Journal of Craniomaxillofacial Research

Vol. 13, Issue. 1 Winter 2026

Intentional Replantation of a Hopeless Mandibular Molar with a Combined Periodontal–Endodontic Lesion: A Case Report

Saeed Asgary *

Iranian Centre for Endodontic Research, Research Institute of Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

ARTICLE INFO

Article Type:
Case Report

Received: 6 September 2025
Revised: 26 October 2025
Accepted: 25 December 2025

**Corresponding author:*
Saeed Asgary

Iranian Centre for Endodontic Research, Research Institute of Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Tel: +98-21-84903747
Fax: +98-21-84903747
Email: saasgary@yahoo.com

ABSTRACT

Intentional replantation (IR) is traditionally considered a last-resort procedure for teeth with an otherwise hopeless prognosis. Although advances in biomaterials have improved clinical outcomes, long-term evidence in teeth with combined periodontal–endodontic lesions (CPEL) and severe mobility remains limited. This case report describes a 12-year outcome of IR in a mandibular molar with a large CPEL, Grade III mobility, and persistent infection despite previous root canal therapy (RCT). A 45-year-old female presented with persistent pain and a draining sinus tract associated with tooth #36 one month after an RCT performed elsewhere. Clinical examination revealed Grade III mobility, probing depths >6 mm, bleeding on probing, and Class III furcation involvement. Radiography showed extensive periradicular and furcal radiolucency (PAI = 5). After obtaining written informed consent, an IR was performed. Atraumatic extraction was followed by root-end resection, retro-preparation using Gates-Glidden burs, and placement of calcium-enriched mixture (CEM) cement as a root-end filling material. The tooth was replanted within 9 minutes. No splinting was used. At two weeks, the infection had resolved, and mobility decreased to Grade II. Complete radiographic healing was observed at 3 years (PAI = 1). Probing depths normalized (<3 mm), mobility resolved (Grade 0), and no root resorption or ankylosis occurred. Follow-ups at 4, 5, 6, and 12 years confirmed long-term stability. At 12 years, recurrent coronal caries was restored with an amalgam crown featuring intra-orifice barriers. Periapical health, periodontal architecture, and function remained intact. This 12-year follow-up demonstrates that, when executed with strict biological principles and biomaterial selection, IR can achieve long-lasting success even in teeth with multiple negative prognostic indicators. The result highlights CEM cement as a biocompatible, bioactive root-end filling material that may promote periradicular healing in compromised conditions.

Keywords: Intentional replantation; Calcium silicate; Periodontal-endodontic lesion; Apical periodontitis; Root-end filling; Mineral trioxide aggregate; Long-term outcome.

Please cite this Article as:
Asgary S. Intentional Replantation of a Hopeless Mandibular Molar with a Combined Periodontal–Endodontic Lesion: A Case Report. J Craniomaxillofac Res 2026; 13(1): 123-128. DOI: 10.18502/jcr.v13i1.21484

Introduction

The preservation of natural dentition remains a cornerstone of contemporary dentistry, offering superior biological, functional, and aesthetic outcomes compared with prosthetic replacements such as implants or fixed partial dentures [1]. However, teeth presenting with complex combined periodontal-endodontic lesions (CPEL), severe mobility, and active infection are traditionally considered to have a hopeless prognosis, with extraction often regarded as the only viable management strategy [2]. Intentional replantation (IR), defined as the deliberate extraction of a tooth, extraoral examination and treatment, followed by reinsertion into the original socket, was first described by Grossman (1966) as a procedure of last resort [3]. Over time, refinements in surgical technique and advances in root-end filling biomaterials have led to improved outcomes. Recent systematic reviews report pooled survival rates of 78% and a pooled survival rate of 86-89% for IR in treated teeth [4,5]. Nevertheless, prognosis diminishes considerably when complicating factors such as periodontal involvement, severe mobility, or acute infection are present.

