

# Successful Crown Placement on C-Shape Tooth using Intentional Replantation: Long-term Follow-up

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## Abstract

Intentional replantation (IR) has been considered as treatment option to prevent tooth extraction and prosthetic replacement when conventional root canal treatments are contraindicated. The most important factor needed for the success of IR is preserving the viability of periodontal ligament cells by controlling the time factor with less manipulation of the root surface. This case report

shows successful case of intentional replantation for C-shaped mandibular second molar with periapical lesion. The tooth was functional, asymptomatic with no root resorption and the radiograph showed healed periapical area in four-year recall. The success rate of intentional replantation is encouraging if the procedural techniques are implemented correctly.

**Keywords:** Intentional replantation (IR), Root Canal.

## Introduction

IR was defined by Grossman as the “purposeful removal of a teeth and its reinsertion into the socket almost immediately after sealing the apical foramina [1]. The indications of IR include unsuccessful previous nonsurgical endodontics [13], unsuitable apicoectomy procedure (e.g. Proximity to mandibular nerve), economical factors prevent implant placement, occasionally posts or separated instrument removal may cause risks more than benefits when compared with other options such as extraction [5].

Contraindications to IR comprise the following: apical surgery or implant placement lead to more favourable prognosis, advanced periodontal diseases, hopeless tooth, extraction needs hemisection or osseous recontouring, the tooth is part of a multiple-tooth prosthesis, divergent roots [11,14].

IR has some advantages over apical surgery, which includes being easier, less invasive, time consuming, less costly procedure. Moreover, diagnosis of the defect and its correction is

better performed extra orally [2]. Replacement resorption or ankyloses is one of the greatest disadvantage of intentional replantation [15]. Also, root fracture during extraction.

The prevalence of C-shaped root canal configuration is higher in mandibular second molar Which makes root canal treatment unsuccessful because of the anatomical variations in the root canal system. Perforation or over instrumentation may occur during the canal instrumentation because of the isthmus-like small canals that connecting the C-shaped fin area. If the treatment failure occurs on this type of tooth because of the bifurcation or canal blockage, then the intentional replantation can be a good alternative treatment option [3].

According to Jerome, a root with C-shaped configuration is a good candidate for the intentional replantation procedure because the extraction of a tooth with this type of root can be relatively easy [4].

### CASE REPORT

A 43 -year-old female came to the Department of Endodontics at King Abdulaziz medical city, Jeddah with pain in lower second left posterior tooth (pointed to tooth #37). The medical history was not significant. After reviewing her dental history, it was found that #37 had RCT by an endodontist before one year in the same hospital. Clinical examination was carried out with normal extraoral examination and intraoral examination except for tooth #37 that had pain to percussion and palpation. Tooth #37 was filled with well-sealed OM amalgam build up. Periodontal examination showed normal mobility, probing depths and gingival anatomy.

The radiographic interpretation showed a large apical radiolucency associated with the apex of tooth #37 (Figure 1). The patient was informed about the unfavourable prognosis of endodontic retreatment. The patient was given the treatment options of extraction and a dental implant, extraction without implant or intentional replantation. After taking into consideration the risks and benefits of all treatment options, the patient decided to do intentional replantation.

### PROCEDURE

The patient rinsed with chlorhexidine gluconate 0.12% and was given 600 mg of ibuprofen, before one hour from the procedure. The patient was given profound inferior alveolar and lingual nerve block anesthesia with 2% lidocaine containing 1:100,000 epinephrine (Xylocaine® dental adrenaline 20mg/ml, 1.8ml/ carpule, DENTSPLY).

The mandibular second molar (tooth #37) was intentionally extracted with minimal trauma through the use of forceps. The patient was asked to bite gently on a wet gauze while working on the tooth extraorally. No fractures was noticed under the microscope (Proergo; ZEISS, Germany).

