

Case Report

Management of Endodontic Complication by Intentional Replantation

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Abstract: Complete cleaning and shaping of the root canal system is essential for success of endodontic treatment. Accurate measurement of working length and 3D obturation till the apical constriction is necessary for ensuring fluid tight seal. One of the disadvantages of overextended root canal obturations is post-operative pain. The treatment options in such cases are endodontic surgery to remove the extruded filling material or Intentional Replantation. This case report discusses the advantages of Intentional Replantation and the procedure involved in endodontic retreatment of a mandibular molar with this technique.

Keywords: dental operating microscope, endodontic retreatment, intentional replantation, mandibular molar, overextrusion, splinting

INTRODUCTION

Successful endodontic treatment requires thorough mechanical debridement and chemical cleansing of the entire pulp space. Thus, the importance of locating all radicular canals cannot be overemphasized. This needs to be followed by a three-dimensional, fluid tight seal of the root canal system with a suitable filling material. A satisfactory obturation entails a filling material that is restricted to the root canal, without extending to the periapical tissues or neighbouring structures [1]. Despite the inert nature of gutta percha (GP), an extruded cone can act as a source of mechanical irritation to the periapical tissues, promoting persistent chronic inflammation [2].

Retrieval of overextended GP via a non-surgical orthograde approach can prove to be quite challenging for a clinician. Where such methods fail, a more invasive approach may be warranted. While apical surgery is often opted for, intentional replantation is another procedure that merits consideration. It includes atraumatic extraction of the tooth in question, followed by a root end resection and filling, and reinsertion of the tooth into its socket [3]. It has largely been regarded as a 'last resort' to save the tooth but the past decade has shown rising interest in this procedure [4, 5].

The current case report describes the use of intentional replantation as a treatment modality in the management of a symptomatic endodontically treated mandibular molar with overobtured mesial and distal canals.

CASE REPORT

A 25 year old male patient presented to the Department of Conservative Dentistry and Endodontics with the chief complaint of throbbing pain in a tooth in the lower left back region of his jaw since one week. He gave a history of previous endodontic treatment regarding the same tooth, which had been carried out 3 years ago. Medical history was non-contributory. On intraoral examination, the mandibular left first molar (tooth number 36) was tender on vertical percussion. No permanent restoration or crown was present. There was no associated swelling, sinus tract or mobility, and probing depths were within normal limits. Radiographic examination revealed an obturated 36, with an overextension of GP in both mesial and distal roots by 1 and 2 mm respectively (Figure 1a). In addition, periapical radiolucency was seen with respect to both roots. A diagnosis of symptomatic apical periodontitis secondary to failed endodontic treatment was made. Nonsurgical endodontic retreatment was decided as the preferred treatment modality and the procedure along with the possible risks associated with the retrieval of the extended GP were explained to the patient. Informed consent was obtained.

Local anesthesia was administered with 2% lignocaine hydrochloride in 1:80,000 adrenaline (El-Ligno Adr, Elder Pharmaceuticals, Mumbai) and the tooth was isolated with rubber dam. The temporary restorative material was removed and the three previously obturated root canal orifices were exposed.

GP in the canals was removed with the aid of H files (Mani, Japan) and solvent (RC Solve, Prime Dental Products). GP in both mesial canals was removed completely, but the overextended material in the distal canal could not be retrieved despite repeated attempts (Figure 1b). Canals were irrigated with 5.25% sodium hypochlorite (Hyposept, Dortmund Labs, Mumbai) and 17% EDTA solution (Dent Wash, Prime Dental Products, Mumbai). Suspecting an additional canal, the pulp chamber floor was carefully examined under the dental operating microscope (Moller Wedel, Germany). A second distal canal was located lingual to the previous canal. All canals were cleaned and prepared using hand ProTaper files (Dentsply Maillefer, Ballaigues, Switzerland) and irrigation with EDTA and sodium hypochlorite. An aqueous based calcium hydroxide intracanal medicament (RC Cal, Prime

Dental Products) was placed in each canal and the tooth was temporized. The patient was recalled one week later and was asymptomatic. Regarding the previously overextended GP in the distobuccal canal, the patient was informed about the same and two treatment options were presented and explained to him: apical surgery and intentional replantation. Due to the absence of any pain, a third option in the form of the 'wait and watch' approach was also suggested. The patient was unwilling to undergo any invasive treatment, and opted to 'wait and watch'. Canals were obturated using GP cones in a lateral condensation technique with epoxy resin based sealer (AH plus, Dentsply Gmbh, Germany) (Figure 1c) and the access cavity was restored with dental composite (SwissTec, Coltene, Switzerland). The patient was kept under observation.

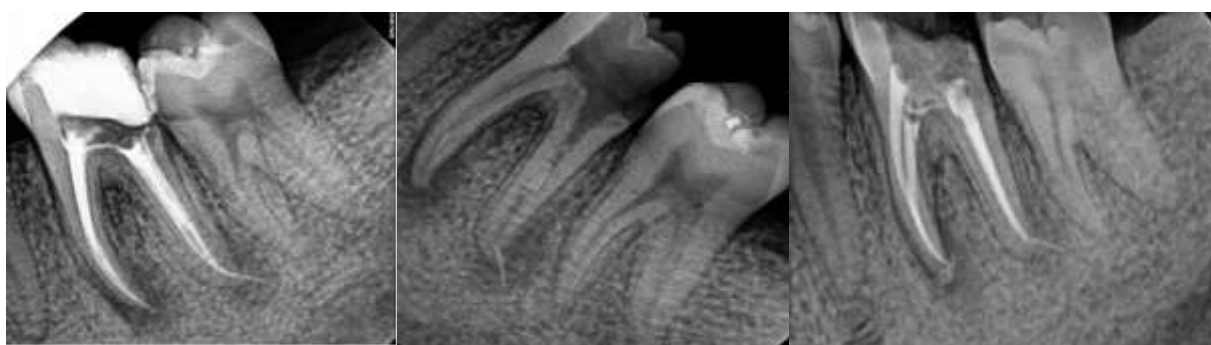


Fig-1: (a) Pre operative radiograph; (b) Removal of old GP; (c) Re obturation radiograph

