

Management of Extruded Gutta Percha by Intentional Replantation: A Case Report

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Abstract: Persistence of bacterial infection after root canal treatment and presence of preoperative periapical rarefaction are the key reasons of root canal treatment failure. Endodontic failure could occur due to incomplete obturation, root resorption/ perforation, grossly overfilled canals and broken instruments. When non-surgical retreatment and apical surgery fail to treat the periapical pathology, intentional replantation may be considered as a treatment modality with a success rate of 91% that may be attributed to superior root-end filling materials and innovations in endodontic surgery. This case report highlights the successful outcome of Intentional Replantation in a complex case with poor prognosis.

Keywords: Intentional replantation; Case report; MTA; Extruded guttapercha; Iatrogenic error

1. Introduction

Elimination of bacteria from the root canal system holds the key to a fruitful endodontic treatment. The primary determining factor to achieve this and to prevent imminent invasion of bacteria is a methodical and scrupulous technique.^[1]

The primary objective of endodontic treatment is to prevent and intercept pulpal/periradicularpathosis and to preserve the natural dentition when affected by pathosis. (Treatment Standards, American Association of Endodontists)

When these measures are taken in consideration, success rate has been shown to be as high as 94%.^[2] Endodontic failure could occur due to incomplete obturation, external root resorption, root perforation, coexistent periodontal-periradicular lesions, grossly overfilled or overextended canals and broken instruments.

Occurrence of such errors can produce dismal consequences. Certain errors have undoubtedly been revealed to have a significantly negative impact on the final outcome. Similarly, overfilling of the canals also contributes to failure and has been shown to reduce success rate to as low as 76%.^[3]

Ideally, the filling material and the endodontic instruments should be limited to the root canal without extending to the periapical tissues or other neighboring structures. Filling material, broken file, and gutta-percha extruded in the periapical area cause a foreign body reaction to the connective tissue. Depending on the organism's immune response, the connective tissue tends to absorb the foreign body or more frequently, surrounds it with a fibrous capsule.

The prognosis for an endodontically treated tooth with overfilling depends on the response of the periradicular tissue to the canal obturation material, which is a consequence of the complex and an unpredictable interaction between the materials and the host defenses.^[4]

When non-surgical re-treatment is unfavorable, treatment includes apical surgery or Intentional replantation. Apical surgery has certain disadvantages over Intentional Replantation such as risk to adjacent anatomic structures such as inferior alveolar canal and maxillary sinus, difficulty in achieving isolation, more invasive, prolonged time for healing etc.

Intentional replantation is the intentional removal of a tooth and its reinsertion into the socket after endodontic manipulation or obturation of the canals or both. (Grossman 1966)^[5]

Weine has stated that intentional replantation is only indicated when all other endodontic nonsurgical and surgical treatments have been performed and failed or were deemed impossible to perform.

According to AAE, Intentional Replantation is indicated in following conditions: Persistent periradicularpathosis following endodontic treatment, Nonsurgical retreatment is not possible/ has unfavorable prognosis, Periradicular surgery is not possible/ involves high risk to adjacent anatomical structures, Tooth presents an opportunity for removal without fracture, Tooth has an acceptable periodontal status prior to replantation and vertical root fracture.

Contraindications include Teeth with flared or moderately curved roots, Presence of periodontal disease, Immunocompromised patients, Teeth with non-restorable caries, Teeth that are amenable to non-surgical and conservative treatment.

2. Case Report

A 24 yr old male presented to the Department of Conservative Dentistry and Endodontics, I. T. S Dental College, Hospital and Research Centre, Greater Noida for evaluation of tooth 36. His chief complaint was "pain in lower left back tooth on biting". His medical history was non-contributory, no allergies or medications. Dental history showed endodontically treated 36. Clinical examination

revealed pain to percussion and palpation. Re-RCT was attempted with respect to the offending tooth.

Periodontal examination revealed mobility, probing depths and gingival tone within normal limits. Radiographic examination revealed extruded gutta-percha seen with respect to 36 [Fig.1 (A)]. Crestal bone levels appeared to be within normal limits.

The patient was presented with the treatment options of extraction followed by a dental implant/ bridge or extraction with no replacement. Endodontic retreatment and implant/bridge therapy were declined by the patient. Surgical endodontics was contra-indicated because of proximity to the inferior alveolar canal. After understanding risks and benefits of all treatment options, the patient made an informed decision to have the tooth removed.

