). Tooth showed Grade 1 mobility and probing pocket depth was with in normal limits. Intraoral periapical radiograph revealed a broken instrument in middle and apical third of mesio-buccal canal (MBC) with periapical rarefaction around the apices of mesial and distal roots with a bone loss at the furcation area (Figure 1A). Diagnosis of previously initiated root canal therapy with acute apical abscess was made. All possible treatment options were explained to

the patient along with their pros and cons. The options included 1) non-surgical endodontics after removing or by-passing the broken instrument 2) periapical surgery and retrograde filling 3) Hemi-section 4) non-surgical endodontic treatment followed by intentional replantation 5) Tooth extraction with or without replacement. It was decided with patient consent to start with option 1 and in case of failure, proceed with option 4.

After taking informed consent, local anaesthesia with lidocaine 2% and 1:80000 epinephrine (Septodont) was administered. Subsequently, rubber dam (Henry Schein) was applied and re-entry into the pulp chamber was made by using a high speed round carbide bur (Mani, Japan) with water spray. After access cavity was refined using ultrasonic tips and canal orifices identified. The attempts to remove or by-pass the broken instrument in the MBC were unsuccessful. Therefore, it was decided to prepare and obturate the MBC to the point where the canal was patent. Working lengths of the mesio-lingual and distal canals were obtained by electronic apex locator (DentaportZx, Mani Japan) and verified with a periapical radiograph (Figure 1B). Chemico-Mechanical preparation was carried out with hand files (Mani, Japan) and 3% sodium hypochlorite (Septodont) was used as the primary irrigant. A final irrigation of 17% EDTA (vista dental) was used preceded by a saline rinse. The canals were dried using paper points and Ledermix™ was used as an intracanal medicament for two weeks. On the follow-up visit, tooth was asymptomatic and obturated with gutta percha cones (Dentsply Sirona, USA) and a eugenol based sealer (Tubliseal, Kerr Dental Supplies) using the cold lateral condensation technique. The tooth was restored with amalgam restoration which was made occlusion free and patient was recalled after 7days for intentional replantation (Figure 1C).

At patient's return, antisepsis was carried out by using 0.2% Chlorhexidine di-gluconate and tooth was anesthetized by giving Inferior alveolar nerve block with lidocaine 2% and 1:80000 epinephrine (Septodont). Atraumatic extraction of the tooth was done by using extraction forceps without any intraoperative complication. Following extraction, tooth was held from the crown portion by wet sterile gauze in order to keep it moist. Mesial root was resected using high-speed hand piece with the straight bur (Mani, Japan) till the junction of apical and middle third as broken endodontic file was present in that portion. Root end cavity was prepared with straight bur (Mani, Japan) and filled with MTA (Angelus Fillapex, Brazil) (Figure 1D and 1E). Tetracycline containing saline solution was used for irrigation during root resection and root end cavity preparation. The apical part of socket was carefully curetted to remove any granulomatous tissue and the tooth was re-implanted in the axial direction using digital pressure within 10 minutes of extraction. Patient was asked to close her jaw in order to completely seat the tooth in alveolus. Digital pressure was applied from the bucco-lingual side to ensure socket wall adaptation with the root surface. Semi-rigid splint was used to stabilize the tooth for ten days (Figure 2A). Patient was instructed not to chew from right side for 2 hours and to be on soft diet for ten days. Ibuprofen 400mg, 0.2% chlorhexidine gluconate mouth rinse, and Amoxicillin 500mg thrice a day daily for a week were prescribed. Patient was recalled for Follow up at 1month, 2 months (Figure 2B), 4months, 6 months interval till 24 months. Metal crown was place after 6 months. On follow-up radiographs, marked reduction in the size of peri-radicular lesion was observed and complete bone regeneration of lamina dura was observed after 2 years showing a successful case (Figure-2C)

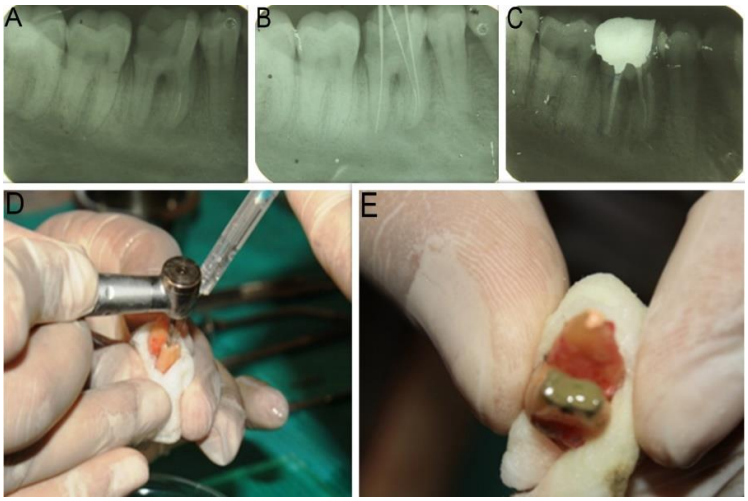

Figure-1: (A) Preoperative Radiograph (B) Working Length Radiograph (C) Post obturation Radiograph (D) Root End Preparation (E) MTA root end filling

