

Intentional Replantation for the Management of Endodontic Complications

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Abstract:

Background: The root canal system must be thoroughly cleaned and shaped in order for endodontic treatment to be successful. To ensure a fluid-tight seal, precise measurement of the working length and 3D obturation up to the apical constriction are required. Post-operative discomfort is one of the drawbacks of overextended root canal obturations. Intentional Replantation or endodontic surgery to extract the extruded filling material are the available therapeutic options in such situations. The benefits of Intentional Replantation are explored in this case study, along with the steps involved in endodontic retreatment using this method on a mandibular molar.

Case report: The patient, a male 25-year-old, arrived at the Department of Conservative Dentistry and Endodontics complaining of a throbbing pain in a tooth located in his lower left rear region of his jaw that had been there for a week. An obturated 36 was discovered by radiographic evaluation, with GP overextended by 1 and 2 mm in the mesial and distal roots, respectively. Furthermore, periapical radiolucency was observed for both roots. The cause of the symptomatic apical periodontitis was determined to be a failed endodontic procedure. Nonsurgical endodontic retreatment was done to be the best course of action.

Conclusion: The successful application of intentional replantation to treat a mandibular molar that was symptomatic following endodontic therapy is described in this case report. If cases are properly selected and treatment protocols are strictly adhered to, it can be considered a successful therapy choice with predictable outcomes.

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

Background

Thorough mechanical debridement and chemical cleaning of the whole pulp area are necessary for endodontic treatment to be successful. It is therefore crucial to locate each and every radicular canal. A three-dimensional, fluid-tight closure of the root canal system using an appropriate filler substance must come next. A filling material that is contained within the root canal and does not penetrate the periapical tissues or surrounding structures is necessary for a proper obturation [1]. Gutta percha (GP) is inert, but an extruded cone can cause mechanical irritation to the periapical tissues, which can lead to chronic inflammation that lasts a long time [2].

For a clinician, retrieving an overextended GP using a non-surgical orthograde method can be very difficult. If these approaches don't work, a more intrusive strategy might be necessary. Although apical surgery is frequently chosen, deliberate replantation is an additional treatment that should be

taken into account. It entails removing the problematic tooth without using force, filing it, resecting the root end, and then replacing the tooth in its socket [3]. Although it has traditionally been thought of as a "last resort" to save the tooth, interest in this surgery has increased over the last ten years [4, 5].

Intentional replantation is used as a treatment method in the current case report to address a mandibular molar that is symptomatic after endodontic treatment and has overobturated mesial and distal canals.

Case report

The patient, a male 25-year-old, arrived at the Department of Conservative Dentistry and Endodontics complaining of a throbbing pain in a tooth located in his lower left rear region of his jaw that had been there for a week. He described the three-year-old endodontic treatment that had been performed on the same tooth in the past. Medical background did not play a role. The mandibular left first molar (tooth number 36) was tender to vertical percussion upon intraoral examination. There was no crown or permanent restoration in place. Probing depths were within normal ranges, there was no related edoema, and there was no movement or sinus tract swelling. An obturated 36 was discovered by radiographic evaluation, with GP overextended by 1 and 2 mm in the mesial and distal roots, respectively (Figure 1a). Furthermore, periapical radiolucency was observed for both roots. The cause of the symptomatic apical periodontitis was determined to be a failed endodontic procedure. The patient was informed of the process and any potential hazards related to the retrieval of the extended GP after nonsurgical endodontic retreatment was determined to be the best course of action. Consent was acquired with knowledge.

The tooth was separated using a rubber dam, and local anaesthesia was applied using 2% lignocaine hydrochloride in 1:80,000 adrenaline (El-Ligno Adr, Elder Pharmaceuticals, Mumbai). The three previously obturated root canal orifices were visible after the temporary restorative material was removed.



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

With the use of H files (Mani, Japan) and solvent (RC Solve, Prime Dental Products), GP in the canals was eliminated. Complete removal of GP was achieved in both mesial canals; however, repeated attempts to retrieve the overextended material in the distal canal proved unsuccessful (Figure 1b). 5.25% sodium hypochlorite (Hyposept, Dortmund Labs, Mumbai) and 17% EDTA solution (Dent Wash, Prime Dental Products, Mumbai) were used to irrigate the canals. The pulp

chamber floor was closely inspected under the dental operating microscope (Moller Wedel, Germany) since there was a suspicion that there might be another canal.

Lingual to the preceding canal was a second distal canal. Using hand ProTaper files (Dentsply Maillefer, Ballaigues, Switzerland) and irrigation with EDTA and sodium hypochlorite, all canals were cleaned and prepped. Each canal was filled with an aqueous-based calcium hydroxide intracanal medication (RC Cal, Prime Dental Products), and the tooth was temporised. A week later, the patient was recalled and had no symptoms.

The patient was informed about the overextended GP in the distobuccal canal, and two treatment options—apical surgery and purposeful replantation—were provided and discussed with him. Another option, the "wait and watch" method, was also proposed because there was no pain. The patient chose to "wait and watch" rather than receive any invasive therapy.

