

Reimplantation of a Mandibular Molar with Surgical File Retrieval-A Case Report

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ABSTRACT:

Tooth auto transplantation is defined as the transplantation of unerupted or erupted teeth in the same individual, from one site to another, into extraction sites or surgically prepared sockets. Hereby we describe a case report of a 20 year old male patient who reported with a chief complaint of pain in lower left right back tooth region since 2 weeks. On clinical examination tooth was tender on percussion. Radiographic examination revealed file separation in the apical third of the mesio lingual root. Tooth was extracted and after stored in normal saline. Preoperative radiograph of the extracted tooth with file separation was taken. An extra oral Retrieval of the fractured segment was performed.

Gutta percha was retrieved from the mesiolingual root, new working length was taken, chemo mechanical preparation was done till f2 with copious irrigation of the canal. The mesio lingual root was dried with paper points and obturation and core build up was done extra orally. Tooth was reimplanted after curettage of the granulation tissue and splinting was done. Patient was recalled after 21 days.

Keywords: reimplantation, granulation tissue, endodontic.

INTRODUCTION

Tooth auto transplantation is defined as the transplantation of unerupted or erupted teeth in the same individual, from one site to another, into extraction sites or surgically prepared sockets (Natiella *et al.* **1970**) . Conservation is always given importance in dentistry. Most of the time, in clinical practice, the above said is difficult to maintain as most of the dentist don't have the time or patients are busy or the importance are not understood as well. Conservation not only imply the maintenance of tooth structure or bone on which treatment is performed, but also to preserve surrounding tissues to enhance the future development. A good example for this is the preservation of decayed teeth/tooth for the uneventful eruption of adjacent teeth/tooth into its position. The latter can then be extracted or maintained depending upon the prognosis of the treatment carried out. First molar is considered to be the most important determinant of occlusion. It also helps in maintaining the arch stability and normal alignment. ^{[1],[2]}

Intentional extraction and replantation are a treatment to be considered when other modes of treatment fail. A case is presented here where a first molar was atraumatically extracted and replanted back after endodontic treatment and socket curettage after which a drastic cure in the condition occurred.

Bender and Louis ^[3] reported 31 cases of intentional replantation with an overall success rate of 80.6% and with six recorded failures. Survival times varied from 1 day to 22 years. Messakob ^[9] have reported a successful three unit bridge on a replanted root for the first time. Benenati ^[10] did a 15.5-year follow-up clinical examination, which revealed the patient to be asymptomatic and functional. A recall film showed no evidence of root resorption. Rouhani *et al.* ^[11] reported a 95% success rate on reimplanted cases with an average retention of 3-5 years.

Preservation of natural dentition is the primary goal of any conservative treatment modality. Intentional replantation is an accepted endodontic treatment procedure in which a tooth is extracted and treated outside the oral cavity and then inserted into its socket to correct an obvious radiographic or clinical endodontic failure. Although not the primary therapy of choice, intentional replantation is an alternative to certain situations that a dentist should consider. ^{[6],[11],[12]} Clinicians should know well about its indications/contraindications, surgical procedure and complications following treatment. Numerous factors such as the amount of bone, the time the tooth is out of the socket, the preservation media, ^[13] aseptic conditions followed, radiographic findings etc come into considerations when such type of treatments are executed. External inflammatory resorption and ankylosis caused by the periodontal ligament damage are the most common failure associated with this mode of treatment. ^[11]

CASE REPORT

A 20 year old male patient reported to the department of conservative dentistry and endodontics with a chief complains of pain in lower left right back tooth region since 2 weeks. Patient gave a history of root canal treatment 2 years back. On clinical examination tooth was tender on percussion. Radiographic examination revealed file separation in the apical third of the mesio lingual root. Patient was then referred to the department of oral and maxillofacial surgery for extraction of the tooth. After extraction of tooth it was stored in normal saline. Preoperative radiograph of the extracted tooth with file separation was taken. An extra oral Retrieval of the fractured segment was performed. Gutta percha was retrieved from the mesiolingual root, new working length was taken, chemo mechanical preparation was done till f2 with copious irrigation of the canal. The mesio lingual root was dried with paper points and obturation and core build up was done extra orally. Tooth was reimplanted after curettage of the granulation tissue and splinting was done. Patient was recalled after 21days.

