



## MANAGEMENT OF ENDODONTICALLY FAILED TOOTH BY INTENTIONAL REPLANTATION – A CASE REPORT

### Dental Science

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### ABSTRACT

Intentional replantation treatment which is being followed for many years is considered as the last resort to save a natural tooth where all other treatment modalities have failed or not recommended. When standard treatment protocols are followed, good clinical and radiographic success can be expected. This article presents a case in which an endodontically failed tooth was intentionally replanted with successful one year follow up result.

### KEYWORDS

Intentional Replantation, Endodontically Failed Tooth, Extra Alveolar Time, Splinting.

### INTRODUCTION

Conventional root canal treatment which has high survival and success rate<sup>1</sup> is the treatment of choice for managing pulpal and periapical inflammation or infection. Persistent apical periodontitis following endodontic failure requires a nonsurgical retreatment following which periapical surgical procedure can be considered if the lesion does not resolve. However, apical surgery may be considered an unfavorable procedure when anatomic factors interfere with surgical outcome (eg, buccal plate thickness, proximity to anatomic structures such as the mandibular nerve, or inoperable sites such as lingual surfaces of mandibular molars)<sup>2,3</sup>. When nonsurgical retreatment and surgical treatments have an unfavorable prognosis or are risky and the patient wishes to make every attempt to save his tooth, intentional replantation can be considered as a last treatment option. A Meta analysis study published in 2015 determined a mean survival rate of 88% for intentionally replanted teeth<sup>4</sup>. As last resort intentional replantation can be considered as an alternative to tooth extraction for preserving the natural tooth, as a replanted tooth may also provide periodontal proprioception just like other natural teeth.

In the eleventh century AD, Abulcasis gave the first account of replantation and use of ligatures to splint the replanted tooth<sup>5</sup>. Grossman has defined intentional replantation as "A purposeful removal of a tooth and its reinsection into the socket almost immediately after sealing the apical foramina." He also stated that it is "the act of deliberately removing a tooth and following examination, diagnosis, endodontic manipulation, and repair, returning the tooth to its original socket to correct an apparent clinical or radiographic endodontic failure"<sup>6,7</sup>.

In this paper, intentional replantation has been successfully performed with one year follow up review for an endodontically treated teeth with persistent periapical lesion

### CASE REPORT

A 28 year old male reported to the department with persistent pain in relation to maxillary left central incisor. The patient history revealed that multiple endodontic therapies were performed elsewhere in relation to both maxillary central incisors. Patient had no history of any medical complications. Upon clinical examination it was found that the 21 (left maxillary central incisor) was tender to percussion. Soft tissue in relation to the upper incisors was normal. Preoperative radiographic examination revealed that root canal treatment in relation to tooth 11 and 21 had been previously initiated and canals were left unfilled. The periapical radiograph showed signs of a periapical

radiolucency indicating endodontic failure of maxillary left central incisor. (FIGURE 1&2).

Non surgical retreatment was started, but periapical lesion did not resolve even after 2 months and canals were wet indicating weeping canal due to persistent infection. Considering the failures of past attempted endodontic treatment procedures and patients willingness to retain the natural tooth, intentional replantation was considered. After risk and benefits were discussed with the patient, intentional extraction and replantation was decided as treatment plan. An informed consent was obtained from the patient.

Root canal treatment was completed in the maxillary incisors prior to intentional replantation to minimize extra oral time. Root canal access was regained in both the maxillary central incisor. The canals were properly shaped and cleaned with sodium hypochlorite and 17% EDTA. The irrigants were activated by sonic system (Micromega MM 1500). Final irrigation was done using 2% chlorhexidine solution following which obturation was done using cold lateral condensation technique. Following this Chlorhexidine rinse was carried out to control the oral microflora prior to procedure. Local anesthesia was administered. A luxator was used to luxate the left maxillary central incisor tooth within its socket, which was followed by an atraumatic extraction using forceps. Once the tooth was extracted atraumatically, it was rinsed using saline and placed in HANK's Balanced Salt Solution (HBSS). To avoid damage to the periodontal ligament, the tooth was held in crown portion with sterile wet gauze during the procedure and root end resection (approximately 3-4mm) was performed using high speed hand piece. Root end preparation (3mm) was done with ultrasonic tip and the root end filling was done using MTA (FIGURE 3). Before replantation the socket was gently curetted to remove granulation tissue taking care not to damage the periodontal ligament. It was taken care that the procedure was done in quick and precise manner so that the extra-oral time was less than 20 minutes.

The tooth was properly oriented into the socket and gentle pressure was applied. Patient was asked to bite on a piece of gauze for 10 mins following which fibre splinting with adjacent tooth was done using a composite ribbon and resin for a short period of 1 week. Occlusion was checked and post-operative radiograph was taken (FIGURE 5). After a week, tooth was checked for mobility, tenderness to percussion. As the tooth responded favourably splint was removed and permanent entrance filling was done. The patient was called for recall visits every 3 months thereafter. At third month recall visit the patient was free of clinical symptoms and six months periapical radiograph showed that

the periapical rarefaction had marked reduction in size. At the 12 months recall visit, the tooth was asymptomatic and a progressive healing of the lesion was evident (FIGURE 6).

