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Original Article

Intentional Replantation Combined with Periapical Surgery: A Case Report with One-Year Follow-Up

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ABSTRACT

Intentional replantation is a procedure where a tooth is deliberately extracted and then reinserted into its original socket. It is recognized as an alternative treatment for teeth with advanced periodontal damage, especially in the anterior region. This technique is most commonly used for teeth with endodontic re-infection but good periodontal support, while it is generally not recommended for teeth with significant periodontal compromise. One of the main advantages of this procedure is that it allows for better access to areas of the tooth that are otherwise difficult to treat, without harming the surrounding periodontal tissues, thereby promoting the healing of periradicular structures. Recent studies have expanded the use of intentional replantation to include teeth with poor periodontal prognosis. This case report discusses the treatment of a periodontally compromised lower central incisor using intentional replantation, combined with periapical surgery on the adjacent lateral incisor. The patient was monitored with follow-up visits every 3 months for a year.

Keywords: Hopeless Tooth, Intentional Replantation, Periapical Abscess, Periodontally Compromised.

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Introduction

The fundamental goal of periodontal therapy is to restore and regenerate the lost periodontium. When anterior teeth exhibit severe periodontal damage, their management becomes biologically and functionally challenging, often making extraction unavoidable in advanced cases [1, 2].

Intentional replantation involves the careful, atraumatic extraction of a tooth, followed by root-end filling and reinsertion into its original socket [3, 4]. Some researchers consider this approach a last-resort effort to retain a compromised tooth under specific circumstances [5]. This technique is relatively simple, cost-effective, and time-efficient, with minimal postoperative discomfort [6]. A key advantage is that it allows direct visualization of previously inaccessible root surfaces while preserving adjacent periodontal structures, thereby facilitating the regeneration of periradicular tissues [7].

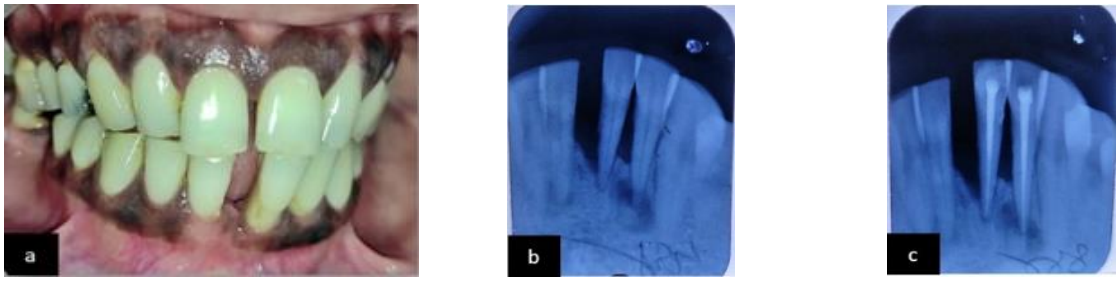
This report highlights the clinical and radiographic outcomes observed one year after the intentional replantation of a periodontally compromised tooth deemed hopeless.

Case Report

A 42-year-old female patient, in good systemic health, was referred to the Department of Periodontology due to persistent mobility of her lower front teeth over the past year. Upon intraoral examination, the gingiva in the affected region appeared pink with melanin hyperpigmentation, featuring rolled margins and

blunted interdental papilla. The tissue was soft, lacked stippling, and exhibited bleeding on probing. Tooth 31 displayed class IV recession, while tooth 32 presented with class I recession. Probing pocket depth measurements ranged from 5 to 6 mm, with a gingival recession of 5 mm noted concerning tooth 31 (Figure 1a). The attached gingiva width and vestibular depth were found to be sufficient. Tooth 31 showed pathological migration and was assessed with grade II mobility. A thermal vitality test confirmed that both teeth 31 and 32 were non-vital.

Radiographic assessment using intraoral periapical radiographs revealed extensive alveolar bone resorption reaching the apex of the mandibular left central incisor. Additionally, an indistinct periapical radiolucency measuring approximately 5 mm was observed near the left mandibular lateral incisor (Figure 1b). The patient expressed a strong preference for retaining her natural tooth due to financial limitations and was unwilling to undergo extraction. Considering her wishes and the clinical presentation, a comprehensive treatment plan was formulated, including phase I therapy and root canal treatment for teeth 31 and 32 (Figure 1c), followed by intentional replantation of tooth 31 and an apicectomy for tooth 32.



a) b) c)

Figure 1. a) preoperative image displaying pathological migration and clinical attachment loss in tooth 31; b) intraoral periapical radiograph showing extensive alveolar bone resorption extending to the apex of the mandibular left central incisor, along with an indistinct periapical radiolucency of approximately 5 mm near the left mandibular lateral incisor; c) post-root canal treatment status of teeth 31 and 32.