Upon the patient's decision to have the tooth extracted, the treatment option of intentional replantation with associated risks and benefits was offered. The patient accepted.

3. Procedure

Two operators were present for the procedure. Before the procedure, the patient was asked to rinse with chlorhexidinegluconate 0.12%. The patient was prepared for surgery and profound inferior alveolar and lingual nerve block anaesthesia was achieved with 2% lidocaine containing 1: 100, 000 epinephrine.

The tooth was luxated slightly to gain access to the crown portion apical to the cervical margin to prevent any damage to the tooth and avoid the risk of fracture. The tooth was extracted with minimal trauma through the use of forceps.

The tooth was held by forceps and was continuously moistened using saline. Ultrasonic scaling was done to remove all granulation tissue and tartar to improve periodontal healing and prognosis of the tooth.

The roots of the tooth were evaluated for vertical root fractures.

The apices of the two roots were retro prepared using a high speed handpiece and a small straight fissured diamond but removing 3 mm of gutta-percha and debris.

The canals were sealed with MTA Angelus (Angelus, Londrina, Brazil) as root end filling material and burnished. [Fig. I (B)]

As the tooth was being treated, operator #2 lightly curetted the apical portion of the socket without disturbing the socket walls coronal to the apex and successfully retrieved the extruded guttapercha. [Fig. II (B)]

The tooth was replanted into the socket within 15 minutes from extraction. Since the roots of the tooth were curved, it aided in stabilization, thus ruling out the need for splinting. It has been cited in literature that prolonged periods of splinting increase the likelihood of ankylosis and replacement resorption.

Post-operative radiograph was taken and the post operative instructions were given as follows: soft diet for 2 weeks, antibiotics for 5 days, ketorolac tromethamine dispersible tablets 10 mg as required, chlorhexidinegluconate mouth rinses 0.12% for 1 week.

Patient was recalled in 1 week, 1 month, 3 months, 6 months and 12 months. At 1 week, the soft tissues appeared pink-red with moderate inflammation and mild pain on biting.

At 1 month, the patient showed minimal soft tissue inflammation and pain on biting had diminished. Tooth mobility was normal. Healing was uneventful on 3, 6 and 12 months respectively. Clinical examination revealed no response to percussion or palpation, soft tissue probing depths were normal. Radiographic examination revealed no widening of the periodontal ligament space. [Fig. I (C, D) and Fig. II (A)]

Patient was completely asymptomatic with the tooth returned to function within 10 days.

VAS scoring on a scale of 1-10 of pain perception showed a score of 10 preoperatively. On 1 week and 1 month, the score was 6 and 1 respectively. On 3, 6 and 12 months, the score was consistent at 0.

4. Discussion

According to the American Dental Association, overfilling by more than 2mm past the radiological apex represents a technical error ascribable to over-instrumentation, inadequate measuring, or a lack of an apical stop. Over-instrumentation, in particular, may extrude infected material contained in the canals beyond the apex, interfering, or impeding the healing process of the periapical tissue.

Guttapercha cones which had been extruded past the apices and subsequently examined under a scanning electron microscope, have demonstrated the presence of a "biofilm" on the cones. This "biofilm" allows undisturbed growth of the bacteria and renders them particularly resistant to the defenses of the host, and may be responsible for foreign body reactions. The consequences of overfilling can, therefore, result in infective periapical periodontitis caused by the transport of bacteria beyond the apex and an incomplete cleansing; foreign body reactions; and pain symptoms which are ascribable to irritative stimuli, even in the absence of radiological evidence.

There is no agreement, in fact, regarding the radicular level at which the treatment should reach, even though some meta-analyses have recognised that, over time, the best results for canal obturations occur when the gutta-percha arrives at 0-1 mm from the apex and, on the contrary, when considering measurements of greater than 1mm (above or below the apex), the results are less favorable.^[6]

Non-surgical re-treatment was the treatment of choice to remove the extruded root canal filling material. Failure to do so resulted in change of treatment plan to Intentional Replantation as the patient did not wish to get his tooth extracted.

Splinting should be done only if required. In the case reported, no splinting was required as primary stability was achieved on replanting the tooth and to allow physiologic mobility. Splinting for long periods of time, on the other hand, increase the risk of ankylosis and replacement resorption. To achieve minimal extra-oral time, this treatment was less than 15 min.^[7] The success of intentional replantation is likely dependent upon a minimally traumatic extraction, short extra-oral time with copious irrigation and meticulous instrumentation as well as carefully controlled postoperative patient compliance. Visual inspection demonstrated adequate marginal adaptation at the apex and #36 healed uneventfully.