Periodontal-endodontic lesions, particularly true CPEL, where pulpal and periodontal pathologies converge, are consistently recognized as negative prognostic factors. The recent meta-analysis demonstrated that teeth with CPEL had a significantly lower survival rate ratio (0.80%) compared with isolated endodontic lesions [5]. Severe mobility, especially Grade III mobility, reflects advanced periodontal ligament (PDL) destruction and alveolar bone loss, which critically compromises reattachment potential following replantation [6]. In addition, the presence of an acute abscess introduces a microbial and inflammatory burden that jeopardizes PDL healing and increases risks of ankylosis or root resorption [7].

Conventional management of such cases typically involves extraction and subsequent implant or prosthetic rehabilitation, since the likelihood of saving the natural tooth through nonsurgical retreatment or apical surgery is minimal [7]. However, recent advancements, such as atraumatic extraction techniques, minimizing extraoral time to ≤15 minutes, preservation of viable PDL cells, and the use of calcium-silicate bioactive root-end materials, have significantly enhanced the prognosis of IR [8]. Despite these improvements, long-term evidence remains scarce, particularly for teeth with multiple unfavorable prognostic indicators. Most published reports on IR for CPEL cases with severe mobility and acute infection involve short- to medium-term follow-ups, with failures often occurring within the first few years [4]. Reports of survival beyond a decade are extremely rare, especially when all major negative prognostic factors are present simultaneously. This case report presents a 12-year follow-up of a mandibular first molar treated with IR despite being deemed hopeless due to a large CPEL, Grade III mobility, and a chronic discharging abscess. The outcome challenges conventional prognostic expectations and underscores the potential of intentional replantation, when performed with biological precision, to provide long-term tooth retention even in the most compromised scenarios.

Case Presentation

A 45-year-old female presented in 2012 with a chief complaint of pain in the left mandibular first molar (#36). She reported several months of intermittent swelling and discomfort in the region. Her medical history was non-contributory, and she was not taking any medications affecting periodontal or endodontic status. Clinical examination revealed a large disto-occlusal amalgam restoration with recurrent caries. Deep periodontal probing depths (>6 mm) were detected along the distal and furcal aspects, corresponding to the site of a chronic draining sinus tract. The tooth exhibited Grade III mobility [9]. Percussion and palpation tests elicited positive responses, whereas thermal and electric pulp tests were negative, confirming pulpal necrosis. An orthopantomogram (OPG) demonstrated a large periradicular radiolucency associated with tooth #36; the lower incisors also showed radiographic changes suggestive of previous traumatic injuries (Figure 1A). The initial diagnosis was pulp necrosis with symptomatic apical periodontitis. The patient declined immediate treatment and subsequently underwent root canal therapy (RCT) at another dental clinic. Eleven months later, the patient returned to our clinic reporting persistent symptoms one month after completion of the RCT. Compared with the 2012 assessment, periodontal destruction had progressed markedly. Periapical radiography revealed acceptable root canal obturation; however, tooth #36 displayed Grade III mobility, persistent purulent drainage despite a 10-day course of amoxicillin (500 mg), probing depths greater than 6 mm (mean 12 mm), bleeding on probing, Class III furcation involvement, and a Periapical Index (PAI) score of 5 (Figure 1B) [10]. These findings refined the diagnosis to a primary endodontic lesion with secondary periodontal involvement [classified as a true combined periodontal-endodontic lesion (CPEL)] complicated

 DOI: 10.18502/jcr.v13i1.21484

by severe mobility and chronic infection. Given the extensive periodontal breakdown, furcation involvement, persistent sinus tract, and history of unresolved infection despite adequate RCT, non-surgical retreatment was considered biologically insufficient. The presence of a likely extraradicular infectious component indicated that orthograde retreatment alone would not predictably resolve the lesion. Because conventional apical surgery was contraindicated due to furcal destruction, intentional replantation (IR) was proposed as the only feasible tooth-preserving option. The patient strongly wished to avoid extraction and consented to the procedure after a detailed discussion. Written informed consent for treatment and publication was obtained.

