

Intentional Reimplantation: The Light at the End of the Tunnel

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ABSTRACT

Background: Intentional reimplantation is a surgical procedure that has often been regarded as the last treatment option but with the right case selection and thorough knowledge about the indications and contraindications it can be the ideal treatment option for many cases where non-surgical root canal treatment or re-treatments have failed. In the present case on radiographic examination, there was a file separated beyond the apex with respect to 46, and the patient came in with persistent pain. Considering the anatomical limitations and the future prognosis of the tooth, intentional reimplantation was put forth as a treatment option after explaining the risks and limitations of the procedure to the patient. In the present case, after the root canal treatment, gentle and atraumatic extraction of the tooth was carried out followed by apicoectomy and appropriate root-end cavity preparation which was filled with MTA. The tooth was then reimplanted within 11 minutes and 13 seconds. An 8 month follow up X-ray revealed progressive healing of the tooth with no clinical symptoms.

Keywords: Reimplantation, root canal treatment, endodontics.

INTRODUCTION

Inflammation and infection of pulpal and periapical origin can be managed adequately by non-surgical root canal treatment. However, in certain cases, the periapical lesion and discomfort may persist even though non-surgical root canal treatment has been performed perfectly. (1) Amongst the various treatment options available to preserve the natural tooth, apical surgery is often considered the last resort to treat persistent periapical lesion in an endodontically treated or retreated tooth. (2).

Though apical surgeries have shown promising results, in the long run, it may be difficult to perform in certain cases due to anatomical obstacles such as the mental foramen or the mandibular canal. It can also pose to be a challenge in the case of molars because of the difficulty faced in attaining proper access. (3) Keeping all these

factors in mind, intentional reimplantation may be an alternative choice of treatment for some of these cases. It is always preferable to preserve the natural tooth; therefore, even though tooth reimplantation is considered as a treatment of last resort, it should be considered as a reliable and predictable procedure.

CASE REPORT

A 32-year-old male patient reported to the Department of Conservative Dentistry and Endodontics (D Y Patil School of Dentistry, Nerul, Navi Mumbai) with a chief complaint of persistent pain in the lower right back region of the jaw. He gave a history of root canal treatment initiated 6 months back. Radiographic examination revealed

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the presence of a separated file beyond the apex with respect to 46. (Figure 1)

The patient was advised to get the tooth extracted, but he did not want to lose the tooth. Due to the anatomical limitations and the position of the file beyond the apex, the patient was offered the alternative of intentional reimplantation and was appraised of its risks and limitations. He accepted this line of treatment and further procedures were then carried out. Cleaning and shaping of the tooth were initiated. The tooth was copiously irrigated with sodium hypochlorite and saline. The canals were then dried with paper points after which obturation (Figure 2) and post endodontic restoration was done (Figure 3). The tooth was kept out of occlusion, and the patient was then scheduled for an intentional reimplantation procedure.

Delicate luxation was done with an elevator which was followed by an atraumatic extraction using a forceps (figure 4 and 5). After extraction, the socket was left undisturbed to avoid damage to the socket wall and to preserve the periodontal ligament (Figure 6). The file was retrieved from the root end (Figure 7). The tooth was kept in a moist environment with the help of saline. Apicoectomy was done, which was followed by the apical preparation of the root end using an ultrasonic tip (E31D, NSK America Corp IL, Brasseler USA, Savannah GA) (Figure 8,9 and 10). MTA Angelus (Angelus, Londrina, PR, Brazil) was used as a retrograde filling material, and the tooth was reimplanted into the socket within 11 minutes 13 seconds (Figure 11,12 and 13).

The patient was asked to bite on a cotton roll for initial stabilisation and to control haemorrhage after which the tooth was splinted with a wire composite splint (Figure 14,15). The splint was removed in a week's time. The patient was recalled for a regular follow-up after one week, which was then followed by a 2 -week, 4- week and an eight-month follow up. The final 8-month follow-up revealed that the tooth showed no clinical symptoms along with progressive healing (Figure 16).

A temporary acrylic crown was placed on 46 after ten days, and the patient was advised to get a permanent crown on the same at a later date.

However, due to financial constraints, he opted to defer this treatment (Figure 17).



Fig 1: Pre-operative radiograph showing file broken beyond the apex

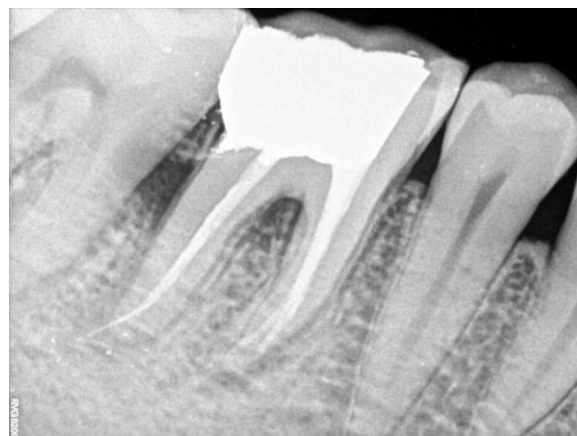


Fig 2: Obturation of the tooth.