Surgical Procedure

The procedure was conducted under strict aseptic conditions. Local anesthesia was administered using a left inferior alveolar nerve block and a right mental nerve block with 2% lidocaine (**Figure 2a**). To gain access, sulcular and interdental incisions were made from the distal aspect of tooth 33 to the distal aspect of tooth 43 (**Figure 2b**). A vertical releasing incision was placed at the distofacial papilla of the canine, allowing for the reflection of a rectangular flap on the labial side (**Figure 2c**).

For tooth 32, osteotomy was performed at the predetermined site, as identified from the intraoral periapical radiograph, using a straight fissure carbide bur. Apical curettage was completed with curettes, followed by a 3 mm root-end resection. The retrograde root-end cavity was then filled using glass ionomer cement (**Figure 2d**).

Regarding tooth 31, an atraumatic extraction was carried out, ensuring minimal trauma to the surrounding structures. Root planing was meticulously performed to eliminate necrotic cementum and granulation tissue. The extracted tooth was then immersed in normal saline to maintain hydration (**Figure 2e**). The socket was prepared for replantation using a sequence of implant drills, D2 and D3. The extracted tooth was carefully repositioned into the socket and stabilized using an extra-coronal splint with a 26-gauge wire, extending from tooth 33 to tooth 43 (**Figure 2f**). The flaps were then repositioned and secured with simple interrupted sutures using 3-0 black silk, a non-resorbable suture material (**Figure 2g**).

To provide additional stabilization, acrylic cap splints were custom-fabricated and placed in the lower anterior region (**Figure 2h**). Postoperatively, the patient was prescribed a five-day course of antibiotics and analgesics.

a) b) c) d)

e) f) g) h)

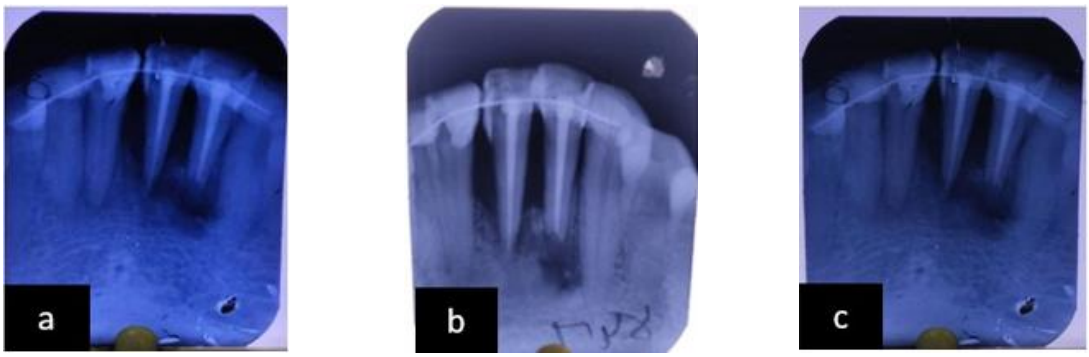
Figure 2. a) preoperative view; b) sulcular and interdental incisions extending from the distal aspect of tooth 33 to the distal aspect of tooth 43, with a vertical releasing incision at the distofacial papilla of the canine; c) rectangular flap reflected on the labial side; d) apicectomy performed on tooth 32; e) atraumatic extraction of tooth 31; f) replantation of tooth 31 into its socket, followed by stabilization using extracoronal splinting; g) acrylic splint placement; and h) periodontal dressing applied.

A follow-up evaluation was conducted 10 days after the procedure. The acrylic splint was removed, and stabilization was maintained using composite stops. Sutures were also removed at this visit. At the 6-week postoperative review, clinical examination showed satisfactory healing (**Figure 3a**). To enhance long-term stabilization, the extracoronal splint was replaced with intracoronal splinting using braided ligature wire and composite (**Figure 3b**).

a) b)

Figure 3. a) 6 weeks post-operative clinical photograph; and b) intra-coronal splinting

At the 3-month follow-up, radiographic examination showed a slight haziness around tooth 31, indicative of potential bone formation (**Figure 4a**). Clinically, there was a noticeable reduction in probing pocket depth (PPD) and bleeding on probing (BOP) (**Figure 5a**). Further assessments at 6 months and 12 months demonstrated progressive radiographic improvement, with increased radiodensity surrounding tooth 31 (**Figures 4b** and **4c**). Clinically, additional reduction in PPD was observed, along with improved patient acceptance and overall treatment success (**Figures 5b** and **5c**).



a) b) c)