Under local anesthesia (2% lidocaine with 1:80,000 epinephrine; DarouPakhsh, Tehran, Iran), the tooth was atraumatically extracted using periotomes and fine luxators to preserve periodontal ligament (PDL) viability. Total extraoral time was strictly limited to 9 minutes and recorded. During this period, the root surfaces and socket were intermittently irrigated with sterile saline to prevent desiccation. Approximately 3 mm of each root apex was resected under continuous water cooling. The resected surfaces were examined with surgical loupes (EVC250N, MI, USA) and stained with methylene blue to evaluate cracks or isthmi. Diseased soft tissue was carefully curetted from the socket and root apex to remove potential extraradicular biofilms, including possible Actinomyces spp. Retrograde preparations were created with Gates-Glidden #2 and #3 burs to a depth of 3–4 mm [11], irrigated with saline, and dried with sterile paper points (Aryadent, Tehran, Iran). Calcium-enriched mixture (CEM) cement (BioniqueDent, Tehran, Iran) was placed into the retrocavities and gently condensed. The tooth was immediately replanted into its original socket, ensuring correct positioning (Figure 2A). Splinting was intentionally avoided to reduce ankylosis risk. Postoperative instructions were given; no antibiotics were prescribed because systemic involvement was absent and local infection had been thoroughly managed. At the 2-week follow-up, mobility had decreased to Grade II, the sinus tract had resolved, and the patient was asymptomatic with acceptable oral hygiene. A definitive composite restoration with intra-orifice barriers was placed to enhance coronal sealing (Figure 2B). At the 3-year recall, radiography demonstrated complete healing of the periradicular and interradicular lesions (PAI 1) (Figure 3A). Clinically, probing depths were <3 mm without bleeding, the furcation defect had clinically resolved (Class 0), and mobility was Grade 0. Follow-up examinations at 4, 5, and 6 years confirmed continued periodontal and periapical stability (Figures 3B–D). At the 12-year recall (2025), the tooth remained fully functional, asymptomatic, and stable, with probing depths <3 mm, no bleeding on probing, Grade 0 mobility, and preserved periodontal architecture. Periapical radiography confirmed complete healing, intact PDL space, and absence of root resorption or ankylosis (Figure 4A). Recurrent coronal caries was detected and restored with a new amalgam crown (Sinalux, Faghihi Co., Tehran, Iran) incorporating tight intra-orifice barriers to ensure optimal coronal seal (Figure 4B). Aside from this restorative intervention, the tooth remained clinically and radiographically healthy over the entire 12-year period.

Figure 1. Initial presentation and preoperative status. A) Orthopantomogram (OPG) from 2012 showing the lower left first molar with extensive amalgam restoration and a Cl II DO cavity decay (white arrow), associated with a large periradicular/furcal lesion requiring RCT. Lower incisors also show endodontic lesions from previous trauma. B) Periapical radiograph taken 11 months post initial visit (2013), and one month after RCT performed elsewhere, showing adequate root canal filling but persistent Grade III mobility, chronic abscess despite antibiotic therapy, and extensive periradicular bone destruction (black line).

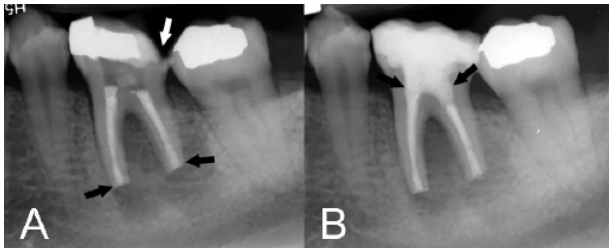

Figure 2. Intentional replantation procedure and immediate postoperative outcome. A) Immediate postoperative periapical radiograph following IR. The tooth was atraumatically extracted, followed by root-end resection/preparation using GG burs, with root-end filling using CEM cement (black arrows). No arch bar fixation was used. B) Periapical radiograph 2 weeks postoperatively after the resolution of infection, with coronal restoration/intraorifice barriers (black arrows) using composite resin.