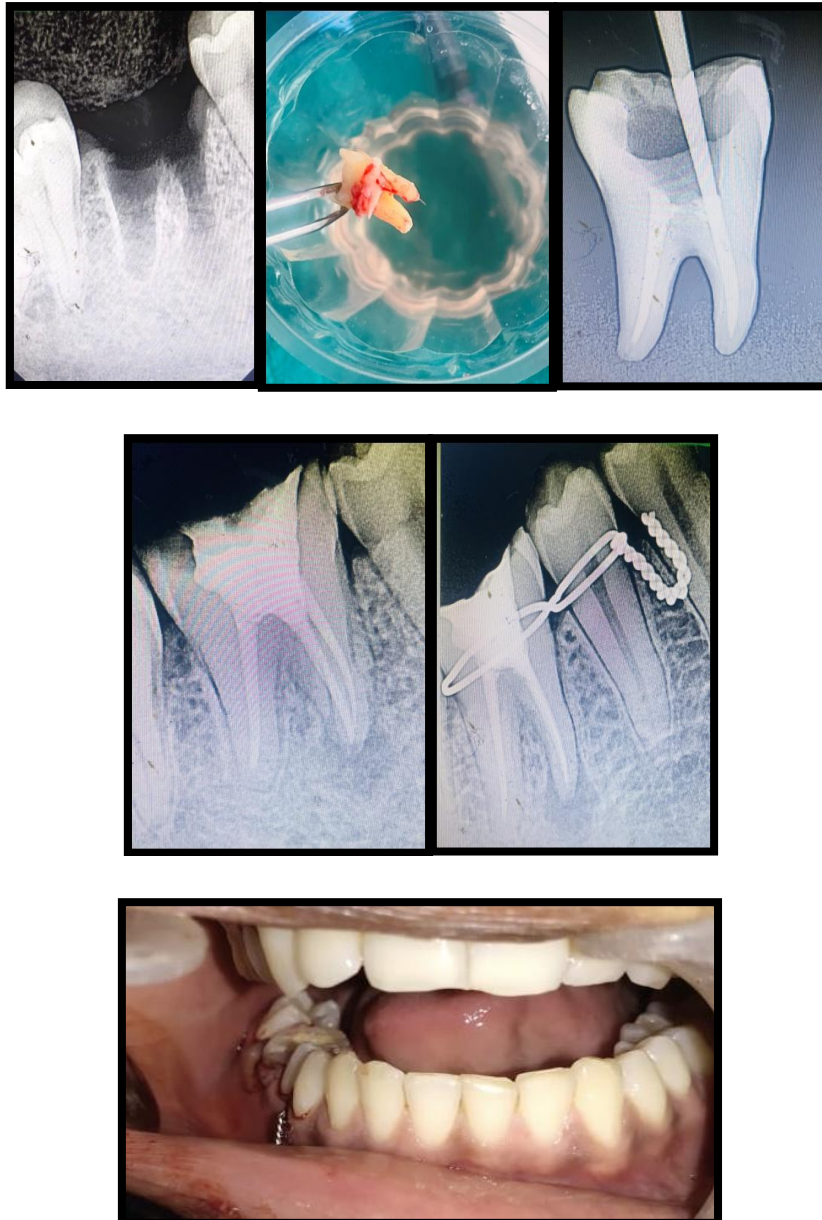


Fig 1: extraction socket , fig 2 : extracted tooth with file , fig 3- mastercone fig -3 , fig 4 :reimplantation after obturation & corebuildup ,fig 5 : splinting of the tooth .

