



## Intentional Replantation After Failed Endodontic Treatment: Two Case Reports

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### Case Report

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### ABSTRACT

Intentional replantation is a procedure based on the principle of extracting the tooth in cases where endodontic treatment has failed through conventional or surgical approaches, evaluating and treating the root end extraorally, and then replanting the tooth into its socket. This case report presents the treatment of two cases using the intentional replantation method: one in which healing was not observed after retreatment, and another with external root resorption. In both cases, clinical and radiographic evaluations performed 12 months after replantation revealed continued healing and function.

**Keywords:** Endodontic surgery, intentional replantation, lesion healing, MTA

## Başarısız Endodontik Tedavi Sonrası Uygulanan Kasıtlı Replantasyon: İki Olgu Sunumu

### Olgu Sunumu

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### ÖZ

Kasıtlı replantasyon, endodontik tedavinin konvansiyonel ya da cerrahi yaklaşımlarla başarısız olduğu durumlarda, dişin çekilmesi, kök ucunun dış ortamda değerlendirilip tedavi edilmesi ve tekrar sokete replante edilmesi esasına dayanan bir yöntemdir. Bu olgu sunumunda; biri retreatment sonrası iyileşme gözlenmeyen, diğeri ise eksternal kök rezorpsiyonu bulunan iki olgunun kasıtlı replantasyon yöntemiyle tedavi edilmesi sunulmaktadır. Her iki olguda da replantasyondan 12 ay sonraki klinik ve radyografik değerlendirmelerde iyileşme ve fonksiyonun devam ettiği gözlenmiştir.

**Anahtar Kelimeler:** Endodontik cerrahi, kasıtlı replantasyon, lezyon iyileşmesi, MTA

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### Introduction

Intentional replantation is defined as the deliberate removal of a tooth from its socket, followed by endodontic manipulation and repair in a sterile environment outside the mouth, and then its replantation into the original socket. It is one of the methods used to keep the tooth in the mouth when traditional endodontic treatment methods fail or are not possible.<sup>1</sup> This procedure involves the atraumatic extraction of the tooth, extraoral evaluation and treatment of the root surface, and replantation of the tooth into the alveolar socket under suitable conditions.<sup>2</sup> For successful intentional replantation, it is of great importance to minimize the extraoral time, preserve the vitality of the periodontal ligament, use an appropriate root-end filling material, and maintain aseptic working conditions.<sup>3</sup>

In this case report, the successful treatment of two teeth using the intentional replantation method is presented: one exhibiting an enlarged periradicular lesion after unsuccessful retreatment, and another with external root resorption.

### Case Report

#### Case 1: Intentional Replantation of a Tooth with External Root Resorption

A 20-year-old female patient presented to the Department of Endodontics, Faculty of Dentistry, Sivas Cumhuriyet University, with complaints of mobility and mild pain in the right mandibular second molar. Radiographic examination revealed external root resorption and periapical radiolucency (Figure 1A). Although root canal treatment was initiated (Figure 1B), the symptoms persisted, and tooth mobility increased. Because the root resorption was in a surgically inaccessible position, intentional replantation was planned and the procedure was explained to the patient and consent was obtained. Before the procedure, the patient's blood was drawn and centrifuged to obtain PRF (Platelet Rich Fibrin) from his own blood. The PRF was then prepared for application to the socket. The area around the mouth was then cleaned with batikon to prepare the surgical environment. After the atraumatic extraction of the tooth was performed with a sterile

atraumatic tooth extraction set, the granulation tissue on the root surface was removed with the help of a surgical curette. The root apex was resected 3 mm under sterile saline irrigation cooling (Figure 1C), and a retrograde cavity was prepared (Figure 1D) and filled with Mineral Trioxide Aggregate (MTA) (Figure 1E). During these procedures, the periodontal ligament at the cemento-enamel junction was left as is without removal. Simultaneously, another clinician performed curettage of the extraction socket and placed a sufficient amount of

PRF into the socket (Figure 1F). The tooth was placed back into the socket and occlusal adjustment was made, then fixed semi-rigidly with a cross suture (Figure 1G-H). Care was taken to complete the procedures performed outside the mouth in less than 10 minutes. The patient was called for appointments at regular intervals and the intraoral and radiographic status of the tooth was checked. At the one-year follow-up, the tooth was asymptomatic clinically, and radiographic evaluation showed complete healing of the lesion with no progression of resorption (Figure 1I).



Figure 1. A. Initial radiographic image of the tooth. B. Radiographic image after root canal treatment. C. Apical resection of the tooth. D. Preparation of the retrograde cavity. E. Filling of the cavity with MTA. F. PRF prepared for the extraction socket. G. Splinting after replantation. H. Radiographic image after replantation. I. Postoperative 1-year radiographic image.