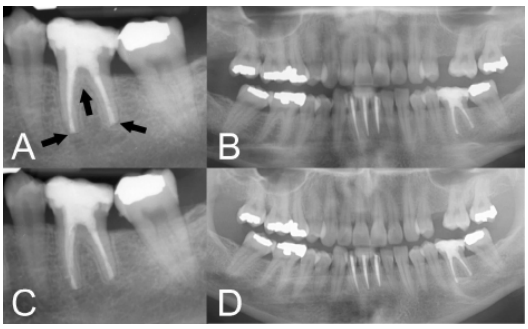

Figure 3. Medium-term follow-up radiographs demonstrate successful healing. A) Periapical radiograph at 3-year follow-up (2016) showing complete healing of the periradicular/interradicular lesions (black arrows), normal periodontal ligament space, and no signs of root resorption. B) OPG at 4-year follow-up (2017), confirming successful outcomes. C) Periapical radiograph at 5-year follow-up (2018) showing continued periapical health. D) OPG at 6-year follow-up (2019), confirming long-term success.

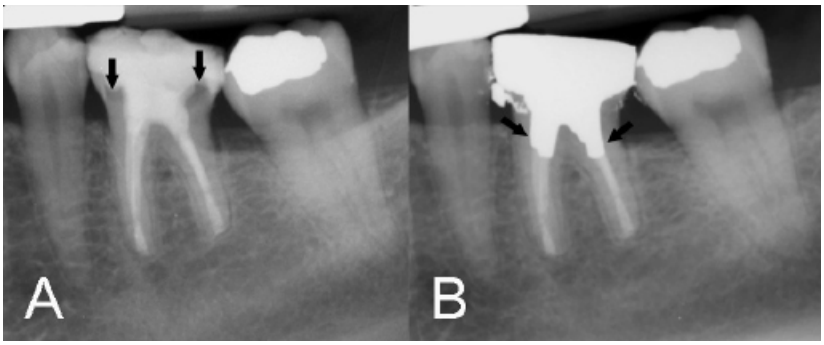

Figure 4. Long-term follow-up and management of recurrent caries. A) Periapical radiograph at 12-year follow-up (2025) showing recurrent coronal caries (black arrows) but otherwise excellent periapical health, intact periodontal ligament space, and no evidence of pathology. B) Immediate postoperative periapical radiograph after placement of an amalgam crown, showing tight intraorifice barriers (black arrows) and excellent marginal adaptation/restoration.

Table 1. Long-term clinical and radiographic outcomes for the replanted tooth.

Recall date (months/years after IR)	*Mobility (Miller grade)*	*Deepest probing depth (mm)*	*Mean probing depth (mm)*	*Bleeding on probing (yes/no)*	*Furcation involvement (Hamp class)*	*PAI score**	*Notes*
Baseline (pre-IR)	*Grade III*	*>6*	*12*	*Yes*	*Class III*	*5*	*Recurrent caries; symptomatic*
Immediate post-op	*Grade III*	*Not recorded*	*Not recorded*	*Not recorded*	*Class III*	*5*	*Temporary restoration*
2 weeks	*Grade II*	*Not recorded*	*Not recorded*	*Yes*	*Class III*	*Not recorded*	*Patient asymptomatic; good OH*
3 years	*Grade 0*	*<3*	*<3*	*No*	*Class 0*	*1*	*No clinical signs of inflammation*
4 years	*Grade 0*	*<3*	*<3*	*No*	*Class 0*	*1*	*Stable*
5 years	*Grade 0*	*<3*	*<3*	*No*	*Class 0*	*1*	*Stable*
6 years	*Grade 0*	*<3*	*<3*	*No*	*Class 0*	*1*	*Stable*
12 years	*Grade 0*	*<3*	*<3*	*No*	*Class 0*	*1*	*Recurrent caries#*

*PAI = Periapical Index; Miller grade: 0 = physiologic; I = ≤1 mm horizontal mobility; II = >1 mm horizontal, no vertical; III = vertical and horizontal mobility; Hamp classification: Class 0 = no furcation involvement; I = <3 mm; II = >3 mm, not through-and-through; III = through-and-through defect; # that managed with a new amalgam crown; restoration was polished to minimize gingival irritation.