The tooth was covered with saline-soaked gauze. Under copious saline irrigation, the apex was resected with high-speed fissure bur (Figure 2). Under X26, the resected root surface was retro prepared with small round bur to a depth of 3mm (Figure 3). The EndoSequence® Root Repair Material (BC RRM-Fast Set Putty™) was used to seal the root-end cavity (Figure 4). The sterile saline was used to irrigate the socket and the tooth was then replanted into the socket in less than 15 min from extraction.

To check the repositioning, postoperative radiograph was taken (Figure 5). The splint was placed because no initial stability of the tooth (Figure 6). The patient was instructed to eat soft diet and stay away from sticky foods for two weeks. Moreover, chlorhexidine gluconate 0.12% was prescribed for 7 days and ibuprofen 600 mg every 4 to 6 h for 48 h. After 1 week, the splint was removed. The patient did not complain from the tooth and soft tissues were normal. At six months follow up, healing was noticed with normal mobility and probing depth. Radiographic examination revealed decrease in the size of the periapical rarefaction. (Figure 7). At three and four years follow up, tooth was asymptomatic, no response in percussion and palpation, normal sulcular depth and complete healing of the periapical radiolucency (Figure 8, 9).



**Figure1:** Preoperative radiograph



**Figure1:** Preoperative radiograph



**Figure2:** Root-end resection



**Figure3:** Root-end filling with bioceramic putty



**Figure4:** Post-operative radiograph



**Figure5:** After splint



**Figure6:** Six-month follow-up



**Figure7:** Three years follow-up



**Figure8:** Four years follow-up



**Figure8:** Four years follow-up



**Figure8:** Four years follow-up

## Discussion

Many factors correlated with the outcome of intentional replantation of teeth. The main factors include atraumatic extraction/reinsertion, root hydration medium, prevention of damage to tooth roots, minimal extraoral time, adequate apical seal in terms of depth, material compaction, and characteristics as well as suitable case selection [7]. Additional factors affecting the treatment outcome could be the protection of the socket, tooth handling method, apicectomy technique along with tooth insertion and method of splinting [7].

Survival of the PDL cells has been found to be a critical factor in the healing of intentionally replanted teeth and prevention of ankylosis and root resorption complications [10]. Minimizing the extraoral “dry” time and keeping the tooth wet by immersing in a physiologic solution has been found as factors affecting the survival of PDL cells. In our case, the extra oral time was less than 15 min and the saline was used as wetting agent for the replanted tooth. Jang et al. found higher success rates for teeth in which the extraoral time was minimal, that is, 15 min or less compared with those which were kept out for >15 min [9].

The use of surgical elevators is prohibited. The tips of the forceps should not pass the cemento enamel junction to prevent unnecessary trauma to the periodontal ligament. Although some studies reject the use of curettage, others encourage curettage the apical area without touching the walls. The overall success rate was 72.4% for the 29 intentionally replanted C-shaped mandibular second molars. The success rate of replanted teeth with preoperative periapical lesions was similar to that of

replanted teeth which have no periapical lesions [3].

A systematic review and meta-analysis by Torabinejad *et al.* Showed an overall mean survival of 88% for intentionally replanted teeth with a mean 4-years follow-up [8]. Root resorption was reported as an adverse outcome in all included studies, with an overall prevalence of 11% [6]. Other studies have shown clinical success rate of intentional replantation cases after 1 year to be 89% which decreased to 59% at 5 years [9]. Although most complications occurred within 1 year after replantation, it was suggested that the follow-up should extend for at least 3 years to capture late complications [12]. The case presented in this article have shown normal clinical and radiographic normal healing throughout the four years follow-up period which confirmed the successful management of the case.

The biocompatibility of the filling material will also affect the healing process. That’s why we decided to choose EndoSequence® Root Repair Material (BC RRM-Fast Set Putty™) as root end filling material that has superior handling and healing properties.

## Conclusion

With proper case selection and clinical expertise helps to achieve successful outcomes in intentional replantation cases. The intentional replantation procedure was chosen to keep the natural dentition that is why achieving the main goal of any conservative treatment.

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