DISCUSSION

The selection of intentional replantation as a treatment modality has been controversial. There are many reported indications, yet the procedure has often been considered a last resort option to retain natural teeth (4). As highlighted, there are several different steps in the procedure, thus the opportunity for many variations of technique and materials. This may explain the wide range in reported success rates, which are often less favourable than other treatment methods. A recent systematic review of the literature by Torabinejad et al (40) found an overall 88% survival rate for intentionally replanted teeth, with more contemporary studies demonstrating success rates as high as 95%. Because of recently reported high survival rates, intentional replantation might now be considered among more commonly accepted treatment options. It was noted in this same study, however, that only 2 of the

articles were published in the past 12 years and also demonstrated differences in clinical technique, thereby limiting the understanding of contemporary intentional replantation practice (40).

Specific indications for intentional replantation include circumstances that may preclude traditional apical surgery, such as areas of limited access and visibility, close proximity to delicate anatomic structures, or when a periodontal defect may result. Other indications include the presence of conditions for which nonsurgical retreatment is impracticable, such as obstruction of the root canal system, or perforation that is not accessible (28). Finally, intentional replantation also has been indicated in situations of difficult patient management, persistent chronic pain, accidental iatrogenic avulsion, involuntary orthodontic extrusion, and previous failure of nonsurgical retreatment and apical surgery (29)

Recommendations for extra oral times have also varied. In 1966, Grossman (4) reported the time out of the mouth should be “a matter of minutes,” noting specifically that the PDL can be kept alive for 15 to 20 minutes. Kratchman (11) recommended a maximum extra oral time of 10 to 15 minutes. In the 1994 report by Dryden and Arens (28) on intentional replantations, J. Andreasen was noted to have reported 90% success rates when avulsed teeth were replanted within 30 minutes.

Root Hydration Medium

The use of saline for a root hydration medium was near unanimous. In contrast, Kratchman (11) and Niemczyk (9) each recommended HBSS. In addition, Kratchman (11) reported that periodic submersion of the tooth in a bath of HBSS during root resection was the best approach to avoid root desiccation.

Socket Curettage

After endodontic manipulation, and before reinsertion of the tooth into its socket, all authors performed some manipulation of the socket in preparation for seating. This varied from simple aspiration or rinsing of the blood clot using a suction device or saline, to curettage of the socket using surgical instruments. When curettage of the socket was performed or suggested, some authors were implicit that only the apical portion of the socket be touched, thus avoiding contact with walls, whereas others made no distinction.

Tooth Insertion

To seat the tooth in the socket, 2 methods were reported. Most authors used simple placement using fingers, then digital compression of the socket walls. A minority suggested or reported further seating of the tooth using the patient's biting pressure to drive the tooth into position.

Intentional replantation

Intentional replantation has been used to manage crown–root fracture, perforation, external root resorption, periodontally compromised teeth and periodontal defects due to radicular grooves (Mainkar 2017). Twelve clinical studies evaluated the outcome of intentional replantation of at least 10 cases (Table S2) (Grossman 1966, Emmertsen & Andreasen 1966, Kingsbury & Wiesenbaugh 1971, Koenig 1988, Bender & Rossman 1993,

Raghoebar&Vissink [1999](#), Abid [2010](#), Choi *et al.* [2014](#), Asgary *et al.* [2014](#), Cho *et al.* [2016](#), [2017](#), Jang *et al.* [2016b](#)). Most intentional replantation studies were based on clinical and radiographic evaluations to investigate the success rate of the procedure (Bender & Rossman [1993](#), Hayashi *et al.* [2002](#)). Recent systematic reviews and meta-analyses reported survival rates of approximately 90% for intentionally replanted teeth (Torabinejad *et al.* [2015](#), Mainkar [2017](#)), demonstrating that it should be considered as a valid treatment option. When surgical/root canal nonsurgical retreatment procedures have poor prognosis or they are not feasible, intentional replantation procedure is a reliable and cost-effective treatment (Mainkar [2017](#)).

Tooth Splinting

On reinsertion, splinting of the tooth was variable. Many studies included splinting only when gross instability of the tooth was present. Others, such as Dryden and Arens (28), incorporated a splint for each case. The advocated duration of splint application also varied from 7 to 10 days or 3 to 4 weeks. Material for splint fabrication ranged from wire to acrylic to sutures. Emmertsen and Andreasen (7) reported the use of lead foil for splinting. Relief of the reimplanted tooth from occlusal contact was near unanimous, although a few recommended no adjustment or only “as needed.”

