



## “Intentional Reimplantation of a Maxillary Central Incisor with Incomplete Endodontic Treatment Along With Iatrogenic Root Perforation: A Case Report”

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### ABSTRACT

Intentional reimplantation is an accepted endodontic procedure for the treatment of teeth in which conventional endodontic treatment is not possible or has failed beyond retreatment.<sup>1</sup> The technique of intentional reimplantation can provide a second chance to save teeth destined for extraction.<sup>2</sup>

This article presents a case of intentional reimplantation of a maxillary central incisor with iatrogenic root perforation on the labial side resulting from a failed attempt to locate the root canal. Follow-up clinical and radiographic evaluation at twelve months revealed successful periodontal healing and absence of symptoms. This report highlights intentional reimplantation as an alternative treatment modality to implant in order to save a tooth with a hopeless prognosis due to compromised access to the root canal system.

**KEYWORDS:** Intentional reimplantation, Root perforation, MTA, Atraumatic extraction.

### I. INTRODUCTION

Intentional reimplantation is the deliberate extraction and immediate replacement of a tooth back into its own socket, with the objective of sealing the root canal from all directions (apical and lateral) while the tooth is out of the socket, which is impossible otherwise.

Although it should be considered a last resort, recent literature<sup>3</sup> suggests that the success

rates are favourable with proper case selection, atraumatic extraction with minimum extraoral time to maintain the viability of the periodontal ligament and the use of biocompatible materials such as MTA, Biodentine, etc., for sealing.<sup>4-5</sup>

Root canal treatment may be challenging because of root canal calcification, frequently leading to root perforations with accompanying complications if not monitored carefully. When nonsurgical endodontic treatment/ retreatment is not feasible or has failed, intentional reimplantation offers a conservative and effective alternative rather than extracting the tooth and placing an implant.

Intentional reimplantation helps in precise inspection, canal negotiation, retrograde preparation, and sealing under direct vision. However, we must ensure that the periodontal ligament is preserved and that extraoral time is minimal.

### II. CASE REPORT

A 26-year-old female patient presented to the Department of Conservative Dentistry and Endodontics with the chief complaint of pain in the upper front tooth persisting for approximately 15–20 days.

The history of present illness revealed that the tooth had previously undergone endodontic intervention at a private clinic as part of a prosthodontic rehabilitation to close the space left



by a missing central incisor (Fig. A). Clinical Examination revealed an access cavity with an unfilled canal and a perforation defect on the labial aspect of the mid-root region (Fig. B).

The root canal was located and instrumented up to a 50k file, bypassing the buccal perforation (Fig. C).

An initial attempt at perforation repair, as well as the canal obturation with mineral trioxide aggregate (MTA), was undertaken. Radiographic evaluation revealed extrusion of MTA via the labial perforation, resulting in inadequate obturation (Fig. D). Keeping in mind the persistent possible symptoms, the compromised canal anatomy and the extrusion of MTA through the buccal defect, apicectomy with retrograde sealing was planned and explained to the patient, but the patient refused the surgery. So, the intentional reimplantation was proposed as a last resort to save the tooth for which the patient agreed.

Following informed consent, the tooth was atraumatically extracted under local anaesthesia (Fig. E, F) and immediately immersed in saline to maintain viability of the periodontal ligament. The extraction socket was irrigated with saline and 0.12% chlorhexidine. Inspection of the extracted tooth allowed confirmation of the labial perforation with MTA extruding from the perforation and identification of the apical foramen. Apical retrograde access was established with files, reconfirming canal patency (Fig. G). Retrograde

canal preparation and obturation were accomplished using gutta-percha, and apically sealed with MTA to enhance apical sealing (Fig. H, I). Excess MTA was removed from the buccal perforation, and the perforation was properly sealed (Fig. J). The tooth was then reimplanted into the extraction socket (Fig. K, L) and stabilised using a composite splint (Fig. M, N). Postoperative radiographs confirmed adequate obturation and appropriate repositioning of the reimplanted tooth. The extraoral time was limited to approximately 15 minutes.

Postoperative management included the administration of systemic antibiotics and analgesics, supplemented with oral hygiene instructions. The patient was scheduled for periodic recall and reviews at 1, 3, 6 and 12 months postoperatively, following which the patient was asymptomatic at one-month follow-up, and clinical evaluation indicated satisfactory healing. At three-months and six-months recall, radiographic evidence supported ongoing bone regeneration and absence of periapical pathology. Final prosthetic rehabilitation was performed by the prosthetic department. At the end of twelve-months recall (Fig. O, P), the tooth remained functional, with normal periodontal probing depths, and no radiographic evidence of root resorption or ankylosis.