In a lateral condensation approach, canals were obturated using GP cones and epoxy resin-based sealant (AH plus, Dentsply GmbH, Germany) (Figure 1c). Dental composite (SwissTec, Coltene, Switzerland) was used to repair the access cavity. The patient was monitored closely.

Three months later, the patient came back complaining of pain that persisted in the treated tooth and requesting the extruded GP be removed. The patient chose deliberate replantation over apical surgery as their course of treatment. At the following visit, tooth number 36 was painlessly pulled. Throughout the process, saltwater-soaked gauze was used to hold the tooth by the crown as it was gently cleaned with physiologic saline (Figure 2a). Resection of the root end was performed, and the GP was observed protruding out of the distal root end. A retrograde cavity was filled with MTA (MTA Angelus, Londrina, Brazil) after it was formed at a low pace using a no. 1/2 round bur (Mani, Japan) and abundant saline irrigation.

Without causing any harm to the socket walls, the periapical granulation tissue was extracted from the socket using surgical curettes. Five minutes were spent on the full extraoral treatment. The tooth was replaced after the socket had been gently cleaned with saline (Figure 2b). Fiber-reinforced composite was used to splint the tooth with the neighbouring 35 and 37 (Ribbond Inc., Seattle, Washington). The patient was instructed to rinse with 0.12% chlorhexidine gluconate solution twice a day for a week, along with other oral hygiene guidelines. Additionally, a week's worth of preventive antibiotics were administered.

When the splint was taken out three weeks later, the tooth looked to be secure in its socket and showed no symptoms of pathologic movement. The patient didn't experience any pain or discomfort at this time. The patient was still asymptomatic at the one-year follow-up, and the intraoral periapical radiograph revealed that the periapical lesion surrounding both root apices had healed (Figure 2c).



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

Discussion

According to Witherspoon et al. [6], the most frequent reason for an endodontic retreatment is the inability to identify and treat a second canal. According to Chourasia et al. [7], 36% of mandibular first molars in an Indian population had a second distal canal. In addition to the use of specialised equipment like the DG16 explorer, magnification with loupes or a dental operating microscope is very helpful in locating these missing orifices.

The current situation was exacerbated by the presence of extruded GP in both roots in addition to the missing canal. Complications resulting from the overextension of filler material have been recorded in case reports. These have included everything from mild postoperative discomfort to more serious issues like paresthesia and periapical bone disintegration [8].

Although reports of root canal therapy generally show a success rate of 85–95%, in cases when the opening is overobtured, this figure drops to 76% [9]. The erratic interplay between the materials and host defences determines how the periapical tissues react to the canal obturation material [10]. In this instance, the extruded GP may have functioned as a foreign body causing persistent inflammation in the patient's periapical tissue, impeding adequate healing and giving rise to the patient's ongoing pain. Because the extruded material could not be recovered non-surgically, a more invasive technique had to be used.

The thick buccal cortical plate, challenging intraoral access, and close proximity of the teeth to significant anatomical systems including the lingual nerve and inferior alveolar canal hinder apical surgery in mandibular posteriors.

Replanting with intention is not a new technique. Pierre Fauchard [11] has described its use as early as 1712. Its indications have grown over time to cover a variety of clinical situations, including individuals who have surgical reluctance, developmental abnormalities, anatomical restrictions, access issues, unintentional exarticulation, patients who oppose to surgery, and trismus [12]. In their comprehensive review and meta-analysis, Torabinejad et al. found that purposeful replanting had an 88% success rate [13].

The root anatomy in this instance further supported the decision to choose deliberate replanting. An atraumatic extraction with minimal risk of root fracture is made possible by straight roots, which is a crucial factor to take into account for posterior teeth. Replacement resorption and ankylosis are the two main issues with the process [14]. To reduce these problems, it is crucial to maintain the viability of periodontal ligament (PDL) cells [15]. Because of this, forceps beaks were kept coronal to the cement-enamel junction and lift use was avoided during extraction. Furthermore, the length of extraoral time required has a direct impact on the procedure's prognosis [16].

Bony ankylosis is more likely when PDL cells dry down and replantation is delayed by at least eight minutes [17]. As a result, the extraoral period was minimised. Additionally, because of its brief duration, there was no need to apply root biomodification agents such as tetracyclines, citric acid, or derivatives of enamel matrix. Moreover, there has been evidence of increased success rates in the replantation of teeth sealed with root end filling materials [18]. Consequently, white MTA was used to prepare and seal a class I retrograde cavity.

Because semi-rigid splints do not impair physiologic motion, they are chosen as a means of reducing the risk of ankylosis. Additionally, the benefits of fiber-reinforced splints include enhanced strength and fracture toughness, which are especially advantageous qualities in the mandibular molar region.

Conclusion

This case study details the effective use of deliberate replantation to treat a mandibular molar that was symptomatic after endodontic therapy. It can be regarded as an effective therapy option with predictable results if cases are carefully chosen and treatment protocols are followed to the letter.

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