Two additional procedural categories demonstrated differences in reported or suggested technique.

Post-treatment considerations

A radiograph might be taken before splinting to corroborate the position of the tooth in the socket. However, if a reasonably good fit is obvious clinically, this step can be omitted.

The techniques used for splinting teeth after surgical extrusion, intentional replantation and tooth auto transplantation include suture splints, surgical dressings, both suture splint and surgical dressing, wire–composite resin splint, composite resin splint, fibre-reinforced splint and ligature wire. In general, the duration of splinting ranged between 7 and 21 days (Elkhadem *et al.* [2014](#)). In the case of sufficient stability, postoperative fixation may be carried out with a crossed suture suspended above the occlusal surface with or without the use of resin composite to fix the suture to the tooth surface.

In the event of inadequate stability, a flexible splint with a steel wire no greater than 0.3–0.4 mm allowing physiologic tooth mobility is applied for 2 weeks to reduce the risk of ankylosis (Kahler *et al.* [2016](#)). Where there is substantial mobility due to mismatch between the socket and the extruded, replanted or transplanted tooth, the splinting period may be extended up to 6 weeks (Kelly *et al.* [2016](#)). Unfortunately, it has been reported that the absence of primary stability can contribute to a larger number of complications during healing (Bauss *et al.* [2002](#)).

An occlusal check is essential to ensure relief from occlusal contacts (Asgary *et al.* [2014](#), Choi *et al.* [2014](#), Jang *et al.* [2016b](#), Becker [2018](#)). Some authors have recommended the use of a surgical dressing or periodontal packing to protect the transplant area against infection and mechanical trauma during the first 2–3 days of wound healing (Tsukiboshi [2002](#)).

Pulp healing is expected with transplanted immature teeth, making endodontic treatment unnecessary in most cases. The roots should continue to develop and closure of the apex and positive response to pulp sensibility tests are expected, although these are not consistent or reliable in the first few months following the procedure. In case of any signs or symptoms of pulp pathosis (irreversible pulpitis or inflammatory root resorption), root canal treatment should be started immediately.

In case of auto transplantation of mature teeth, if the donor tooth is accessible, the endodontic treatment can be completed before surgery. When the root canal treatment cannot be performed before or during surgical extrusion, intentional replantation or tooth auto transplantation, orthograde endodontic treatment should be initiated within the first 2 weeks after these procedures to avoid infection-related root resorption (Andersson *et al.* 2012). Even if a recent case report has demonstrated a positive 5-year outcome for an autotransplanted tooth in which extraoral root-end resection and filling were performed without any conventional orthograde treatment (Boschini *et al.* 2020), an early root canal treatment after the surgical procedures may increase the success rate of the intentionally replanted teeth even when apicoectomy and retrograde filling are performed extraorally (Chung *et al.* 2014).

After completion of these procedures, it is important to inform the patient that these teeth are subject to the same risks of any other natural tooth. Thus, regular follow-up visits are necessary to evaluate their outcome.

After removal of the splint, the tooth should be allowed to settle naturally into its new position; however, it is advisable to adjust any developing occlusal interference. Depending on each case and according to the aesthetics and function of the tooth, the need to perform a restorative treatment should be assessed. Restorative treatment is usually performed 6 to 8 weeks after surgical intervention. In case the procedure has involved an anterior tooth, aesthetic modifications should be performed as soon as possible.

It is generally accepted that any traumatized tooth with PDL injury should not be moved orthodontically for at least 6 months after trauma. As transplanted and replanted or extruded teeth are considered in this category, any planned orthodontic movement should be delayed for 6 months after surgery (Kindelan *et al.* 2008, Day *et al.* 2008).

Topical administration of antibiotics may be recommended to improve the healing process after surgical extrusion, intentional replantation and tooth autotransplantation procedures, as the use of topical antibiotics has been showed to have better beneficial effects compared with systemic antibiotics in avulsion cases (Segura-Egea *et al.* 2017, European Society of Endodontology 2018b).