### Case 2: Intentional Replantation After Failed Retreatment

A 31-year-old male patient presented to the clinic with persistent pain and swelling in the right mandibular first molar. Radiographic examination showed that the periradicular lesion had not healed but rather progressed over 14 months following previous retreatment (Figure 2A-B). Since the patient refused another endodontic treatment but wanted to preserve the tooth, the intentional replantation option was explained, and the patient provided informed consent. The tooth was replanted with the same procedure applied in the first case (Figure 2C), and the patient was followed up with regular follow-up appointments. At the one-year follow-up, no mobility, tenderness, or swelling was observed

clinically. Radiographic evaluation revealed periapical healing and a normal periodontal ligament space (Figure 2D).

### Discussion

Intentional replantation is considered an effective treatment approach for maintaining a tooth in the oral cavity in cases where anatomical limitations prevent optimal access and visibility to the root apex and furcation area for endodontic surgery, or when retreatment has failed to achieve success.<sup>4-6</sup> A systematic review and meta-analysis conducted by Torabinejad et al.<sup>7</sup> reported a success rate of approximately 88% for this procedure. With the use of modern equipment, instruments, and materials, intentional replantation techniques have

significantly advanced, leading to notably high success rates in recent years.<sup>8</sup>

In intentional replantation procedures, it is crucial to extract the tooth atraumatically, minimizing the risk of fracture and damage to the periodontal ligament. The use of elevators during extraction should be avoided to prevent injury to the periodontal ligament cells.<sup>1</sup> In our cases, the teeth were extracted without the use of elevators; the

crowns were grasped with forceps while avoiding contact with the roots, and the roots were kept continuously moistened with saline solution to prevent dehydration. The preservation of viable periodontal ligament cells plays a critical role in successful healing.<sup>9</sup> Cho et al.<sup>3</sup> and Pohl et al.<sup>10</sup> reported that extraoral times exceeding 15 minutes increase the risk of root resorption and ankylosis. For this reason, the procedure time in our cases was kept less than 10 minutes.



Figure 2. A. Radiographic image of the tooth after retreatment. B. 14-month radiographic image following retreatment. C. Radiographic image after replantation. D. Postoperative 1-year radiographic image.

Root-end resection and retrograde filling are performed using ultrasonic tips and MTA.<sup>11</sup> The use of a root-end filling material with strong bonding ability is also essential for long-term success.<sup>12</sup> Calcium silicate-based materials such as MTA, provide excellent sealing ability and exhibit bioactivity on the dentin surface through the precipitation of hydroxyapatite crystals.<sup>1,13</sup> Moreover, they are biocompatible and promote tissue regeneration when in contact with periradicular tissues.<sup>14</sup> In our cases, MTA was chosen as the root-end filling material because of these superior properties.

Various materials such as wire, acrylic, or sutures can be used for stabilization of the replanted tooth. Among these, suture splinting is generally preferred, as rigid splinting can facilitate bacterial adhesion, hinder the healing process, and cause replacement resorption by restricting physiological mobility.<sup>9</sup> In our study, sutures were used to provide a more flexible form of splinting. It has been reported that inflammatory resorption and ankylosis following replantation can be detected within two months, whereas complications related to resorption

and periodontal problems may appear after one year.<sup>3,8</sup> In our cases, patients are followed up at regular intervals to ensure early detection of any potential negative situations.

In conclusion, in cases where surgical or nonsurgical retreatment methods cannot be applied or are unsuccessful, intentional replantation is considered as a preferable alternative treatment approach due to its reliability, effectiveness, and economic feasibility.<sup>15</sup> The successful healing observed in both of our cases after one year highlights the importance of preserving the periodontal ligament, minimizing the extraoral time, and selecting an appropriate root-end filling material. Furthermore, in the case with external root resorption, root surface decontamination and the use of a biocompatible material effectively prevented further resorption.

### Conclusions

In this case report, intentional replantation performed on two teeth with failed retreatment treatments and

external resorption demonstrates that this approach can be an effective and predictable treatment option for appropriate indications. In both cases, atraumatic tooth extraction, careful evaluation and cleaning of the root surfaces of the teeth from granulation tissue, necessary retrograde preparation, retrograde filling with biocompatible materials, and subsequent replantation within the optimal timeframe contributed to periodontal healing and preservation of function. Despite existing resorptive processes and previous treatment failures, the short-term results of intentional replantation were observed to be successful. These findings demonstrate that appropriate case selection, appropriate surgical technique, and careful postoperative follow-up significantly improve the prognosis of intentional replantation, especially in cases where conventional endodontic options have been exhausted. In inference, intentional replantation is a valuable method for retaining teeth in the mouth when external resorption cannot be controlled, the root canal anatomy is unsuitable for retreatment, or conventional surgical endodontic approaches are not applicable. Clinical and radiographic follow-up is critical for assessing the sustainability of periodontal healing.

In cases where intentional replantation is planned, it is recommended that the time between extraction and replantation be kept to a minimum and atraumatic techniques be employed to minimize trauma to the root surfaces. Resorptive areas should be meticulously cleaned, and biocompatible retrograde materials should be preferred. Following replantation, regular clinical and radiographic follow-up is essential to monitor healing and ensure long-term success. When these protocols are appropriately followed, intentional replantation provides a reliable, conservative, and effective treatment option for preserving and protecting the natural tooth.

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#### Conflicts of Interest Statement

The authors declare no conflict of interest.

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