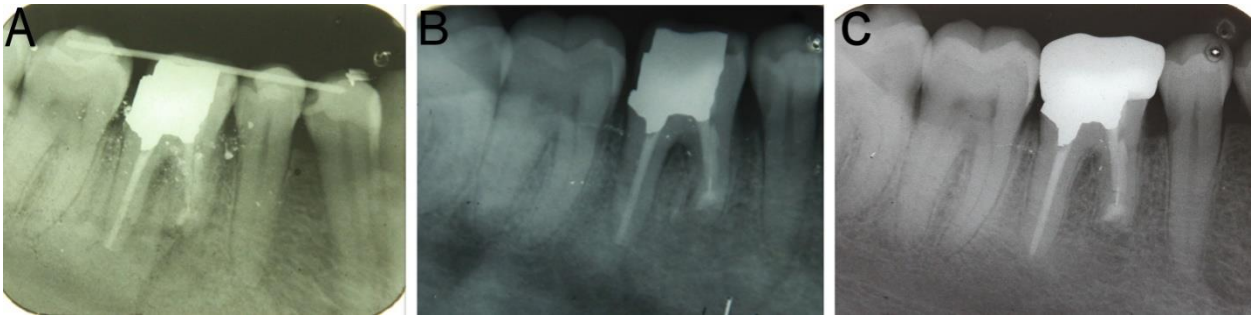

Figure-2: (A) Post replantation radiograph (B) Two months follow up (C) Two years follow up

DISCUSSION

Intentional replantation is easier, less-invasive, less time-consuming, and less-costly procedure as compared to peri-radicular surgery but the greatest disadvantage of intentional replantation is that replacement resorption or ankylosis may occur.[7] In the current case, postoperative follow-up of 2 years was done. Patient was completely asymptomatic with no metallic sound on percussion and no pain on palpation. Periapical radiograph also revealed presence of intact lamina dura and no signs of ankyloses.

During endodontic treatment, Ledermix paste (demeclocycline and triamcinolone) was placed in the root canal for 14 days. The demeclocycline (antibiotic) impede ribosomal protein synthesis of bacteria and triamcinolone (corticosteroid) inhibits dentinoclasts' activity that results in inhibition of external inflammatory root resorption.[8,9]

For a successful intentional replantation, one of the most important factors is the viability of PDL fibers. In order to minimize trauma to the PDL, use of elevators should be avoided and forceps extraction should be done by limiting the engagement to the crown part of the tooth.[8,9] Secondly the roots of the tooth should be kept moist with the wet sterile gauze or by dipping the tooth in HBSS.[10] Thirdly the extra-oral time should not exceed 15minutes to increase the success rate for the IR.[11]Accordingly, in the current case forceps extraction was done and moist saline soaked gauze piece was used to hold the tooth instead of forceps to prevent dryness of PDL fibers. Furthermore, the most important factor of extra-oral time was only 10 minutes.

Root resection methods and the length of resected portion of the root varied. Some authors suggest that the resection should be done 'as needed' and cavity preparation of at least 3mm should be done to enhance placement of root-end filling.[12]In the present case, apical third of the mesial root was resected because of the presence of broken instrument. Socket preparation before tooth re-insertion was done in our case. It was curetted apically and was irrigated with saline to rinse blood clot and any debris present in the socket. Asgary *et al* in 2014 reported that socket curettage should only be done for cases with periapical granuloma or extruded filling material.[13]

Splinting of the tooth after intentional replantation is a controversial thing to do. Many authors suggest that splinting should only be done in case of gross instability[12]; others suggest that it should be done in all cases to support periodontal tissues.[14]it was suggested that splinting should be done with the flexible material to allow physiologic tooth movement. Different materials used for splinting ranged from thin wires no greater than 0.3–0.4 mm to sutures and periodontal dressings.[15]In the current case flexible splinting was done for 10 days with 0.4mm wire. The tooth was kept free of occlusal contacts during that time.

CONCLUSION

Intentional replantation with careful case selection is a successful, easy and reliable treatment option for hopeless cases. Proper case selection, atraumatic extraction, minimum extra-alveolar time and aseptic techniques during the procedure are the key factors for success of this procedure

Patient Consent: The consent was obtained from the patient for the publication of the case report.

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