 DOI: 10.18502/jcr.v13i1.21484

Discussion

The purpose of this case report is not to describe the standard technical steps of IR, which are well established in the literature [5,12], but rather to document the sustained clinical and radiographic stability achieved over 12 years in a tooth that initially exhibited a hopeless prognosis. The baseline condition _severe CPEL, extensive periradicular/furcal bone loss, Grade III mobility, and persistent abscess_ would generally contraindicate tooth preservation. Despite these factors, the long-term success observed in this case highlights the potential of IR, when performed with strict adherence to biological principles and meticulous surgical technique, to provide durable outcomes in exceptionally compromised scenarios [13].

Several biological and clinical mechanisms likely contributed to this outcome. First, strictly minimizing extraoral time (<10 minutes) and handling the tooth as atraumatically as possible helped preserve PDL cell viability, a critical determinant of successful reattachment and healing. Second, thorough mechanical debridement of both the socket and the root-end area likely reduced extraradicular bacterial load. In cases with furcation involvement or CPEL, the removal of necrotic tissue and potential Actinomyces-containing biofilms is essential because these microorganisms are frequently involved in refractory apical periodontitis and are resistant to orthograde approaches. Third, the use of CEM cement as the root-end filling material likely played a significant role in the favorable biological response. CEM cement is a calcium silicate-based biomaterial with demonstrated biocompatibility, hydrophilicity, sealing ability, antibacterial activity, and the capacity to induce dentinogenesis, cementogenesis, and osteogenesis [14].

These properties support the formation of a biologically active hard-tissue barrier and contribute to long-term periapical and periodontal healing. Although the biomaterial itself is not novel, its use in this severely compromised context aligns with current evidence showing that bioactive cements can enhance healing even in teeth with unfavorable prognostic indicators [15]. The diagnosis in this case was complex. The rapid periodontal deterioration following pulpal necrosis, the presence of a draining sinus, and the radiographic configuration are consistent with a primary endodontic lesion with secondary periodontal involvement, classified as a true CPEL. Such lesions are historically associated with poor regenerative potential, reduced predictability of periodontal healing, and compromised outcomes following conventional retreatment [2]. Non-surgical retreatment was considered but deemed insufficient to eliminate the extraradicular infectious component or address the furcal lesion. Similarly, surgical endodontics was contraindicated because of the degree of furcation destruction. IR thus provided a uniquely comprehensive approach: direct root-end management, socket debridement, and elimination of extraradicular irritants within a single procedure. The long-term healing observed clinically and radiographically underscores the importance of patient-specific factors as well. The patient's systemic health, immune response, and compliance with follow-up may have positively influenced the healing trajectory. Additionally, avoiding rigid splinting likely reduced the risk of ankylosis and facilitated physiological PDL healing.

The resolution of furcation involvement warrants particular mention. Clinically, the furcation defect was no longer detectable after 3 years, and probing depths remained normal throughout the 12-year follow-up. Radiographically, periapical images suggested significant bone fill. However, because CBCT was not obtained at the 12-year recall, definitive three-dimensional confirmation of furcal regeneration cannot be claimed. This limitation also applies to the detection of subtle replacement or surface resorption, which may be radiographically occult on two-dimensional imaging. A restorative complication (recurrent coronal caries after 12 years) required a new amalgam crown. Importantly, this event was unrelated to the IR procedure and did not compromise the periradicular or periodontal stability. This observation underscores the clinical principle that even when root-end healing is successful, the long-term prognosis of replanted teeth depends on the quality of coronal seal and regular maintenance.

The limitations of this report include its single-case design, which inherently restricts generalizability, and the fact that the RCT was performed in another clinic, limiting control over the initial intracanal procedures. Nevertheless, this case contributes valuable long-term data demonstrating that IR can succeed in conditions long considered incompatible with predictable healing. Overall, this report supports the growing evidence that IR, when performed with proper case selection, atraumatic handling, and appropriate biomaterial application, can serve as a realistic alternative to extraction, even in teeth with multiple negative prognostic indicators. The 12-year stability documented here challenges conventional assumptions and reinforces the relevance of IR as a biologically grounded, cost-effective, and

tooth-preserving treatment modality.