The retrograde seal used in this treatment was MTA. Data that has been published subsequent to the procedure described here suggest that MTA-Angelus shows better marginal adaptation than Super-EBA and Vitremer.^[8]

In the first investigation on MTA as a root-end filling material in dogs, Torabinejad et al showed that the material promotes cementum formation in 23% of specimens 2–5 weeks after periapical surgery. More than 80% of the root-end cavities filled with MTA showed cementum deposition 10–18 weeks after surgery.^[9]

Baek et al compared Super EBA, amalgam, and MTA in dogs' teeth as root-end filling materials. MTA showed the most favorable results in terms of degree of polymorphonuclear infiltration, bone maturation, and cementum formation.^[10]

Studies show that MTA produces favorable results when it is used as a root-end filling material in terms of lack of inflammation, presence of cementum and hard tissue formation.^[8, 9]

VAS scoring was done for the assessment of pain to compare the pre-operative and post-operative pain of the patient. The scoring done at baseline, 1 week, 1 month 3 months, 6 months and 12 months follow up show a decline in pain with readings 6, 5, 2 and subsequently reaching nil at the 3, 6, 12 month mark.

5. Conclusion

Intentional replantation is an effective treatment modality when traditional endodontic procedures or apical surgery are unsuccessful. This case report with 1 year follow up shows that Intentional replantation of teeth can be a good alternative for treating endodontic mishaps such as removal of overextended filling material beyond root apex.

Evidence- based practices suggest that it should no longer be considered as a final treatment modality, but in fact as a conventional treatment. Longer follow ups are required to confirm these favorable outcomes.

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Figure Legends

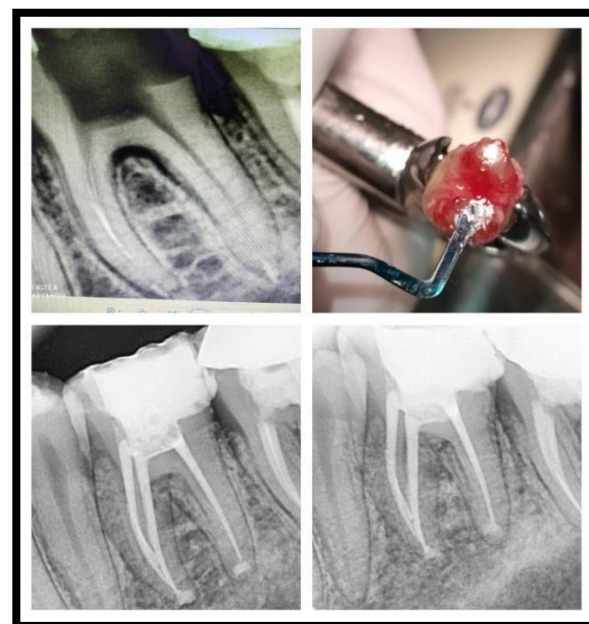


Figure 1: (A) Pre-Operative Xray (B) MTA Condensation (C) Baseline Xray (D) 3 month follow up

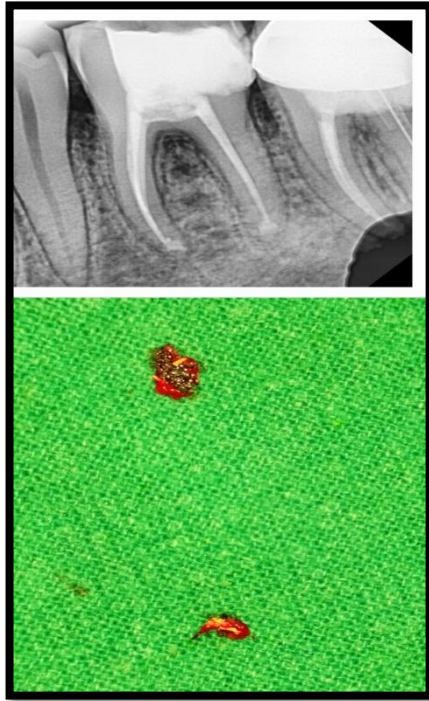


Figure 2: (A) 6 month follow up (B) Curretted Extruded Guttapercha and Granulation tissue