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Treatment of extrusive luxation by intentional replantation

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Background. The accepted treatment for extrusive luxation is repositioning of the extruded tooth at the earliest possible opportunity.

Case report. Repositioning was not possible in a patient who presented for treatment 4 days after the accident, and therefore, an intentional replantation was performed instead. The tooth was carefully extracted, the blood clot removed from the alveolus and the tooth was then replanted.

Conclusion. Intentional replantation involves the deliberate removal of a tooth and its reinsertion into the alveolus almost immediately afterwards. It is now an accepted endodontic procedure. The favourable outcome of this case suggests that intentional replantation of severely extruded teeth may be a treatment option in cases where the tooth cannot be repositioned and if treatment conditions are adequately followed.

Introduction

Luxations of the permanent teeth are divided into the following categories: subluxation, lateral luxation, intrusion and extrusion. A clinical sign of extrusion is an elongated mobile tooth and a common radiographic finding is an apically increased periodontal space. The accepted treatment for extrusion is repositioning of the extruded tooth at the earliest opportunity and stabilization with a splint for up to 3 weeks[1]. In cases where the tooth cannot be repositioned because of blood clot blockage or as a result of delayed treatment, a different option for tooth repositioning may be considered.

Intentional replantation is the deliberate removal of a tooth and its reinsertion into the alveolus almost immediately after sealing the apical foramina[2]. This surgical procedure has a high success rate. Intentional replantation was originally regarded as a last resort to save an otherwise lost tooth, but today, with increased understanding of the periodontum and improved techniques, it should no longer be viewed as a last-resort treatment[2–9]. This report presents a case of intentional replantation as the treatment of choice for a patient who presented 4 days after trauma and severe extrusive luxation of a central incisor.

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Case report

A 15-year-old girl suffered a traffic accident and sustained trauma to her face involving several skin and mucosa lacerations. She was treated in a medical emergency facility, but received no treatment for her oral injuries at that time. Four days after the accident, she was seen at the Endodontics Clinic of the Pontificial Catholic University of Paraná, Curitiba, Paraná, Brazil, where she presented with a 4-mm extrusive luxation and slight distal inclination of her left central incisor (Fig. 1). The tooth presented with grade II mobility. The adjacent periodontal tissue was slightly erythematous in the cervical area of the tooth. A periapical radiograph showed no evidence of root or bone fractures (Fig. 2). The tooth was unable to be repositioned by the conventional digital manoeuvre, probably because of blood clot blockage.

The care plan included immediate surgical extraction, replantation and repositioning the tooth in its alveolus. The surgical site was prepared and anaesthetized.

After careful syndesmotomy, the tooth was then extracted and immersed in Hanks' balanced salt solution[6,10]. The blood clot was carefully removed by curettage from the alveolus,

Fig. 1. Photograph of the subject at her initial presentation showing a 4-mm extrusive luxation and slight distal inclination of her left central incisor.

Fig. 2. Periapical radiograph showing no evidence of root or bone fractures.

Fig. 3. Photograph of the replanted tooth showing how it was repositioned in its alveolus.

Fig. 4. Photograph of the tooth splinted with #7 nylon thead and light cured resin.

followed by gentle irrigation with warm saline solution. The tooth was then replanted and repositioned in its alveolus (Fig. 3). Care was taken to gently approximate the buccal and lingual plates of alveolar bone using an index finger and thumb to reduce any micro-fractures that would be present (Chompret's manoeuvre). The occlusion was checked to ensure that there were no traumatic interferences. The entire surgical procedure was completed in approximately 10 min to minimize the time that the tooth was out of the alveolus. An immediate post-operative periapical radiograph revealed a favourable position of the tooth in the alveolus (Fig. 4). The repositioned

Fig. 5. Photograph taken 15 days after the surgery showing that the replanted tooth was firm and the adjacent periodontal tissue was normal.

Fig. 6. Radiograph of the root canal treated with Tagger's hybrid technique and sealed with endodontic cement.

tooth was then semi-rigidly splinted with #7 nylon thread and light-cured resin[1].

