



REIMPLANTATION OF A MANDIBULAR MOLAR WITH BROKEN INSTRUMENT: A CASE REPORT

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ARTICLE INFO

Article History:

Received 8th June, 2016
Received in revised form 11th
July, 2016 Accepted 6th
August, 2016 Published online 28th
September, 2016

Key words:

Reimplantation, fractured peri-apical
instrument, splinting, tetracycline.

ABSTRACT

Curvatures of root canals in a multi-rooted tooth are a challenge to the dentist for successful negotiation and completing the treatment in a comprehensive manner. However, angulations in such root canals increase the chances of separation of the instrument during the cleaning and shaping procedures. In order to provide the best prognosis for such teeth with peri-apically fractured instrument, various treatment modalities of instrument retrieval are thought off, of which surgical intentional reimplantation is one of the effective procedure. Best long term prognosis for an extracted tooth can be achieved by decreasing the exposure of tooth to the extra-oral environment. This case report presents intentional reimplantation of a mandibular molar with the separated instrument in the peri-apical region of the tooth.

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INTRODUCTION

Separation of endodontic instrument is unfortunately a common procedural error in dental practice. When an instrument fractures during a procedure in the root canal, the best option is to remove it¹. Evaluation of endodontic recall radiographs indicates that the frequency of remaining fragments ranges between 2% and 6% of the cases investigated.^{2,3}

Abulcasis, an Arabian physician practicing in the eleventh century, is the first credited with recording the principle of intentional replantation.⁴

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When conventional endodontic treatment or retreatment is not possible, the operator may choose to intentionally extract and replant the involved tooth. In 1756, Phillips Pfaff describe the use of tooth replantation and recommended root end resection for long teeth, followed by root – end filling with wax or lead prior to replantation.⁵

Kingsbury and Weisenbaugh reported on 151 Mandibular premolar and molar teeth that were extracted, treated, and

replanted. They evaluated these teeth over a 3-year period and reported a success rate of 95%.⁶

Koenig and associates reported on a study involving 192 extracted and replanted teeth. Following an evaluation period of between 6 and 51 months, they reported a success rate of 82%.⁷ More recently, Bender and Rossman reported on 31 cases of extraction/ replantation. They reported a success rate of 80.6% with an observation period of up to 22 years.⁸

The critical event in any reimplantation following avulsion or extraction of a tooth is the preservation of cellular vitality in the periodontal ligament under aseptic conditions.⁹ The removal of all tissue debris and irritating substances from the root surface, achievement of a good apical seal and reinforcement of the crown structure are mandatory for normal function.¹⁰

However this particular procedure can be considered as a mode of treatment as the last resort; when no other treatment modality is viable for instrument retrieval beyond the apex. The present article describes a clinical case wherein intentional reimplantation was chosen as a treatment approach to remove an instrument that had separated beyond the apex and relive the continuing symptoms.

Case Report

A 22-year-old female patient who had undergone incomplete endodontic treatment in her left lower mandibular tooth (#36) reported to the Department of Conservative Dentistry and Endodontics with spontaneous and intense pain in the same

tooth. Detailed clinical and radiographic examination revealed two broken instruments extending 2-3mm beyond apex in the mesio-lingual and distal canal with #36. Instrument fracture was confirmed with the peri-apical radiographs and OPG.(Fig 1)



Fig.1

Conventional non-surgical methods of fractured fragment retrieval were ruled out owing to the extent and snug fit of the instrument in the periapical roots. The anatomy of angulated root apex and its close vicinity to the inferior nerve waived out the surgical approach. Thus, the last resort was to plan an intentional reimplantation. The patient was informed of the pros and cons of the proposed treatment. The patient was pre-medicated to relieve the symptoms before commencing the procedure.

Routine endodontic treatment was initiated followed by a core build up using composite restoration. (Fig.1)The symptoms of spontaneous pain were reduced to intermittent pain on mastication by patient's consecutive follow-up.



One hour before the procedure, the patient rinsed with chlorhexidine gluconate 0.12% and was given 600 mg of ibuprofen. The patient was administered with local anaesthesia for inferior alveolar nerve block. A muco-periosteal flap was elevated in order to prevent damage to the crown and to obtain a proper grip for extraction. The tooth was extracted with maximum care to prevent trauma through the use of forceps. Care was taken to protect the PDL and cementum by restricting the forcep beak extension to cement-enamel junction.(Fig.2)

Following extraction, the tooth was kept in the tetracycline solution immediately .The extracted tooth was stored in the tetracycline solution(fig.3). A solution of tetracycline and saline was chosen. since it has proven that it has the potential to reduce post treatment complications like root resorption and ankylosis.

The crown portion of the tooth was held with the help of forcep beaks and the separated instrument was removed with the help of a pair of tweezers as the fractured fragment jetted out of the apices.