References

1. Haapasalo M, Shen Y, A. Ricucci D. Reasons for persistent and emerging post-treatment endodontic disease. *Endod Topics*. 2008; 18: 31-50
2. Siqueira Jr., J. F. A. Etiology of root canal treatment failure: why well-treated teeth can fail. *Int Endod J*. 2001; 34: 1-10
Considerations and concepts of case selection in the management of post-treatment endodontic disease (treatment failure). *Endod Topics*. 2002; 1: 54-78
Intentional replantation of teeth. *J Am Dent Assoc*. 1966; 72: 1111-1118

3. Weinberger B.W. An Introduction to the History of Dentistry. C.V. Mosby Co., St. Louis, MO 1948
4. Grossman L.I. A brief history of endodontics. *J Endod.* 1982; 8: S36-S40
5. Emmertsen E., Andreasen J. Replantation of extracted molars: a radiographic and histological study. *Acta Odontol Scand.* 1966; 24: 327-346
6. Nosonowitz D.M. On intentional replantation. *N Y J Dent.* 1972; 42 (passim): 44-47
7. Niemczyk S.P. Re-inventing intentional replantation: a modification of the technique. *Pract Proced Aesthet Dent.* 2001; 13 (quiz 440): 433-439
8. Grossman L.I. Intentional replantation of teeth: a clinical evaluation. *J Am Dent Assoc.* 1982; 104: 633-639
9. Kratchman S. Intentional replantation. *Dent Clin North Am.* 1997; 41: 603-617
10. Dumsha T.C., Gutmann J.L. Clinical guidelines for intentional replantation. *Compend Contin Educ Dent.* 1985; 6: 606-608
11. Kim S., Kratchman S. Modern endodontic surgery concepts and practice: a review. *J Endod.* 2006; 32: 601-623
12. Sehgal P., Kumar B., Sharma M., Salameh A.A., Kumar S., Asha P. (2022), Role of IoT In Transformation Of Marketing: A Quantitative Study Of Opportunities and Challenges, *Webology*, Vol. 18, no.3, pp 1-11
13. Kumar, S. (2020). Relevance of Buddhist Philosophy in Modern Management Theory. *Psychology and Education*, Vol. 58, no.2, pp. 2104–2111.
14. Roy, V., Shukla, P. K., Gupta, A. K., Goel, V., Shukla, P. K., & Shukla, S. (2021). Taxonomy on EEG Artifacts Removal Methods, Issues, and Healthcare Applications. *Journal of Organizational and End User Computing (JOEUC)*, 33(1), 19-46. <http://doi.org/10.4018/JOEUC.2021010102>
15. Shukla Prashant Kumar, Sandhu Jasminder Kaur, Ahirwar Anamika, Ghai Deepika, Maheshwary Priti, Shukla Piyush Kumar (2021). Multiobjective Genetic Algorithm and Convolutional Neural Network Based COVID-19 Identification in Chest X-Ray Images, *Mathematical Problems in Engineering*, vol. 2021, Article ID 7804540, 9 pages. <https://doi.org/10.1155/2021/7804540>
16. Carr G.B., Murgel C.A.F. The use of the operating microscope in endodontics. *Dent Clin North Am.* 2010; 54: 191-214
Abedi H.R., Van Mierlo B.L., Wilder-Smith P. et al. Effects of ultrasonic root-end cavity preparation on the root apex. *Oral Surg Oral Med Oral Pathol.* 1995; 80: 207-213
17. Torabinejad M., Ford T.R.P. Root end filling materials: review. *Den Traumatol.* 1996; 12: 161-178
18. Nair U., Ghattas S., Saber M. et al. A comparative evaluation of the sealing ability of 2 root-end filling materials: an in vitro leakage study using *Enterococcus faecalis*.
19. Tewari A., Chawla H. Intentional replantation of pulpal or periapically involved permanent posterior teeth. *J Indian Dent Assoc.* 1974; 46: 385-389
20. Bender I.B., Rossman L.E. Intentional replantation of endodontically treated teeth. *Oral Surg Oral Med Oral Pathol.* 1993; 76: 623-630