Conclusion

This 12-year follow-up case report demonstrates that IR using CEM cement can result in long-term healing even in teeth with severe CPEL and a traditionally hopeless prognosis. With meticulous technique and appropriate biomaterial selection, IR should be considered a viable tooth-preserving alternative before extraction.

Conflict of Interest

There is no conflict of interest to declare.

References

[1] Asgary S: Autotransplantation of a Third Molar to Replace an Adjacent Unrestorable Tooth: A Case Report. Cureus. 2023; 15:e48133. 10.7759/cureus.48133.

[2] Rotstein I, Simon JH: Diagnosis, prognosis and decision-making in the treatment of combined periodontal-endodontic lesions. Periodontology 2000. 2004; 34:165-203. 10.1046/j.0906-6713.2003.003431.x.

[3] Grossman LI: Intentional replantation of teeth. Journal of the American Dental Association. 1966; 72:1111-8. 10.14219/jada.archive.1966.0125.

[4] Pisano M, Di Spirito F, Martina S, et al.: Intentional Replantation of Single-Rooted and Multi-Rooted Teeth: A Systematic Review. Healthcare (Basel). 2022; 11 10.3390/healthcare11010011.

[5] Zhang B, Cheng L, Deng X, et al.: Prognosis of intentional replantation for periapical periodontitis teeth: a systematic review and meta-analysis. BMC Oral Health. 2025; 25:1258. 10.1186/s12903-025-06583-1.

[6] Lin Z, Huang D, Huang S, et al.: Expert consensus on intentional tooth replantation. Int J Oral Sci. 2025; 17:16. 10.1038/s41368-024-00337-5.

[7] Plotino G, Abella Sans F, Duggal MS, et al.: European Society of Endodontology position statement: Surgical extrusion, intentional replantation and tooth autotransplantation: European Society of Endodontology developed by. International Endodontic Journal. 2021; 54:655-9. 10.1111/iej.13456.

[8] Praveen Kumar V, Sadasiva K, Raj Kumar J, et al.: Current Trends in Intentional Replantation Treatment Among Endodontists and Postgraduate Students in India, the United States of America, and the United Kingdom: A Cross-Sectional Study. Cureus. 2023; 15:e39742. 10.7759/cureus.39742.

[9] Miller SC: Textbook of Periodontia: oral medicine. (No Title). 1943.

[10] Ørstavik D, Kerekes K, Eriksen HM: The periapical index: a scoring system for radiographic assessment of apical periodontitis. Dental Traumatology. 1986; 2:20-34.

[11] Asgary S, Alim Marvasti L, Kolahdouzan A: Indications and case series of intentional replantation of teeth. Iran Endod J. 2014; 9:71-8.

[12] Asgary S: Management of a Late Complication of Strip Perforation with Overextended Gutta-percha Using Intentional Replantation: A 10-Year Follow-up Case Report. Iran Endod J. 2025; 20:e22. 10.22037/iej.v20i1.48363.

[13] Boschini L, Plotino G, Melillo M, et al.: Endodontic management of an autotransplanted mandibular third molar: A simplified approach. Journal of the American Dental Association. 2020; 151:197-202. 10.1016/j.adaj.2019.10.025.

[14] Asgary S, Aram M, Fazlyab M: Comprehensive review of composition, properties, clinical applications, and future perspectives of calcium-enriched mixture (CEM) cement: a systematic analysis. Biomedical Engineering Online. 2024; 23:96. 10.1186/s12938-024-01290-4.

[15] Asgary S, Roghanizadeh L: Rapid Bone Healing after Intentional Replantation of a Molar with Apical Actinomycosis. Iran Endod J. 2018; 13:135-8. 10.22037/iej.v13i1.19369.

 DOI: 10.18502/jcr.v13i1.21484