After 3 months, the patient returned with the complaint of lingering pain with the treated tooth and wished to get the extruded GP removed. Between apical surgery and intentional replantation, the patient opted for the latter treatment modality. In the next appointment, tooth 36 was extracted atraumatically. The tooth was rinsed gently with physiologic saline and was held by the crown with saline-soaked gauze throughout the procedure (Figure 2a). The GP was seen extruding out of the distal root end and resection of the root end was done. A retrograde cavity was prepared with a no. ½ round bur (Mani, Japan) at low speed with copious saline irrigation and was filled with MTA (MTA Angelus, Londrina, Brazil). Surgical curettes were used to remove the periapical granulation tissue from the socket without damaging the socket walls. The entire extraoral procedure lasted 5 minutes. The socket was

rinsed gently with saline and the tooth was replanted (Figure 2b). Splinting of the tooth with the adjacent 35 and 37 was done with fibre-reinforced composite (Ribbond Inc., Seattle, Washington). The patient was given oral hygiene instructions and asked to rinse with 0.12% chlorhexidine gluconate solution twice daily for one week. Prophylactic antibiotics were also prescribed for a week.

Three weeks later, the splint was removed and the tooth appeared to be stable in its socket, without any signs of pathologic mobility. Patient had no pain or discomfort during this period. At the 1 year follow up, the patient remained asymptomatic and the intraoral periapical radiograph showed healing of the periapical lesion around both root apices (Figure 2c).



Fig-2: (a) Extracted tooth with extruded GP; (b) Re implanted tooth; (c) 1 year recall radiograph

DISCUSSION

Witherspoon *et al* [6] have stated that the failure to locate and treat an additional canal is the most common basis for an endodontic retreatment. In an Indian population, Chourasia *et al* [7] have reported a 36% occurrence of a second distal canal in mandibular first molars. Magnification using loupes or a dental operating microscope serves to be extremely helpful in the location of these missed orifices, along with the use of specialized instruments such as the DG16 explorer.

In addition to the missed canal, the current case was complicated by the presence of extruded GP in both roots. Case reports have documented complications secondary to the overextension of filling material. These have ranged from transient postoperative pain to more severe complications such as destruction of the periapical bone and paresthesia [8].

While a general success rate of 85-95% has been reported for root canal treatment, these numbers are lowered to 76% in overobturated cases [9]. The response of the periapical tissues to the canal obturation material is largely dependent on the unpredictable interaction between materials and host defences [10]. In the present case, the extruded GP could have acted as a foreign body producing chronic inflammation in the patient's periapical tissue thereby preventing satisfactory healing and acting as a cause of persistent pain to the patient. Inability to retrieve the extruded material non-surgically necessitated the use of a more invasive method. Apical surgery in mandibular posteriors is complicated by the presence of a thick buccal cortical plate, difficult intraoral access and proximity of the teeth to important anatomical structures such as the inferior alveolar canal and the lingual nerve.

Intentional replantation is not a novel procedure. As early as 1712, its use has been described by Pierre Fauchard [11]. Over time, its indications have expanded to include several clinical scenarios, such as failed root canal treatments, developmental anomalies, anatomic limitations, difficulties in access, accidental exarticulation, patients with objections to surgery and

trismus [12]. Torabinejad *et al* in their systematic review and meta-analysis showed intentional replantation to have a success rate of 88% [13].

In this case, the decision to opt for intentional replantation was further facilitated by the root anatomy. Straight roots enable an atraumatic extraction with very low chances of root fracture; an extremely important consideration in posterior teeth. The main concerns associated with the procedure are replacement resorption and ankylosis [14]. Maintenance of the viability of periodontal ligament (PDL) cells is essential to minimize these complications [15]. For this reason, use of elevators during extraction was avoided and the beaks of the forceps were kept coronal to the cement-enamel junction. Further, the prognosis of the procedure is directly affected by the amount of extraoral time taken [16]. Drying out of PDL cells with delays of 8 minutes or more in replantation increases the chances of bony ankylosis [17]. Thus the extraoral time was kept as short as possible. This short duration also ensured that application of root biomodification agents such as citric acid, tetracyclines and enamel matrix derivatives was not necessary. Furthermore, replantation of teeth sealed with root end filling materials has shown higher success rates [18]. Thus, a class I retrograde cavity was prepared and sealed with white MTA.

The use of a semi-rigid splint was preferred since it does not hamper physiologic mobility, further decreasing chances of ankylosis. In addition, fibre-reinforced splints offer the advantage of increased strength and fracture toughness which are particularly desirable properties in the mandibular molar region.

CONCLUSION

This case report describes the successful use of intentional replantation for the treatment of a symptomatic endodontically treated mandibular molar. With proper case selection and meticulous execution of treatment protocols, it can be considered a suitable treatment option with predictable outcomes.

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