### III. DISCUSSION

Intentional reimplantation (IR) has emerged as a reliable procedure when traditional endodontic treatment is either not feasible or has previously failed. While it is often considered a last-resort intervention, numerous studies now support its effectiveness, if performed as per the guidelines, reporting success rates between 88% and 95%.<sup>6</sup>

Filho et al. stated that intentional replantation could be indicated correctly as an alternative treatment for cases where conservative endodontic therapy or surgical treatment is contraindicated.<sup>7</sup>

The aim of this conservative treatment is to save the natural tooth and avoid the need for an implant or a bridge. This procedure provides a final chance to preserve the natural tooth for its function and aesthetics.

Critical factors contributing to the success of IR include:

- **Minimal extraoral time** ( $\leq 15$  minutes), which is essential to preserve periodontal ligament cell viability.<sup>8,9</sup>
- **Atraumatic extraction and preservation of the extracted tooth in a moist nonwoven soft gauze in a normal saline solution** to prevent damage to PDL fibres.<sup>6,10</sup>
- **Non-rigid splinting**, which permits physiological movement and supports healing.<sup>11</sup>

Most investigators agree that the shorter the extraoral time before reimplantation, the better the prognosis. Other factors determining prognosis include survival of periodontal ligament cells on the root surface and gentle atraumatic extraction with minimal manipulation of the socket. Extraction should be performed using the appropriate forceps.<sup>7</sup> The use of surgical elevators is contraindicated. The tips of the forceps should not exceed the cemento-enamel junction to avoid any unnecessary trauma to the periodontal ligament.

The patient should avoid chewing on the tooth during the healing period to avoid any excessive mastication forces that might affect the healing process. As indicated, splinting of the tooth for 2 weeks can enhance healing and support the tooth when mobility is present.<sup>7</sup>

A characteristic feature of failures found in cases of reimplantation of both intentional reimplantation and traumatic avulsion cases is the process of resorption. This occurs as a result of a degenerated or missing periodontal ligament or

necrotic cementum, either of which, in the absence of infection, can result in ankylosis or replacement resorption.<sup>12</sup> Thus, it is essential to preserve and maintain the vitality of PDL by atraumatic extraction, delicate handling of the tooth using a good viable medium as well as the socket, since it is crucial for the healing and prevention of ankylosis and root resorption complications.<sup>7</sup>

Further, in Intentional reimplantation procedures, failures are associated with periapical inflammatory resorption<sup>12</sup> as a result of infected pulpal tissue in the apical third area, inaccessible to conventional root canal negotiation. Extensive bone surgeries for the retrograde approach for apical preparation and sealing may result in pain and increased swelling. Moreover, the surgical approach may be contraindicated because of anatomical complications. In such hopeless cases, intentional reimplantation circumvents these problems and gives a chance to save the tooth.

In the current case, the root canal initially could not be negotiated to the full working length and had a buccal perforation because of an initial attempt by another dentist. We could negotiate and prepare the root canal by bypassing the buccal perforation up to 50k. But while attempting root canal filling and perforation repair with MTA, overextension of the material into the gingival tissues happened through the buccal perforation, leading to incomplete obturation, leaving the apical portion unobturated. Since the patient was not willing to undergo the apical surgery, the tooth reimplantation was planned.

This treatment plan provided direct extraoral access for careful inspection of the perforation defect and its proper sealing after removing the excess MTA, retrograde preparation of the root canal, obturation and sealing of the apex. This approach mirrors successful protocols reported in the literature where IR-enabled management of advanced external resorption, or buccal perforations in challenging anatomic scenarios.<sup>13</sup>

The strategic use of gutta-percha for retrograde canal obturation, accompanied by MTA placement at the perforation and apical preparation, provided a complete and biocompatible seal. This dual-material approach is well supported by prior case reports using MTA or Biodentine as retrofilling materials for reconstructing defects and promoting periradicular healing.<sup>14</sup> MTA has been accepted as one of the most suitable root-end filling materials used in surgical procedures for retroseal since it has long-lasting sealing ability and minimal leakage compared to other root-end filling materials. Moreover, it is biocompatible, has



antibacterial activity, and promotes cementogenesis.

Studies of intentionally reimplanted teeth versus reimplantation of accidentally avulsed teeth have shown that the survival time of reimplanted teeth is relatively short.<sup>12</sup> This can be attributed to the time lost before the patient reaches the dentist. In Intentional reimplantation cases, there is no loss of time. In addition, the survival time of IRS is longer (0.5 to 25.5 years) compared with avulsed reimplantation (1.5 to 3.0 years) when early manifestation of inflammatory or replacement resorption was a reason for failures.

In this case, a six-month follow-up revealed stable tooth function, absence of symptoms, intact periodontal ligament space, and no signs of ankylosis or external resorption—consistent with the success of the procedure, comparable to cases reported in the literature.

#### IV. CONCLUSION

While some authors view intentional reimplantation as a last-resort treatment, others regard it as a viable alternative modality to implant placement. This approach can be a predictable option and is recommended in careful case selection, where conventional treatment is either not feasible or has failed, or where periapical surgery is either contraindicated or declined by the patient.

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