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CASE REPORT

Intentional Replantation as a Salvage Treatment for a Molar Following Failed Root-End Surgery

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ABSTRACT

Intentional replantation (IR) is often considered a last-resort intervention for managing failed endodontically treated teeth. This case report details the successful retreatment of a molar with persistent apical lesions, which failed one year after previous root-end surgery using amalgam. A 45-year-old female presented with ongoing pain and mild swelling in the region of the affected molar. A periapical radiograph confirmed lesions at both the mesial and distal roots, diagnosing symptomatic apical periodontitis. The tooth was treated with IR, using calcium-enriched mixture (CEM) cement to seal the root-end cavities. The patient remained asymptomatic two years post-treatment, with clinical and radiographic evaluations showing bone healing and a favourable prognosis. This case demonstrates that intentional replantation, when combined with biocompatible materials such as CEM cement, can serve as a reliable and effective treatment option for complex endodontic failures. The favourable clinical and radiographic outcomes observed over two years underscore the potential of this conservative approach in appropriately selected cases.

KEYWORDS

Intentional replantation; Endodontics; Apical periodontitis; CEM cement

INTRODUCTION

Failed endodontic treatments present significant challenges for both clinicians and patients. When conventional orthograde retreatment or surgical approaches, such as root-end surgery, prove ineffective, intentional replantation (IR) may serve as a viable alternative. IR involves the extraction of a tooth, performing endodontic treatment extraorally, and then replanting the tooth back into its socket [1]. Although less frequently performed, IR has demonstrated high success rates when carefully executed in selected cases.

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The failure of surgical endodontic treatment, specifically root-end surgery, can often be attributed to factors such as incomplete seal of the retrograde filling, persistent infection, or the use of inappropriate materials [2]. Amalgam, once commonly used for root-end fillings, is now known to have several drawbacks, including poor sealing ability, corrosion over time, and biocompatibility concerns [3]. These factors can lead to persistent apical inflammation and ultimately the failure of the surgical intervention.

The objective of this case report is to demonstrate the successful retreatment of a molar with persistent apical lesions, which failed after previous root-end surgery with amalgam, using IR and calcium-enriched mixture (CEM) cement to achieve long-term clinical success and radiographic evidence of healing.

CASE PRESENTATION

A 45-year-old female presented with persistent pain and recurrent swelling in the buccal region of her left maxillary molar, which had previously undergone root-end surgery using amalgam. Clinical examination revealed localized tenderness and swelling around the tooth, while adjacent teeth were asymptomatic with normal responses to sensitivity tests. A periapical radiograph showed large apical lesions involving the mesial and distal roots, leading to a diagnosis of symptomatic apical periodontitis (Figure 1A).

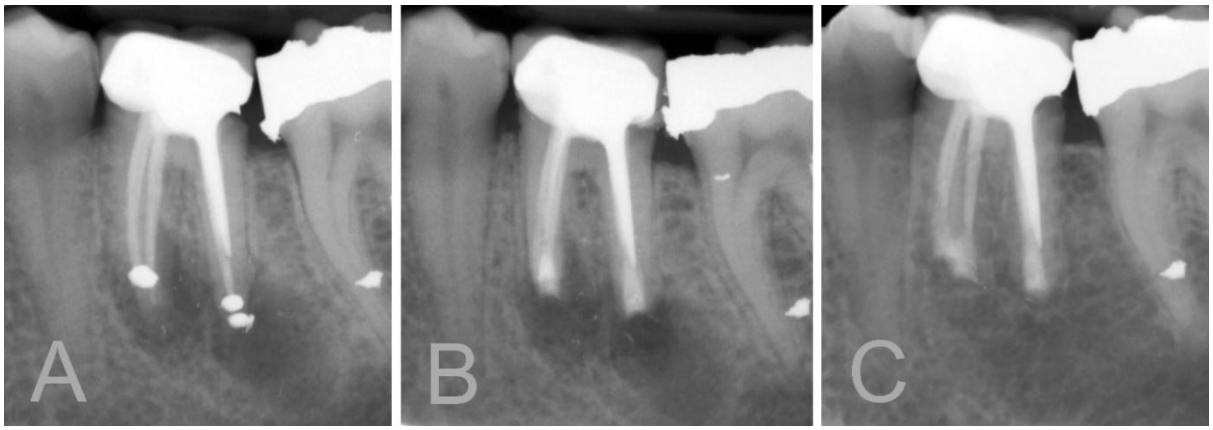

Figure 1 (A): Preoperative periapical radiograph showing large apical lesions involving the mesial and distal roots of the left first maxillary molar, consistent with symptomatic apical periodontitis. **(B)** Immediate postoperative radiograph after IR, showing the tooth reinserted into its socket with root-end cavities filled/sealed using calcium-enriched mixture cement. **(C)** Two-year follow-up radiograph demonstrating complete bone healing, with no signs of recurrent pathology, confirming a favourable treatment outcome.