Fig 3: Post endodontic restoration.



Fig 4: Extraction initiated.



Fig 5: Tooth out of the socket.



Fig 6: Socket after extraction.



Fig 7: File retrieved.



Fig 8: Apiseectomy initiated.

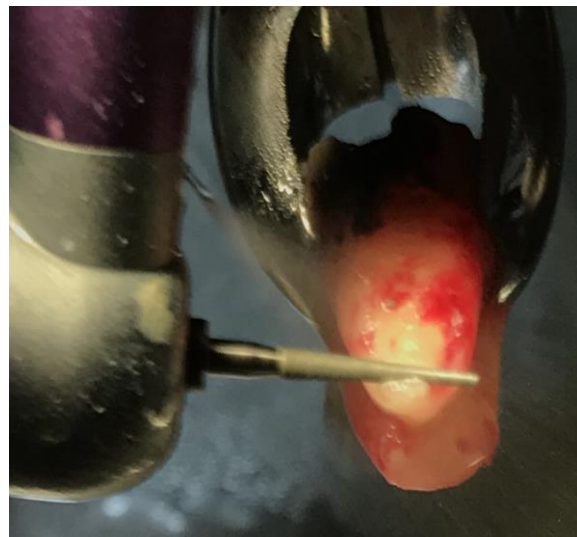


Fig 9: Apiseectomy initiated.

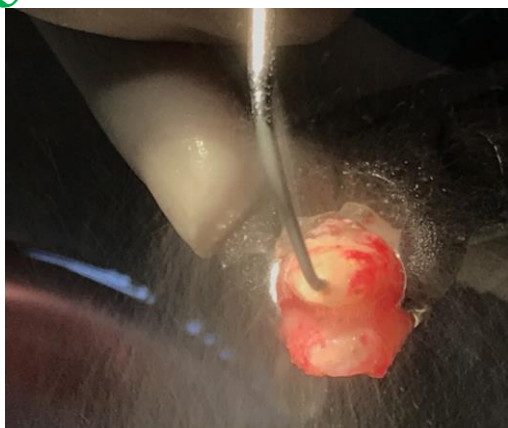


Fig 10: Root end preparation initiated with an ultrasonic tip.

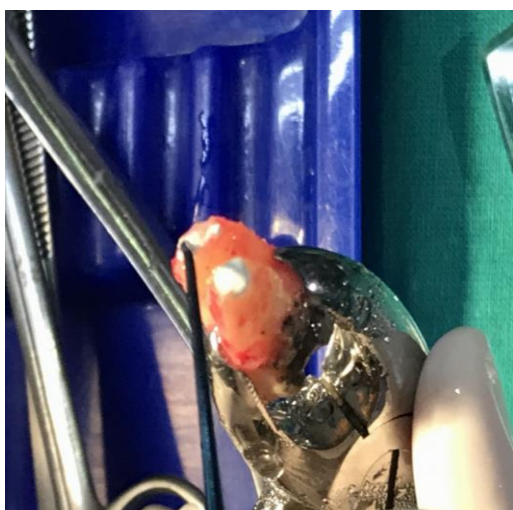


Fig 11: MTA placed at the resected root end.



Fig 12: Tooth reimplanted within the socket.

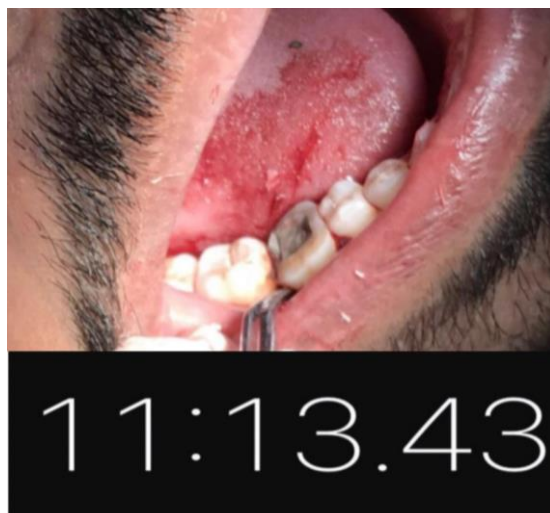


Fig 13: Tooth reimplanted in a stipulated time frame.



Fig 14: Wire composite splint placed.

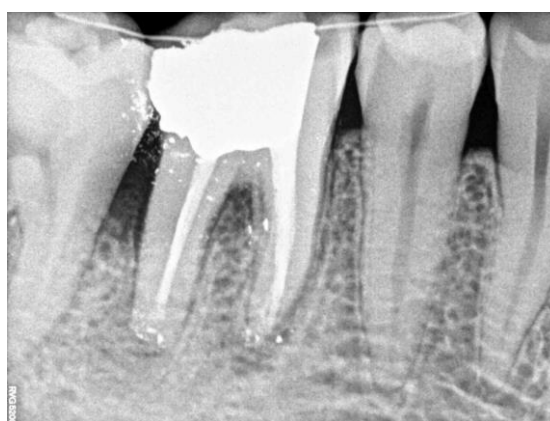


Fig 15: Immediate postoperative Xray after splint placement.