The patient was instructed to gently rinse with an antimicrobial mouthwash every 8 h[1]. After 15 days, the replanted tooth was firm and the adjacent periodontal tissue was normal (Fig. 5). Pulp vitality tests were negative. The splint was removed and the root canal

Fig. 7. Photograph taken at 3-year follow-up showing a yellowship, slightly extruded tooth with adequate gingival health.

was accessed and instrumented. A propylene glycol and calcium hydroxide dressing was maintained in the canal for 3 weeks to prevent inflammatory resorption[16].

The root canal was then treated using the Tagger's hybrid technique and was sealed with endodontic cement[11] (Fig. 6). The endodontic access opening was restored using a composite resin.

A 3-year clinical and radiographic follow-up revealed a yellowish, slightly extruded tooth with adequate gingival health (Fig. 7). A periapical radiograph (Fig. 8) showed no signs of apical or lateral root resorption or ankylosis. The patient declined any further aesthetic procedure (e.g. whitening or crown re-contouring).

Discussion

The accepted treatment for extrusive luxation is immediate repositioning of the extruded tooth and stabilization with a splint, if necessary[1,12]. As in almost all traumatic situations, time is a critical factor for the successful treatment of extrusive luxations.

Repositioning of the extruded tooth must be carried out as early as possible[1,12,13]. However, this was not possible in the present case because the subject presented for treatment 4 days after her accident and all efforts to reposition the tooth were unfruitful.

A different treatment option for tooth repositioning is accepting the tooth position

Fig. 8. Periapical radiograph taken 3-years after the surgery.

initially, followed by orthodontic repositioning[1]. In this case, the above option was not considered because the extruded tooth presented with grade II mobility, leading to a poor prognosis if it was not immediately repositioned.

Intentional replantation differs from the reinsertion of a tooth into its alveolus when it is accidentally or iatrogenically avulsed (as in cases of wrong tooth extraction and avulsion during the removal of a prosthetic crown), which are emergency procedures.

Management of an intentional replantation or an emergency replantation of an avulsed tooth are the same since, in both situations, a tooth is disarticulated from its periodontal ligament and blood supply for a variable time period, and then replanted. Most authors agree that 20–30 min is the maximum length of time that should elapse between exarticulation and replantation[9–15].

Some important conditions should be met to ensure a clinically successful intentional replantation[6]: (1) avoidance of any crushing or scraping contact with the root surface or socket; (2) the tooth should be splinted, if indicated; (3) continuous hydration with tissue culture media (e.g. Hanks' balanced salt solution); and (4) implementation and reinforcement of a soft diet and a hygiene regime.

Indications for intentional replantation were initially limited to posterior teeth when conventional endodontic or surgical-endodontic therapy was contraindicated because of difficult access or anatomical considerations[1,8]. Intentional replantation is now considered a successful treatment alternative for various conditions[5–9]. It is also indicated for post-retained crowns that require re-treatment or when there is a broken endodontic instrument in the canal. The procedure is contraindicated in the presence of severe periodontal disease, in which there is marked tooth mobility, extensive caries, gingival inflammation and the involvement of furcation[12,13].

The long-term clinical and radiographic success in the present case could be attributed to the very short time that the tooth was out of its alveolus (10 min)[14,15]. Another key to success was the careful handling of the tooth once it was removed: it was immediately submerged in an adequate storage media (Hanks' balanced salt solution, in this case)[6,10].

The favourable outcome of this case suggests that intentional replantation may be a reliable treatment option for severely extruded teeth and the technique should be considered as a

What this paper adds

- This article is a valuable example of the application of oral and maxillofacial surgical techniques in the practice of pediatric dentistry.
- It is uncommon for such case reports to be published in the Pediatric Dentistry literature.

Why this paper is important to paediatric dentists

- As the primary dental care provider of children the pediatric dentist must be prepared to manage similar cases since active children are vulnerable to traumatic injuries to the oral cavity.
- In some instances time is of the essence in providing treatment in order to maximize the opportunity for a successful outcome for the child patient.

potential treatment alternative in cases where immediate repositioning is not possible.

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