Case Report

INTENTIONAL REPLANTATION

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ABSTRACT

Intentional replantation, also defined as therapeutic replantation, consists of the extraction of a compromised tooth element, extra-oral endodontic treatment, and immediate repositioning of the tooth in its extraction socket after evaluation of the root surface. The predictability of this technique is influenced by root anatomical factors, non-traumatic extraction techniques, rapid root filling, and non-traumatic extra-oral manipulation of the periodontal ligament, which allow this approach to be considered practicable and scientifically valid in selected cases and patients. Multiple studies have recently demonstrated success rates of intentional repetition of 88% and 95%, giving this technique greater predictability. The aim of this article is to examine the steps of this procedure by presenting two clinical cases.

KEYWORDS: *intentional replantation, extraction, compromised tooth, endodontic treatment*

INTRODUCTION

Considered for years as a 'last resort' when faced with an otherwise compromised tooth and the only alternative to dental avulsion, in recent years, thanks also to the appearance of numerous case series, intentional replantation has been re-evaluated and is considered a technique to be adopted in exceptional circumstances (1)

The indications for this technique may be of a strictly dental nature, such as the impossibility of carrying out a correct orthograde root canal therapy, a reprocessing, or an apicoectomy, in the presence, however, of good knowledge and mastery of extractive and endodontic techniques (2-4). It can also be useful in the presence of carious root lesions, which are difficult to approach in a single session (monophasic).

Compared to the past, the continuous evolution of the procedure has led to changes in tooth extraction and apex preparation techniques, the handling of the tooth during the surgical phase, and the materials used for root-end filling.

Intentional replantation involves several surgical and endodontic steps that must be carried out with precision to achieve a predictable result (2, 5).

During the extraction procedures, the preservation and, therefore, non-damage of the periodontal ligament is the basis of the success of the therapy, which requires a non-traumatic avulsion for both the element and the alveolus and the shortest possible extra-oral element permanence time to avoid ankylosis and external root resorption considered negative prognostic factors (1, 6, 7, 8).

Received: 18 March 2022
Accepted: 22 April 2022

There are elements that must be evaluated for a tooth to be chosen for the clinical procedure of deliberate reimplantation. A fundamental factor related to the element to be re-implanted is the time the tooth is in the extraoral environment because success decreases significantly after 60 minutes. The tooth element to be replanted must be intact, without root fractures, and the alveolus must also be free of comminuted fractures that would lead to probable failure of the replantation.

Complex root anatomy, pre-existing grade III tooth mobility, and the presence of furcation lesions are considered factors that negatively influence the prognosis.

The advantages of this approach are connected with the restoration of a tooth element that would otherwise have been extracted, with possible functional and aesthetic benefits, with considerable facility and speed on the practitioner's part in performing the retrograde treatment in a more conservative and less traumatic manner for the surrounding hard and soft tissues.

Reviews in the literature report a success rate for intentional reimplantation ranging from 70 to 96% of cases (1, 4-7, 9).

CASE REPORTS

In this paper, we describe two cases of therapeutic replantation. Although there is no universally accepted clinical protocol for intentional replantation in the literature, the surgical-endodontic technique we used involves various steps (1, 10).

The first case concerns a 27-year-old male patient with good general health and excellent oral hygiene. Tooth element 2.8 presented painful symptoms attributable to a carious lesion penetrating the pulp (Fig. 1).

Fig. 1. *Lesion penetrating the pulp.*

It was therefore decided to choose intentional replantation and simultaneous reconstruction of the element in an extraoral environment, and after appropriate radiological evaluation, the following protocol was followed:

- preoperative rinses with 0.2% chlorhexidine for 1 minute to reduce the bacterial load in the oral cavity;
- plexic anesthesia with a vasoconstrictor (Septanest, articaine hydrochloride, 1:200,000) avoiding intra-ligamentous anesthesia to avoid possible periodontal ligament damage;
- atraumatic extraction of element 2.8, only with surgical forceps, again to preserve the periodontal ligament;
- After tooth extraction, root inspection is performed with the aid of a dental operating microscope, 40x Labomed, to check for fractures, additional canals or foramen, isthmuses, or apical deltas.

The tooth element is held between the forceps branches during all procedures. A turbine was used to access the chamber, which was cooled with sterile saline. Orthograde access to the root canals was performed at first by manual probing and later with rotating NiTi instruments (Reciproc, Dentsply). Root canal obturation was done using System B (Sybronendo) and Bio dentine (Septodont).

Subsequently, apicoectomy with a high-speed handpiece, approx. 3 mm retrograde root canal was prepared using ultrasound and retrograde obturation with bioceramic cement (BioRoot, Septodont) (Fig. 2). The tooth element was repositioned in the alveolus, which was protected by sterile gauze during the extra-oral procedures. It was stabilized by a 3-0 silk X-shaped suture to seek a better fit of the gingiva with the tooth (Fig. 3). The sutures were removed after 14 days, and the radiographic and intraoral control examination to assess stability was carried out at 3 months (Fig. 4a, b).

