Intentional Replantation of a Mandibular First Molar with Post-Treatment Apical Periodontitis: A Case Report with 12-Month Follow-Up

Tedavi Sonrası Apikal Periodontitisli Mandibular Birinci Molarda Kasıtlı Replantasyon: 12 Aylık Vaka Takibi

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ABSTRACT

Intentional replantation (IR) emerges as a critical intervention when non-surgical endodontic treatment fails, and anatomical limits rule out apicoectomy as a viable option. In cases where proximity to the inferior alveolar nerve, association with the maxillary sinus, or a thick buccal cortical plate prevents apicoectomy, IR becomes the preferred treatment method. A fifty-six-year-old female presented to the Ondokuz Mayıs University Department of Endodontics clinic with persistent discomfort and unresolved swelling in the left mandibular region following unsuccessful root canal treatment performed a year prior. Clinical examination revealed increased probing depths, a draining sinus tract, and localized swelling around tooth 36. A preoperative periapical radiograph confirmed post-treatment apical periodontitis, necessitating IR due to the thick buccal cortical plate. The tooth was atraumatically extracted, an extra-oral apicoectomy was executed, and the root end was prepared and sealed with mineral trioxide aggregate. Subsequently, the tooth was replanted and stabilized with sutures. A three-month follow-up demonstrated resolution of the sinus tract, with the tooth asymptomatic and fully functional at the one-year mark. Despite being overlooked by practitioners and often perceived as complex and unsafe, accumulating evidence supports its efficacy. Considering its cost-effectiveness to dental implants, clinicians should contemplate employing IR before opting for extraction.

Keywords: *Intentional replantation, mineral trioxide aggregate, conservative endodontics*

ÖZ

Kasıtlı replantasyon, cerrahi olmayan endodontik tedavi başarısız olduğunda ve anatomik sınırlar apikoektomiyi uygun bir seçenek olmaktan çıkardığında uygulanabilir. Inferior alveolar sinire yakınlık, maksiller sinüsle ilişki veya kalın bukkal kortikal plaka gibi durumlarda, kasıtlı replantasyon tercih edilebilir. Bu vaka raporunun amacı alt molar dişe yapılan kasıtlı replantasyon vakasının bir yıllık takibini sunmaktır. 56 yaşındaki kadın hasta, bir yıl önce uygulanan retreatment sonrası sol alt çenesinde rahatsızlık ve şişlik şikayetiyle Ondokuz Mayıs Üniversitesi Diş Hekimliği Fakültesi Endodonti kliniğine başvurdu. Klinik muayene, artmış sondalama derinliği, drene haldeki sinüs yolu ve 36 numaralı dişin fasiyal yüzündeki lokalize şişliği ortaya koydu. Periapikal radyografide periradiküler lezyon gözlendi ve tedavi sonrası apikal periodontitis teşhisi konuldu. Kalın bukkal kortikal kemik nedeniyle kasıtlı replantasyon kararı alındı. Diş atravmatik olarak çekildi, apikal rezeksiyon yapılıp kök ucu prepare edildikten sonra retrograd dolduruldu. Ekstraoral süre 5 dakika olarak kaydedildi. Diş replante edilip splintlendi. 3 aylık kontrolde sinüs yolunun kaybolduğu ve 1 yıllık kontrolde lezyonun tamamen iyileştiği, dişin semptomsuz ve fonksiyonel olduğu saptandı. Kasıtlı replantasyon, klinisyenler tarafından genelde göz ardı edilen bir tedavi seçeneğidir. Ancak, tedavinin başarılı olduğuna dair artan kanıtlar ve dental implantlara kıyasla maliyet etkinliği ile her klinisyenin değerlendirmesi gereken bir tedavidir.

Anahtar Kelimeler: *Kasıtlı replantasyon, mineral trioksit agregat, konservatif endodonti*

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INTRODUCTION

Endodontic treatment usually follows the order of less-invasive to invasive, such as pulp capping, amputation, root canal treatment, and retreatment. With the intention of minimal healthy tissue removal and avoidance of overtreatment, less invasive procedures are preferred. In this line of reasoning, when retreatment fails for some reason, we consider the possibility of an apicoectomy. Still, if the condition of the tooth is not viable for the procedure, most typically, Intentional replantation should be preferred to apicoectomy, in such cases as in mandibular molars because of the thick buccal cortical plate causing substantial bone removal to access to roots and post-op complications such as altered sensation[1] and in cases where maxillary premolar/molars are related with maxillary sinus and apicoectomy might damage the Schneiderian membrane.