Fig 16: 8 month follow up X-ray.



Fig 17: Crown placement is done.

DISCUSSION

Reimplantation is not a new procedure, but it is not often been carried out as it is considered as a treatment of last resort. The ideal extraoral time for intentional reimplantation is between 12 to 22 minutes. (4) There are various studies on reimplantation which state that treating the root surface with solutions like citric acid, EDTA, and tetracycline helps to increase the chances of reattachment of the periodontal ligament to the socket wall. (5)(6)

Intentional reimplantation is not considered an ideal treatment option in cases where there are high chances of the tooth to get fractured, in patients with poor oral hygiene with periodontal involvement of the tooth and in immune-compromised patients. (7)

The future prognosis of the tooth depends on several factors like the skills of the operator, the condition of the tooth and last but not least, it also depends on the patient. Operator factors are the most important factor because only with thorough skill and knowledge can one perform atraumatic extractions with utmost precision. (8) When the operator wishes for ideal access and proper visualisation of root apex, then intentional reimplantation is an ideal treatment option to be considered. (3,9)

Presence of crowns, posts or fractured instruments in the canals is the various tooth factors that can pose to be a problem while treating the tooth. (8) Another factor that plays a very important role in the prognosis of the tooth is the patient factor in which the patient insists on saving the tooth but is apprehensive and reluctant to go ahead with periapical surgery, and this will influence our decision to carry out Intentional reimplantation in order to save the tooth. (3,10)

In young patients, skeletal growth is still in progress; therefore, dental implants cannot be considered as an ideal treatment option after the tooth has been extracted. (4) In reimplanted tooth, periodontal proprioception is seen, bone formation occurs around the replanted tooth, which gives it an upper hand over dental implants. (11) In order to preserve the bony structure intentional reimplantation is considered as a treatment of choice where periapical surgery would result in extensive bone removal like in case of an infected tooth with odontogenic maxillary sinusitis, it is also considered as a viable treatment option in cases where the tooth is in close proximity with anatomical structures like a mental nerve. (12,13,14,8)

In order to improve the future prognosis of the tooth and to avoid complications after reimplantation, care should be taken to avoid contact with the socket wall after the tooth has been extracted; this will prevent damage to the periodontal ligament and promote reattachment. (3,15) In order to maintain the vitality of the periodontal ligament and to avoid complications after reimplantation, it is important to keep the tooth in a humid environment. The various solutions that can be used are Viaspan solution,

saline or Hank's buffered salt solution to keep the tooth moist. (15)

Ankylosis and resorption are the most common complications seen in cases of intentional reimplantation when standard protocols are not followed. (14). Reduction in extraoral time and atraumatic extractions are the two main factors that are responsible for preventing dehydration and maintaining the viability of the periodontal ligament cells which will ultimately lead to a reduction in the rate of complication after the tooth has been reimplanted (16).

Due to its merits, MTA has become one of the most widely studied endodontic materials over the past.(17,18,19) MTA consists of calcium, aluminium and selenium. It has various desirable properties such as biocompatibility, bioactivity, hydrophilicity, radiopacity, sealing ability and low solubility. Due to its property of biocompatibility, MTA encourages optimal healing. Histologically MTA shows the formation of new cementum; it also promotes bridge formation along with a low inflammatory response in the pulp space. (20,21). MTA has expansion and contraction properties similar to that of dentin which is the main reason for its optimal seal .MTA also shows high resistance to marginal leakage and to bacterial migration into the root canal system which is one of the key factors for its clinical success. When MTA comes in contact with moisture, calcium oxide gets converted to calcium hydroxide due to which a high pH environment is maintained, which is the key reason for its antibacterial effect. (22)

For root-end resection, the resection plane should be perpendicular to the long axis of the tooth. The retroactivity should be prepared to a depth of 3mm.(23) It is generally suggested to resect the root 3 mm from the root tip to remove the apical delta. The use of ultrasonic tips for the root end preparation have certain advantages viz. they help in preparing cavities of ideal width and depth which helps in better confinement of the dental material, they also help in better preparation of anatomical difficulties such as the isthmus. The occurrence of microfracture in the root end cavity after preparation is one of the disadvantages of the ultrasonic tip. (24,25,26)

CONCLUSION

Intentional reimplantation of the tooth has several advantages over periapical surgery; it is a very cost-effective procedure which requires less clinical time. When standard protocols of intentional reimplantation are followed, clinical success is expected. With thorough knowledge and skills, intentional reimplantation should be considered as a viable treatment option and not as a procedure of last resort.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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