



# INTENTIONAL REPLANTATION –A TREATMENT PROTOCOL TO SAVE A TRAUMATIZED TEETH

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**Abstract:** Intentional replantation (IR) is a treatment modality for traumatized teeth or a treatment option for failed root canal over a thousand years, it is defined by Grossman (1966) as an atraumatic extraction of a tooth followed by reinsertion into its socket immediately after endodontic treatment and apical repair is done extra-orally within 15-20 mins. Intentional replantation can be considered as a last option by some authors; whereas others consider it as another treatment modality. This case report describes intentional replantation in maxillary right central incisor, lateral incisor and left central incisor as a treatment approach to trauma. A follow up revealed the patient to be asymptomatic, the tooth to be functional and a recall film showed no evidence of root resorption.

**Index Terms -** intentional replantation, trauma, atraumatic extraction

## I. INTRODUCTION

Intentional replantation is an alternative treatment modality to routine extraction; it is a conservative treatment modality that aims to preserve the natural tooth. Grossman<sup>1</sup>, described the technique of intentional replantation as the deliberate extraction of a tooth with minimal manipulations of the periodontal ligament, followed by extra-oral root canal treatment and placement of the tooth back into its original socket<sup>1-3</sup>.

Replantation was first reported in 1593, when Pare replanted three avulsed teeth<sup>4</sup>. Abulcasis described replantation and use of ligatures to splint the replanted tooth in 11<sup>th</sup> A.D<sup>5</sup>, in 1712, Pierre Fauchard reported an intentional replantation, fifteen minutes after extraction. Thomas Berdmore<sup>7</sup> reported intentional replantation for mature and immature teeth in 1768. In 1890, Scheff<sup>9</sup> addressed the periodontal ligament role in prognosis of replanted teeth. In 1955, Hammer<sup>10</sup> described the importance of leaving an intact periodontal ligament on intentionally replanted teeth. In 1961, Loe and Waerhaug<sup>11</sup> tried to replant teeth immediately after extraction successfully. This case report describes a case of intentional replantation of a symptomatic mandibular molar with non-retrievable separated instrument in mesiolingual canal.

Failure of root canal treatment leads to posttreatment disease. Development of peri-radicular disease or its persistence eventually jeopardizes the success of the treatment. The persistence of bacterial infection even after root canal treatment and presence of preoperative peri-apical radiolucencies are the major causes of root canal treatment failure as reported by Lin. The etiologic factors that play a secondary role include the presence of a cystic lesion, an over- or under-extension of the root canal filling, and improper coronal seal (leakage)<sup>5</sup>. Some complications during biomechanical preparation or procedural errors might lead to perforations, ledges, or missed canals. Postendodontic treatment disease develops when the endodontic treatment was not follow the standard clinical principles<sup>6</sup>.

There are several indications for intentional replantation. First, it is an alternative treatment option when the conventional endodontic retreatment is not feasible. It is the last treatment option for cases that present with canal obstruction due to a cemented post, complicated perforation, or separated instrument<sup>7</sup>. Second, intentional replantation is indicated when the surgical approach to the apices is impossible, especially if the tooth is symptomatic. Surgical complications are most likely when there is proximity to a major anatomical structure such as the mental nerve, or in cases where extensive bone removal is required and injury to the surrounding anatomical structures is expected; for example, odontogenic maxillary sinusitis is associated with an infected tooth<sup>8</sup>. Limited mouth opening or trismus may decrease the essential visibility that a clinician needs to perform the surgery; furthermore, peri-radicular surgery confers a greater likelihood of trauma to the temporomandibular joint and patient discomfort.

On the contrary, in some cases, intentional replantation is contraindicated if atraumatic extraction cannot be performed. The clinical crown height of the tooth should be of a sufficient to provide a stable forceps grip. This case report describes a case of intentional replantation of a symptomatic traumatized maxillary central and lateral incisors with grade three mobility.

**CASE REPORT**

A 25 year old male patient reported to the “Department of Conservative Dentistry and Endodontics at Narsinhbhai patel dental college and hospital” with chief complaint of severe pain and grade three mobility in the left and right maxillary anterior teeth due to trauma since 2 days. The dental history revealed trauma to the upper front teeth as a result of road accident 2 days back. Crown luxations of 11,12 and 21 was diagnosed at that time and avulsion of 22 was noticed. There had been no other injury to dental hard tissues. When patient reported to us, 11,12 and 21 was luxated from the socket [Fig-1] and sensitive to apical palpation and percussion.



Figure 1-preoperative photograph



Figure 2-intraoral occlusal view



Figure 3-preoperative OPG



Figure 4-preoperative occlusal view



Figure 5-Atraumatic extraction



Figure 6- extracted teeth

The tooth was then extracted as atraumatically as possible [Fig-5]. During the extraoral period the periodontal tissue was frequently irrigated with sterile saline solution. The alveolus was subjected to curettage, in order to remove inflammatory tissue. The alveolus was irrigated with sterile saline solution. Root canal treatment was done extraorally in 11,12,21 teeth. Root end resection and removal of the resorptive defect was performed extraorally followed by sealing by biodentine. This procedure took approximately 10 -15 minutes. Thereafter tooth was replanted and secured with orthodontic wire and flowable composite [Fig-7]. The occlusion was adjusted in order to ensure that tooth to be free of interface. An intraoral periapical radiograph revealed proper repositioning of the tooth and proper root end filling. Antibiotics and analgesics and 0.12% chlorhexidine rinses three times for seven days were prescribed.