Historically, intentional replantation has been practiced as early as the 18th and 19th centuries with the purpose of pain alleviation and abscess drainage.[2] Throughout the history of dental practice, the conduction of such treatment has progressed, and several successful case reports and studies have been made. Modern endodontics uses intentional replantation to treat many conditions, including maxillary sinusitis, vertical root, cases that are nonresponsive to non-surgical root canal treatment, or external root resorption.[3] Multiple meta-analyses finding the success rate 88% to 89.1%.[4] This case report aimed to present post-treatment apical periodontitis related to a mandibular first molar with fused roots and C-shape canals that were treated with hydraulic cement (AGM MTA, Andishe Gostar Masoud Co., Isfahan, Iran) intentional replantation in a female patient.

CASE REPORT

A 56-year-old female patient was referred to the clinic of the Endodontics Department at Ondokuz Mayıs University with complaints consisting of unresolved swelling on the left mandibular region, pain, and discomfort. Clinical examination confirmed a localized buccal swelling and a draining sinus tract in the facial region of tooth #36. The tooth was sensitive to palpation. Periodontal probing was 4 mm in the mesial, and the distal crown showed no sign of any crack. Restoration margins were appropriate. A periapical radiograph was taken, revealing a periapical lesion and a diagnosis of post-treatment apical periodontitis was made. After a thorough discussion with the patient about possible risks and complications, the patient consented to an intentional replantation procedure. The tooth was extracted as atraumatically as possible, purulent drainage was present and aspirated with a surgical suction until drainage was finished. The socket was free of any granulation tissue; to prevent damage to the periodontal ligament, no curettage was performed. The tooth was held by its crown with a sterile saline-soaked gauze by the operator. 3 mm of the apex was removed at 0° bevel angle from the root axis, and a C-shaped canal configuration was observed. Canals were retro-prepped 3mms with a high-speed rotary diamond round bur (FG Diamond, Adia abrasive Technologies, Istanbul, Türkiye) during copious sterile saline irrigation, and an AGM MTA (Andishe Gostar Masoud Co., Isfahan, Iran) retrograde filling was placed in the apices. After the root-end preparation was completed, the tooth was replanted, and A total of 4.5 minutes of extra-oral time was spent out of the socket. Afterward, the tooth was secured to its socket with a non-resorbable cruciate suture for one week. The tooth was reduced from the active occlusion, and 100 mg a day of doxycycline was prescribed for one week post-operatively. Three months of follow-up showed resolution of the apical radiolucency and swelling. In a one-year follow-up, the tooth was completely asymptomatic and in total recovery.

Figure 1. Periapical radiograph illustrating a sizeable periapical radiolucency associated with the apex of tooth #36.

Figure 2. Periapical radiograph of tooth #36 immediately after replantation.

Figure 3. Three-month postoperative periapical radiograph revealing osseous healing of the periapical radiolucency.

Figure 4. One-year postoperative periapical radiograph revealing complete osseous healing of the periapical radiolucency

