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Tooth replantation as an alternative to dental implantology in adolescent patients

ABSTRACT

Case report *A 16-years old female patient was referred to our observation in July 2006, 14 days after an accident, with traumatic intrusive luxation of the right upper central incisor that caused the nasal floor and buccal cortical bone fracture. While the extraoral examination showed the traumatic lesions of the upper lip, the intraoral examination revealed intrusive luxation, pain and high mobility of the tooth, and bleeding of the adjacent oral tissue. The treatment protocol consisted in surgical buccal bone removal, tooth extraction, retrograde root-canal filling, and tooth repositioning in occlusion with a resilient splinting. After 8 weeks the splinting was removed, and clinical and radiological examinations were taken 3, 6, 9, 12, and 24 months after surgery. At the 24 months follow-up the root showed no radiographic signs of inflammation, resorption or ankylosis, and the function of the replanted tooth was fully maintained. Tooth replantation can be considered an effective alternative to dental implant, when the latter is contraindicated in young patient with incomplete skeletal development. The long-term success of the procedure will likely require a multidisciplinary approach.*

Keywords: *Oral injury; Tooth replantation; Traumatology.*

Introduction

The most common causes of tooth avulsion are sports accidents such as falls or cranial trauma. The mandatory use of mouthguards, however, has prevented approximately 200,000 oral injuries per year in football alone in the USA [Powers et al., 1984]. Without mouthguard, a person is 60 times more likely to experience dental trauma if he or she participates in sports [Swiatkowski et al., 2007]. Other common causes of mouth trauma resulting in avulsed teeth include motor vehicle accidents, criminal assaults, fist fights and domestic violence. In most cases, only permanent teeth are replanted. Primary teeth do not usually have long enough roots for a successful replantation. The only exception may be the canine teeth, which have a longer root and therefore a better chance of staying in place. In some cases, however, the dentist may choose to replant a child's primary tooth because there is risk for the not yet emerged permanent tooth.

Case report

A 16-years old female patient was referred to the Department of Paediatric Dentistry of the University of Naples "Federico II" in July 2006 showing the traumatic intrusive luxation of the right upper central incisor, wich caused the fracture of the nasal floor and the buccal cortical bone. While the extraoral examination showed the traumatic lesions of the upper lip, the intraoral examination revealed intrusive luxation, pain and high mobility of the tooth, and bleeding of the adjacent oral tissue. The fracture resulted from a car accident occurred 15 days prior. A multidisciplinary treatment, accepted by the parents, was required to restore the function of the dentoalveolar complex and was performed under general anaesthesia. The treatment included the following steps: surgical buccal bone removal, tooth extraction, retrograde root-canal filling, and tooth repositioning with correct occlusion, and finally adaptation of a resilient splint to the repositioned tooth and adjacent teeth by means of an orthodontic TMA wire for the following 8 weeks (Fig. 1-6).

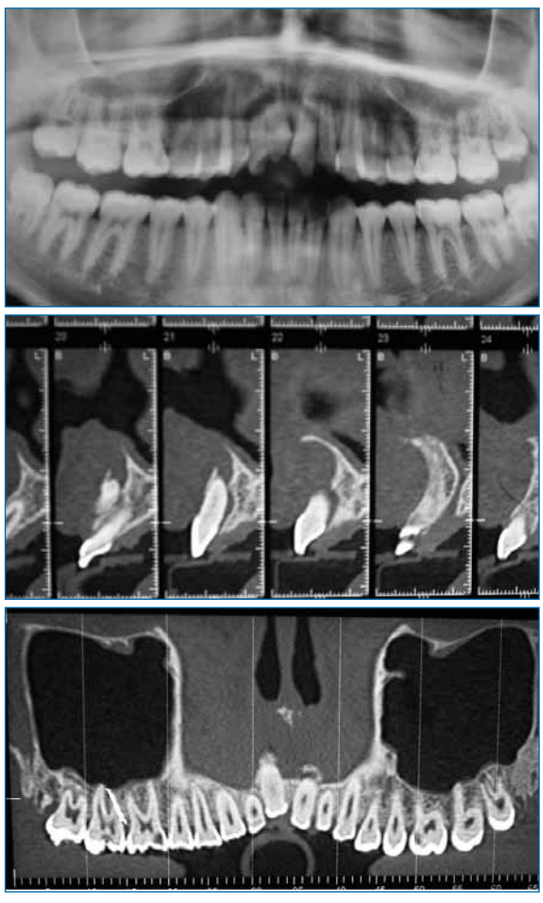

FIG. 1A, 1B, 1C - *Pre-operative orthopantomogram and CT images showing the buccal wall and the nasal floor fracture.*

FIG. 2 - *Clinical image before surgery.*

A

B

FIG. 3A, 3B - *Marginal incision and flap elevation.*

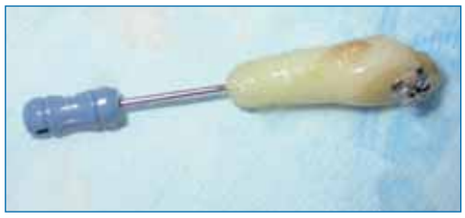

FIG. 4 - *Retrograde root-canal filling of replanted tooth*

FIG. 5 - *Positioning of the replanted right central incisor, splinted by means of a resilient wire to the adjacent teeth.*

The patient followed an antibiotic and anti inflammatory regimen and was prescribed a soft diet for 15 days after tooth replantation, and chlorhexidine mouth rinse.