DISCUSSION

Intended replantation is a conventional endodontic procedure in the cases in which intracanal and surgical endodontic treatments are not recommended. Even though not commonly used, intentional replantation is a treatment alternative that dentists should judge under these conditions. If the set protocols during intentional replantation are not followed, root resorption and ankylosis may be observed in 1-2 months.¹¹ Early, resorptive processes are diagnosed within the first 2–3 years. However, although unusual, latest resorptive processes could happen even after 5 or 10 years.¹²

Yu and others reported a case where a mutual endodontic–periodontic lesion on a mandibular first molar was treated by planned replantation and with the use of hydroxyapatite. 120 days after the surgery, a PFM full-crown restoration was given. At the 1 year follow-up examination, the tooth was functional clinically and radiographically.¹³

Bender and Rossmann reported a success rate of 77.8 % in the molar teeth.¹⁴ Among 14 mandibular molars, success rate in first molars was 85.7%, and %71.4 in second molars. Of the 4 maxillary molars there were 3 first and 1 second molar with a failure of one maxillary first molar, with a success rate of 66.7%.¹⁵ Raghoobar and Vissink replanted 29 teeth consisting of 2 mandibular first, 17 mandibular second, one mandibular third and 9 maxillary second molars and evaluated for an average of 62 months. The success rate was 72 % and 25 of them were still in function¹⁶.

Demiralp and others assessed the clinical and radiographic results of intentional replantation of periodontally involved teeth after conditioning root surfaces with tetracycline-HCl. Thirteen patients (7 women and 6 men; age range: 35–52 years) with 15 periodontally involved hopeless teeth were included in this study. During the replantation procedure, the affected teeth were gently extracted and granulation tissues, calculus, remaining periodontal ligament and necrotic cementum on the root surfaces were removed. Tetracycline-HCl, at a concentration of 100 mg/mL, was applied to the root surfaces for 5 minutes. The teeth were then replaced in their sockets and splinted. After 6 months, no root resorption or ankylosis was detected radiographically. Although the period

of assessment was short, the authors recommend that intentional replantation can be an substitute approach to extraction in cases where progressive periodontal destruction is present and no other treatment can be reflected.¹⁷

The achievement or disappointment of the intentional replantation depends on vitality of PDL cells. These cells can be kept vital when the tooth is out of the socket by keeping the tooth humid and in sterile condition. During extraction caution should be taken to keep the beaks of the forceps away from the cementum to avoid shedding the important periodontal ligament cells. The most delicate portion of the procedure is to extract the tooth atraumatically in one piece. If the root or tooth fractures during extraction the procedure is completed and the tooth extracted. Time feature can be controlled by scrupulous planning and organization. All that the clinician needs should be at his or her disposal. In the authors belief the extraoral time should not outstrip 10 minutes but many investigators believe that even longer time period do not ominously increase the deleterious future outcomes. The extraoral time is critical which should be restricted to 20 - 30 minutes. Proper preparation and team work is the key.¹⁸

Some factors inducing the periodontal healing includes:

1. The extra-alveolar time: This is possibly the most important factor that should be measured. Thirty minutes appears to be the maximum time boundary. More extraoral time can increase the risk of root resorption.
2. Occurrence of preoperative radiolucency: Teeth with radiolucency are more tending to healing without root resorption, which may be due to the facility of the extraction of teeth with apical radiolucency which results in less injury of the root.¹⁹
3. Patient's age: Inflammatory resorption is more recurrent in the age set of 10 to 30 years than in adult age patients, which may be due to the wider dentinal tubules in younger patients.
4. Root end filling: Re-implantation of teeth closed by a root end filling material found to be more effective than re-implantation without root retrograde filling.
5. Care should be taken to negligibly handle the root surfaces: Replanting teeth with the intact PDL attached reassures periodontal remodelling and impedes ankylosis and root resorption. After two weeks, the PDL has two-thirds of its original adhesion.²⁰

In another case report, Filho et al. determined that intentional replantation could be indicated appropriately as an auxiliary treatment for cases, in which conservative endodontic therapy or surgical technique cannot be performed.²¹ Experimental studies of Loe H and Waerhaug shows if the tooth is replanted just after extraction, maintaining the vitality of periodontal ligament, ankylosis and resorption do not occur.²² Nasjleti et. al. stated that resorption and ankylosis were not detected in intentional replanted teeth in monkeys in 3 weeks to 4 months' time.²³

Splinting should be done only if essential. Semirigid splint should be given to permit for physiologic mobility of the tooth and for no longer than a 2 weeks period which again declines the chances of replacement resorption.²⁴

Intentional replantation has some aids over apical surgery, which include being an comfortable, less invasive, less time-

consuming, and economic procedure. In addition, root end filling is better performed extraorally.²⁵

On the other hand, the ultimate drawback of intentional replantation, which leads most dentists to consider this technique as a last choice to save a tooth, is that replacement resorption or ankylosis may occur. However, current long-term studies have shown that the achievement rates for intentional replantation are similar to those for apical surgery.^{26,27,28} Clinical and radiographic success were based on mobility test, probing depth, clinical attachment level, absence of root resorption and alveolar bone integrity. Kratchman stated, "With increased understanding of the periodontium and improved techniques, intentional replantation should no longer be viewed as a treatment of last resort, but rather a successful treatment alternative".

CONCLUSION

An rarely utilized treatment method acceptable us to preserve the patient's tooth and report his pain and infection, without requiring him to get a new set of partial dentures. Some authors consider Intentional Reimplantation to be a last option; whereas others cogitate it as alternative treatment modality. This substitute treatment may be anticipated and suggested for certain cases when routine treatment cannot be accepted or has failed, where periapical surgery would either be impracticable or rejected by the patient or questionable to succeed.²⁹

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