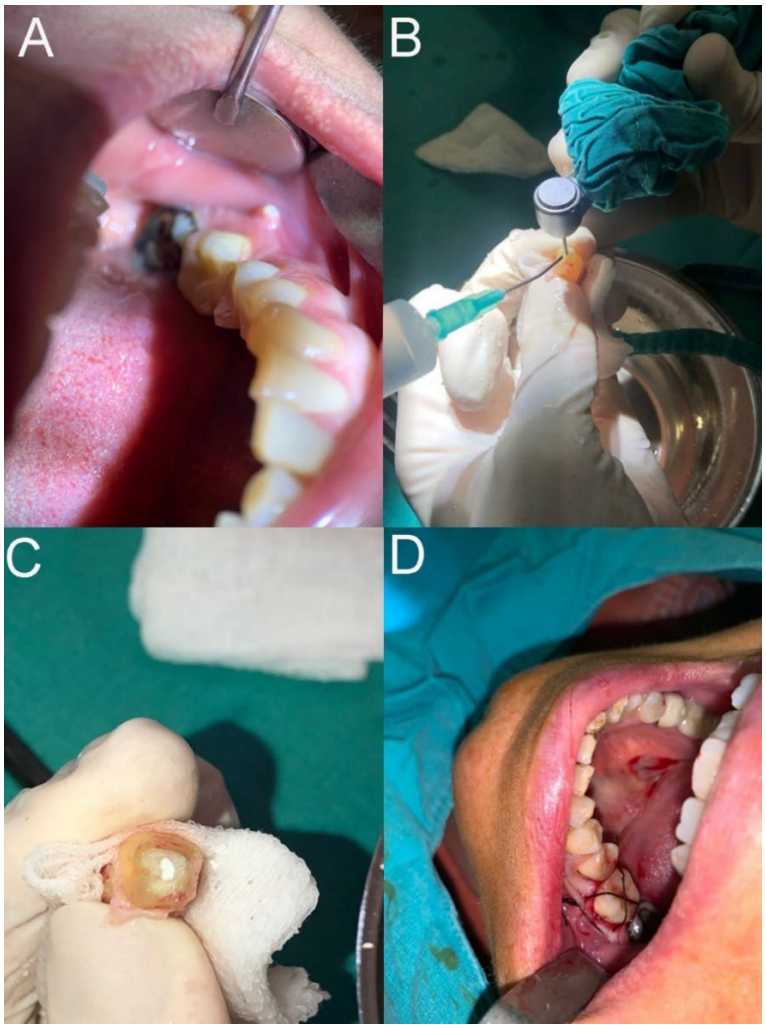

Figure 5-A. A preoperative clinical photograph with a mandibular occlusal view shows the symptomatic tooth #36 with a sinus tract, **5-B**. Photograph illustrating the apical retropreparation of the canals of tooth #36, **5-C** Photograph illustrating the retrograde filling with AGM MTA, **5-D** Photograph showing after replantation and splinting.

DISCUSSION

Nonsurgical root canal retreatment can be considered when the initial root canal procedure is unsuccessful. Although the success rate of retreatment is high, the inability to remove separated instruments in the apical zone, apical transportations, and zip perforations are some limitations to the retreatment procedure. These clinical scenarios may require surgical interventions. Proximity to anatomical landmarks such as the inferior alveolar nerve and maxillary sinus may be a contraindication to surgical approaches.

Apicoectomy and implant surgery are more complex and time-consuming operations than Intentional replantation since they require flap surgery, hemostasis, removal of the bone to some degree, and multiple sessions in implant surgery, making Intentional replantation relatively feasible to perform. Since intentional replantation does not require any flap operation, the surgical part only consists of atraumatic extraction and replantation, which requires little time. Even though dental implants have a high chance of survival compared to intentionally replanted teeth, Intentional replantation is a cost-effective option to single-tooth implants, even if a post-core is needed. The survival rate of intentional replantation must decrease to 54% to lose its cost-effectiveness against dental implants.[4]

Studies have confirmed the importance of intactness of cementum and periodontal ligament during extraction and during the extraoral environment; specimens showed external root resorption in areas with defective cementum and impaired periodontal ligament. Also, preservation of the tooth in a humid environment is critical to the treatment outcome, and studies conclude that 15 minutes or less should favor the prognosis since it also affects the chance of resorption[5] and dehydration of the periodontal ligament.

Although there has yet to be a consensus on the length and type of root-end preparation, multiple authors describe the amount between 2 mm to 4 mm or even one-third of the root length. 3 mm apical resections should be sufficient since 98% of anatomical ramifications and 93% of lateral canals are present within the apical 3mm from the apex.[6]

It has been suggested that the use of ProRoot MTA as a retro-filling material negatively affects the treatment outcome in teeth with C-shaped canal anatomy[7] for MTA's long setting time, resulting in its deterioration and an unfavorable diagnosis. However, new-generation hydraulic cements with a high concentration of larger d90 particles have a decreased setting time[8]; use of a hydraulic material with larger particle size and with a maximum of 15 minutes of setting time should favor the prognosis of intentional replantation.

Literature shows that splinting after replantation is still controversial. Although the literature indicates that The lack of splinting may expedite damage resulting from trauma and instability during the healing process, many materials have been used to splint teeth, such as orthodontic wire, sutures, and acrylic.[9] Kratchmen[10] states that rigid splinting may harbor bacteria, and studies state that suture splinting might facilitate periodontal healing.[9]

CONCLUSION

With the increasing number of successful long-term reports, intentional replantation should be considered before extracting a retreated or a "hopeless" tooth. Even considering its cost-effectiveness, minimal time requirement, and feasibility to dental implants, intentional replantation might be an option before a dental implant insertion.

DECLARATION

Conflicts of Interest: The author declares no potential conflicts of interest concerning this article's research, authorship, and publication.

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