## DISCUSSION

Intentional replantation, is a surgical procedure which is often regarded as the last treatment option by many clinicians, can be considered as a reliable and predictable procedure in an effort to retain natural teeth. In 1712 Pierre Fauchard, reported an Intentional Replantation done 15 minutes after extraction of teeth<sup>8</sup>. In 1778, Hunter believed that boiling the extracted tooth prior to replantation might help to remove the tooth disease<sup>9</sup>. Different investigators have reported the tooth surviving up to 20years after intentional replantation<sup>10,11</sup>. I. B. Bender ET AL followed 31 cases of intentional replantation of endodontically treated teeth and reported success rate of 80.6%<sup>12</sup>.

Intentional replantation is indicated in situations where previous endodontic treatment attempted to save a natural tooth has failed, or periapical surgical procedure is not feasible due to anatomic limitations or accessibility problem. When a fractured instrument is obstructing the root canal, when a perforation of the root is present that cannot easily be walled off, when the root canal is calcified or partly calcified making it impossible to properly instrument the root canal, when apical surgery would result in more removal of bone and cause a periodontal pocket, patient management is difficult and objection to periradicular surgery by patient, financial factors preclude conventional implant placement<sup>2,13,14</sup> and in case of chronic lesion, intentional replantation can be used as diagnostic tool to evaluate unsuspected pathosis like fracture or resorption. In conditions where the root has curved anatomy making atraumatic extraction difficult, a labial or buccal plate that is destroyed or missing and when tooth is periodontally compromised, intentional replantation is usually contraindicated<sup>2,13</sup>.

In 1955, Hammer stated that a healthy periodontal ligament is essential for reattachment and retention of replanted teeth and "an average 10 years life span could be expected when replantation was accomplished in a technically flawless manner.<sup>15</sup>" The success of intentional replantation treatment is mainly dependent upon the maintenance of aseptic conditions during the entire treatment procedure, atraumatic extraction, minimal manipulation of the periodontal ligament, short extra-oral time, meticulous instrumentation, minimal occlusal forces following replantation, as well as carefully controlled postoperative patient compliance<sup>2,4,12</sup>. The standard protocols are to be followed to avoid root resorption and ankylosis that may be observed within one to two month<sup>16</sup>. The most common causes of failure are external inflammatory resorption or replacement resorption and ankylosis caused by periodontal ligament damage<sup>13</sup>. The replacement resorption is influenced by the extraalveolar time and its role on periodontal ligament while the inflammatory resorption is caused by infection after an improper RCT<sup>17</sup>.

Maintaining the vitality of periodontal ligament cells plays a major role in the success of intentional replantation. The periodontal ligament attached to the root surface should be kept moist in saline, HBSS, or doxycycline solution for the entire time the tooth is outside the socket<sup>18</sup>. Studies have suggested that treating root surface before replantation with solutions such as tetracycline, citric acid or EDTA can enhance reattachment of the periodontal ligament on the socket wall<sup>19,20,21</sup>. The recommended extra oral dry time should not exceed more than 20 min<sup>13,22,23,24</sup>.

In this case report, for a patient who reported with persistent pain in relation to maxillary central incisors with history of repeated endodontic retreatment done in relation to that tooth, intentional replantation was considered as a last resort to save the tooth. After routine conventional root canal cleaning shaping and obturation procedure, root end was resected and retro filled with Mineral Trioxide Aggregate (MTA). Due to excellent properties like biocompatibility, minimal toxicity, mild periapical inflammation MTA was chosen as the retrograde filling material in this case<sup>25</sup>. A study done by Torabinejad et al has shown formation of cementum and periodontal ligament fibres adjacent to MTA used as root end filling material<sup>26</sup>. After retrograde filling, the tooth was repositioned inside socket and splinting was done. Splinting if necessary is usually done only for a short period of 1-2 weeks. On further recall visit at 3,6 and 12 months the patient was totally asymptomatic and radiograph showed signs of marked healing of periapical lesion.

## CONCLUSION

Intentional replantation procedure is a relatively simple procedure that gives the patient only minimal postoperative discomfort. In clinical condition where dental implant, nonsurgical retreatment or surgical treatment is not possible, intentional replantation may be a viable treatment option. With good case selection, application of proper technique and use of recent advances in bioregenerative material Intentional replantation can have a high success rate.



FIGURE 1 Pre Operative



FIGURE 2 Pre Operative Iopa

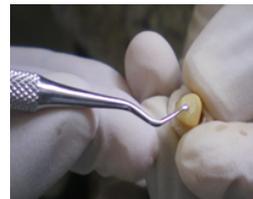


FIGURE 3 Retrograde Filling With MTA Replantation Into Socket



FIGURE 4:



FIGURE 5 X Ray After Replantation



FIGURE 6 IOPA - ONE YEAR Post-operative

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