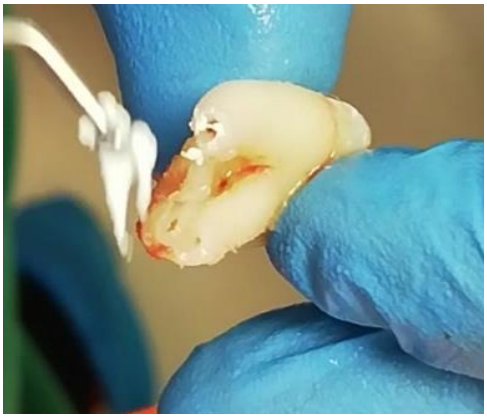


Fig. 2. *Root canal preparation.*

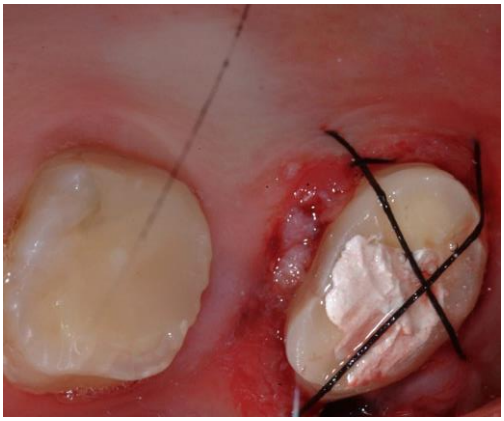
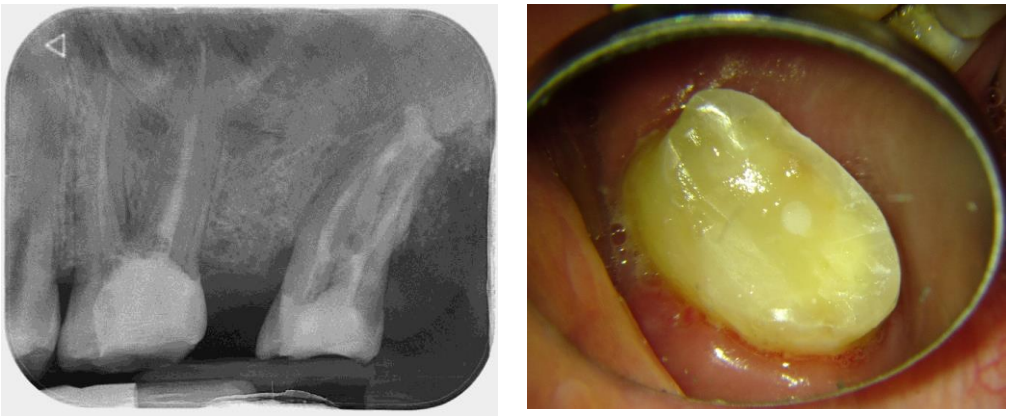


Fig. 3. *Tooth element stabilized by a 3-0 silk X-shaped suture.*



a. b.

Fig. 4. ***a****): Radiographic and* ***b****): intraoral control examination to assess stability at 3 months.*

The second replantation case was performed on an endodontically treated tooth element with secondary root caries apically at the bone margin of tooth 4.7 (Fig. 5).

Fig. 5. *Secondary root caries at the bone margin.*

The therapeutic approach of the intentional replantation involved only apicectomy with retrograde filling in the extraoral phase.

The protocol performed included the same steps as in the previous case, with the exception of endodontic orthograde therapy, which had already been performed (Fig. 6). In the intraoperative endoral X-ray, we can observe how the root apices were apicectomised by at least 3 mm and note the bioceramic cement used for the retrograde filling. Subsequently, the patient was regularly followed up and examined. According to the protocol, we performed endoral control X-rays after 6 months to observe how the tooth is stabilized in its seat (Fig. 7).

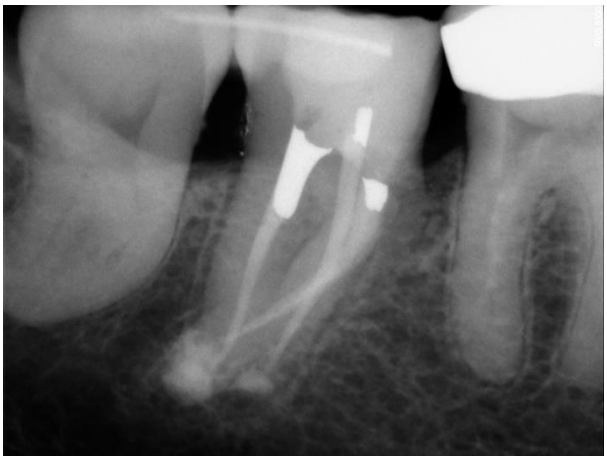


Fig. 6. *Intraoperative endoral X-ray.*

Fig. 7. *Endoral control X-rays after 6 months.*

DISCUSSION

The improved operative efficiency of this technique, as demonstrated in recent literature, has resulted in the fact that in the presence of difficult conservative restorations and anatomical limitation or difficult surgical access that complicates or contraindicates the execution of apicectomy, intentional replantation is considered an alternative method in the resolution of post-treatment endodontic pathology or to more complex techniques of functional prosthetic restoration of dental elements with a simplified and monophasic approach, in selected cases.

Atraumatic extraction techniques, periodontal ligament preservation, and a correct and rapid root canal filling technique are the basis of clinical success. This approach, long considered only for hopeless teeth, is getting an overdue but increasingly consistent recognition in the literature and should be considered as a possible alternative to avulsion and subsequent implant rehabilitation in terms of long-term success and cost-effectiveness (2, 11-15).

CONCLUSIONS

This technique has a rapid evolution in the operative phases and materials used. The presence of two specialists, an oral surgeon and an endodontist, is recommended to reduce the extra-oral retention time of the element and thus increase the success rates of reimplantation. At the same time, an extraction expertise (that preserves the root anatomy and periodontal complex) is essential.

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