Figure 4. a) IOPA at 3 months follow-up; b) IOPA at 6 months follow-up; and c) IOPA at 1 year follow-up

a) b) c)

Figure 5. a) clinical photograph at 3 months; b) clinical photograph at 6 months; and c) clinical photograph at 1 year

Results and Discussion

Prognosis, as defined by Carranza, refers to duration, the anticipated progression and outcomes of a disease, along with its potential response to treatment. It is determined based on an understanding of disease pathogenesis and the presence of various risk factors. Prognostic classifications range from good to hopeless, depending on the severity of attachment loss, furcation involvement, mobility, and crown-to-root ratio [8]. A good prognosis indicates that the disease can be controlled with sufficient periodontal support, whereas a fair prognosis involves up to 25% attachment loss with Class I furcation. A poor prognosis is characterized by 50% attachment loss and class II furcation involvement. When attachment loss exceeds 50%, with class III furcation, an unfavorable crown-to-root ratio, and significant mobility, the prognosis is considered questionable. A hopeless prognosis is assigned when there is inadequate attachment to maintain health, function, and comfort.

In the present case, the mandibular left central incisor exhibited extensive bone loss reaching the apex, along with grade II mobility. Based on prognostic criteria, the tooth was classified as having a hopeless prognosis, as it was unlikely to provide long-term stability or function. The standard treatment for such cases typically involves extraction followed by dental implant placement. However, due to financial constraints and personal preference, the patient was unwilling to proceed with extraction. Given the circumstances, intentional replantation was considered the final treatment option to preserve the natural tooth. Studies indicate that alveolar bone undergoes significant dimensional changes following tooth loss. Within the first year post-extraction, bone volume decreases by approximately 25%, and in the subsequent three years, the alveolar ridge width may be reduced by 40–60%. By opting for intentional replantation, the reduction in alveolar crest height and width was minimized, preserving the structural integrity of the jawbone [9].

Research conducted by Demiralp *et al.* [1] assessed the clinical and radiographic effects of intentional replantation in 15 teeth previously deemed periodontally hopeless. Their findings, observed over six months, showed a significant reduction in probing pocket depth (PPD) without any signs of root resorption or ankylosis on radiographic evaluation [1]. Given these outcomes, intentional replantation has been proposed as a viable alternative when conventional treatment options are not feasible [10, 11].

According to Andreasen [12], when the extra-oral dry time surpasses 2 hours, there is a 95% likelihood of external resorption and the formation of a non-functional scar. Dryden and Arens [13] recommended that the interval between tooth extraction and replantation should ideally remain under 15 minutes to improve success rates. In this case, all replantation procedures were completed within approximately 30 minutes, ensuring minimal risk of complications.

Nagappa *et al.* [14] conducted intentional replantation on two maxillary central incisors presenting with a moderate probing depth of 6 mm and grade II mobility. Without utilizing a root conditioning agent, they attempted regeneration three months post-replantation and observed improved clinical outcomes along with radiographic evidence of bone fill [14]. Similarly, Şen *et al.* [15] mentioned a case series demonstrating favorable clinical and radiographic results following intentional replantation, with a six-month follow-up showing positive outcomes even in the absence of bone grafts and platelet-rich fibrin (PRF).

In the present case, a flap reflection was planned for intentional replantation of the mandibular left central incisor. Given this approach, the periapical lesion in the adjacent mandibular lateral incisor was addressed concurrently, making this the first documented case in which periodontal and endodontic surgical interventions were performed simultaneously.

The patient was monitored monthly for one year, with progressive improvements noted throughout the follow-up period. Clinically, there was a significant decrease in probing pocket depth and bleeding on probing. A slight increase in clinical attachment loss was observed, which may be attributed to gingival epithelial shrinkage. Radiographic evaluation using the bone loss percentage formula established by Schulte *et al.* [16] showed a preoperative bone loss of 69.2%, which improved to 64.1% at three months, 53.8% at six months, and 48.5% at the one-year mark. This indicated an overall bone gain of approximately 20.7%. The patient's compliance and satisfaction were high, further confirming the success of the procedure.

Conclusion

The fundamental goal of dental care is to retain natural teeth in the oral cavity for as long as possible. Intentional replantation serves as a valuable technique to preserve the structural integrity of compromised teeth, ensuring both functional and aesthetic benefits. This approach offers an alternative to extraction, particularly for teeth with a poor prognosis, allowing for their retention and continued use.

In this case, the procedure resulted in positive clinical and radiographic outcomes. However, to confirm the long-term success of intentional replantation, further extensive evaluation through radiographic, clinical, and histological studies is necessary.

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Conflict of Interest: None

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Ethics Statement: None

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