Several treatment options were discussed with the patient, including extraction with implant placement, peri-radicular re-surgery, and IR. Given the patient's preference to preserve the natural tooth and avoid further surgical trauma or prosthetic intervention, IR was selected as the most conservative and biologically favorable treatment option. Informed consent was obtained.

The procedure began with the administration of local anesthesia (2% lidocaine with 1:80,000 epinephrine) and a 0.12% chlorhexidine rinse. The tooth was carefully extracted, and 1 mm of the apical portion of the roots was resected using a high-speed diamond bur. Root-end cavities, 3 mm in depth, were prepared using Gates Glidden burs. The root-end cavities were filled and sealed with CEM cement (BioniqueDent, Tehran, Iran), mixed according to the manufacturer's instructions. After rinsing with saline and aspirating any blood clots, the tooth was replanted into its socket without the need for stabilization (Figure 1B). The total extraoral time was under 14 minutes. Postoperative instructions included maintaining meticulous oral hygiene, using chlorhexidine rinses, following a soft diet, and no antibiotic administration.

The patient was monitored over two years. At follow-up, she remained asymptomatic, with no recurrence of pain or swelling. Radiographic evaluation revealed significant bone healing around the roots, confirming a successful treatment outcome (Figure 1C).

DISCUSSION

Intentional replantation has traditionally been considered a last-resort intervention in the management of endodontically compromised teeth when orthograde retreatment and surgical approaches fail. The present case demonstrates the successful use of IR, combined with CEM cement, in the treatment of a molar that had failed following prior root-end surgery with amalgam. Over a two-year follow-up period, the patient remained asymptomatic, with radiographic evidence of bone healing, highlighting the potential of IR as a viable solution for complex endodontic failures.

Successful intentional replantation requires careful case selection, including teeth with favorable root morphology, absence of periodontal disease, and a patient's willingness to adhere to postoperative care. Additionally, clinician experience plays a critical role in minimizing extraoral time and ensuring atraumatic handling. This case exemplifies how these criteria can be effectively applied in practice.

One of the key factors contributing to the failure of the initial root-end surgery was likely the use of amalgam as the retrograde filling material. Amalgam has long been associated with several disadvantages in endodontic surgery, including poor marginal adaptation, corrosion, and leakage over time [3], which can allow for persistent apical inflammation; sealing materials, such as CEM cement, have been developed to address these limitations [4]. CEM cement, in particular, has shown excellent sealing ability, biocompatibility, and the capacity to promote bone and cementum regeneration, making it a superior choice for root-end filling.

The success of the case can also be attributed to several procedural considerations. First, maintaining a short extraoral time is critical to preserving the periodontal ligament (PDL) cells, which are essential for reattachment and healing [1]. In this case, the extraoral time was limited to under 14 minutes, minimizing the risk of PDL cell damage and optimizing the chances of successful replantation. Moreover, the atraumatic technique and meticulous handling of the tooth ensured that the PDL remained intact, contributing to the favorable outcome [1].

The radiographic evidence of bone healing observed at the two-year follow-up suggests that the combination of IR and CEM cement can effectively resolve apical periodontitis, even in cases involving persistent lesions after previous surgical intervention. CEM cement's ability to induce hydroxyapatite formation in the presence of phosphate-containing fluids facilitates the formation of a biological seal, which is crucial in preventing reinfection and promoting periapical healing [4,5].

Despite the successful outcome in this case, it is important to acknowledge the inherent risks and challenges associated with IR. Although the procedure boasts relatively high success rates, complications such as root resorption, ankylosis, or re-infection may occur if the replantation process is not carefully managed. Moreover, the success of IR depends on the proper case selection, clinician experience, and the use of appropriate biomaterials. In this context, CEM cement emerges as a highly suitable biomaterial due to its proven ability to support favorable clinical outcomes in complex endodontic scenarios.

Beyond its application in this case, IR serves as an underutilized but valuable strategy in the endodontic armamentarium. This case reinforces the need for increased awareness and training among clinicians regarding conservative alternatives to extraction in complex scenarios.

CONCLUSION

This case highlights the successful use of IR combined with CEM cement in the management of a previously failed surgical endodontic case. The favorable clinical and radiographic outcomes observed after two years suggest that IR, when carefully executed, offers a promising treatment option for challenging endodontic failures, particularly when biocompatible materials like CEM cement are employed. Further research with larger sample sizes and longer follow-up periods is needed to validate the long-term effectiveness of this approach.

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