After 8 weeks the splinting was removed and at the clinical examination the replanted tooth appeared in good conditions without radiological evidence of bone and/or root resorption. Clinical and radiological examinations were taken 3, 6, 9, 12, and 24 months after surgery. The twenty-four months follow-up showed no radiographic signs of inflammation, resorption or ankylosis of the root (Fig. 7, 8).

Discussion

Dental replantation is a surgical technique for reinsertion of a voluntary extracted or avulsed tooth into its own alveolar space.

The success key points of this technique are the time of replantation, the severity of the trauma, timing of endodontic treatment and status of the avulsed tooth. A favourable prognosis after tooth avulsion depends on different variables, one of them being the extra-alveolar period [Andreasen et al., 1995a; Andreasen et al., 1995b; Andreasen et al., 1995c; Andreasen et al., 1995d]. In fact, healing of the periodontal ligament can occur only if the innermost layer of cell on the root surface remain vital [Andreasen and Andreasen, 1994]. Often replantation is not performed shortly after avulsion, and this results in necrosis of the periodontal ligament and its subsequent replacement by the surrounding alveolar bone, followed by root resorption [Andreasen, 1992]. Root resorption and ankylosis of replanted teeth are most frequently observed in the first year post-replantation, but these events may also occur after 4 or 5 years from treatment [Andreasen and Andreasen, 1994; Andreasen et al., 1995a; Andreasen et al., 1995b; Andreasen et al., 1995c; Andreasen et al., 1995d; Andreasen, 1992; Donaldson and Kinirons, 2001; Finucane and Kinirons, 2003; Andreasen and Kristerson, 1981]. Another factor that seems to influence the success rate of replantation is the timing of the root-canal treatment after avulsion. The endodontic treatment seems to prevent the inflammatory root resorption caused by tooth nerve infection [Flores et al., 2001; Fuss et al., 2003]. Often in adolescents the

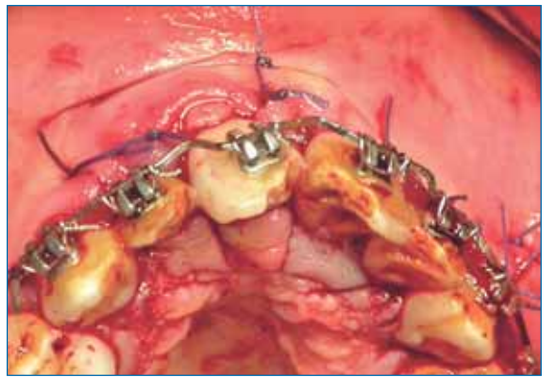

FIG. 6 - *The suture after surgery.*

FIG. 7 - *Clinical image 24 months after replantation.*

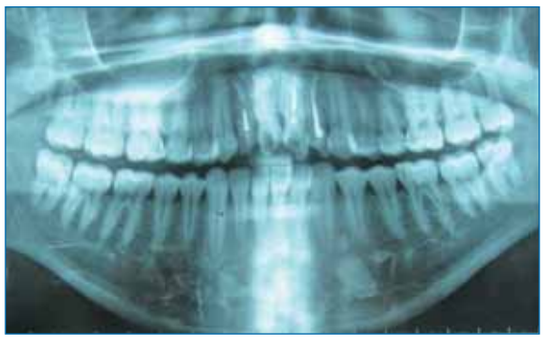

FIG. 8 - *Radiographic checkup 24 months after replantation.*

position in occlusion of the replanted tooth, set in infraocclusion, can be another complication related to the age of the patient [Malmgren and Malmgren, 2002], however in this case there were no clinical or radiological signs of infraocclusion.

The young age is considered a relative contraindication to dental implant because the skeletal development is not yet complete [Hwang and Wang, 2006; Hwang and Wang, 2007], therefore tooth replantation can be considered an effective alternative.

Conclusion

Tooth replantation can prevent post-extractive alveolar bone loss that can cause problems for a future implant insertion. Furthermore this technique solves aesthetic and functional problems in adolescent patients with avulsed anterior permanent teeth.

According to the clinical experience, this case proposes dental replantation as a useful surgical technique for a temporary therapeutic approach in young patients when implantology is contraindicated. A multidisciplinary approach is required for the long-term success of the treatment.

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