Figure 7- splinting done

The splint was removed after 3 weeks of reimplantation. Patient had no pain or discomfort during postoperative period. After 6 months the patient was asymptomatic, percussion was negative and IOPA revealed healing and there was no signs of resorption [Fig-9]. There was no pathological condition, good gingival health [Fig-10] and no periodontal pocket.



Figure 8-3 month follow up



Figure 9- 6 month follow up opg



Figure 10- 6 month follow up intraoral view

## DISCUSSION

The preservation of natural dentition is the primary goal of any conservative treatment modality<sup>4</sup>. When conventional treatment is not applicable, intentional replantation as an alternate treatment which should not be underestimated, although it is not the primary therapy of choice but it can be an alternative to extraction of tooth<sup>6</sup>. The success rate of this treatment depends upon the maintenance of aseptic conditions during the procedure, atraumatic extraction, minimal manipulation of the periodontal ligament, short extra-oral time, occlusal forces should be reduced after replantation, and carefully controlled postoperative patient compliance<sup>7</sup>.

The external inflammatory resorption or replacement resorption and ankylosis caused by PDL damage and further necrosis of the PDL and cementum are the most common causes for failure. These complications are related to the degree of PDL damage.

The success or failure of the intentional replantation depends on the vitality of Periodontal cells. When the tooth is out of socket, the vitality of these cells can be maintained by keeping the tooth moist and in aseptic condition. The extraoral time should be limited to 20 - 30 minutes. Proper planning and team work is the key of success.

Some factors influencing the periodontal healing include:

1. The extra-oral time is probably the most important factor that should be considered. 30 minutes to be the maximum time limit. More extraoral time can increase the possibility of root resorption<sup>14</sup>.
2. Preoperative periapical radiolucency: Teeth with radiolucency are more inclined to healing without root resorption, which may be due to the facility of the extraction of teeth with apical radiolucency which results in less damage of the root<sup>15</sup>.
3. Age of the patient: Inflammatory resorption is more frequent in the age group of 10 to 30 years than in older age patients, which may be due to the wider dentinal tubules in younger patients.
4. Root end resection and restoration: Replantation of teeth sealed by a filling material seems to be more successful than replantation without root canal filling.
5. Keep

manipulation of the root surfaces minimum: Replanting teeth with the intact PDL attached encourages periodontal remodelling and inhibits ankylosis and root resorption. After two weeks, the PDL has two-thirds of its original adhesion<sup>11-14</sup>.

As reported by Kratchman<sup>6</sup>, there are some advantages in performing intentional reimplantation when periapical surgery is refused. This treatment is typically less time consuming and invasive as compared to periradicular surgery. The replantation indicated in cases in which there is limited access, anatomical limitations, and perforations in areas not accessible to surgery, failed apical surgery and persistent chronic pain. With proper case selection, the procedure is simple and straightforward and less chance of damage of vital structures adjacent to the teeth. The second molar had straight conical shape roots which made the extraction and the manipulation during the procedure simple and less time consuming. In the present case report, the tooth was outside the mouth for approximately less than 15 minutes, manipulation was kept minimal, and the periodontal ligament was not removed as recommended by most authors. The best prognosis of replantation is directly related to the amount of time the tooth is maintained extraorally during the procedure. From some reports, the potential for resorption in replanted teeth increases if they remain outside the mouth for more than 30 minutes<sup>7</sup>.

Kratchman also listed contraindications of this procedure like preexistent moderate to severe periodontal disease, curved or flared roots, a non restorable tooth and missing interseptal bone. Fortunately, teeth in the both cases did not fall into any of these categories. Dryden and Arens cited refusal of the patient for periapical surgery as a viable indication for the intentional replantation. The esthetic concern for the central incisor was another factor for performing intentional reimplantation as the surgical procedure would lead to shrinkage of gingival margin. Also the considerable amount of bone would be removed to reach the apex of the tooth. Patient compliance and lack of periodontal disease in this area were also important factors in the decision to perform the procedure.

## CONCLUSION

The intentional replantation procedure is apply to preserve the natural teeth a, thereby it fulfill the main goal of any conservative treatment. It is an easy and fast treatment option than nonsurgical retreatment or surgical apicoectomy. The success of the case is depends on how the case was managed. Intentional replantation is an alternative treatment for cases in which conservative endodontic therapy or surgical technique cannot be performed. Although the success rate of intentional replantation is below that of routine RCT or apical surgery and the most common cause of failure with this procedure are external inflammatory resorption or replacement resorption and ankylosis caused by periodontal ligament damage; still they can be considered as a treatment alternative when other options are not feasible.

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