



Reimplantation of avulsed maxillary central incisors – case report of an 8-year follow-up

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ABSTRACT

Dental trauma is very common, especially in children and adolescents. Tooth avulsion (exarticulation), which is a result of complete rupture of periodontal ligaments is one of the most severe dental injuries. The treatment of choice in avulsion of permanent teeth is reimplantation. Survival of reimplanted teeth depends greatly on the time and conditions in which teeth were stored outside the oral cavity. This report presents a case of 18-year old male with avulsion of central maxillary incisors. The teeth were reimplanted 14 hours after injury. During 8-year follow up no major complications occurred and the teeth still maintain their function, although signs of mild replacement resorption are visible on the follow-up radiographs.

Keywords: tooth injuries, tooth avulsion, tooth implantation

INTRODUCTION

Although oral region constitutes only 1% of body area, dental trauma is very common, especially in children and adolescents. Traumatic events affect mainly anterior teeth in both primary and permanent dentition. One of the most serious dental injuries is avulsion of the tooth. The term avulsion (exarticulation, complete luxation) refers to displacement of tooth from dental socket as a result of complete rupture of periodontal ligaments. Avulsion prevalence is relatively low and it is estimated that its incidence constitutes 8-9% of all types of dental traumas. It can be associated with other dentoalveolar injuries, most frequently with root fractures. Some factors predispose to avulsion, such as lip coverage, molar relationship, and overjet. Distribution also varies across age and sex [4]. Prevalence of avulsion is higher in adolescents and young adults aged 12-20+ than in younger children. Avulsion is also more prevalent in males than females [3]. Reimplantation is the treatment of choice for avulsed permanent teeth according to guidelines of International Association of Dental Traumatology (IADT). This procedure consists of replacing teeth back into the socket and fixing them

with a splint. Prognosis of this treatment depends on the time that teeth were outside of the oral cavity (extra-oral time). Avulsed teeth should be reimplanted as fast as possible, otherwise they should be secured in proper storage media, such as saliva or milk, as the drying causes death of periodontal ligament cells and it makes proper healing impossible. It is thought that after 1 hour of dry-time all periodontal ligament cells become non-viable [1]. Amongst complications of reimplantation, resorption, inflammation and akylosis are the most common. The above mentioned may occur even though proper treatment was provided. The survival of replanted teeth can be divided into short, medium and long term, which depends mainly on periodontal healing status. Replanted tooth acts both as a spacemaintainer and bonemaintainer in the short term. Where unfavourable healing has occurred, the tooth can be expected to last into the medium term (from 2 to 10 and more years), depending on the speed of alveolar bone turnover. Long term survival of the tooth only occurs where favourable periodontal ligament healing has occurred and the replanted tooth can be expected to survive as long as any other tooth [1].

CASE REPORT

An 18-year old male after facial trauma resulting from an assault with avulsion of both central maxillary incisors (11 and 21), was referred for treatment to Clinic of Maxil-

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lofacial Surgery Medical University of Lublin. Intraoral examination revealed complete luxation of central maxillary incisors. On intraoral radiograph broken apex of tooth 21 was present (Fig. 1).



Fig. 1. Before reimplantation. Broken apex of tooth 21

After the injury, the teeth were not secured in any storage media, as they were found the following day lying on a pavement. The total time of teeth being outside the oral cavity was about 14 hours. Although prognosis in such situations is rather poor, decision to reimplant the teeth was made. Prior to reimplantation apices of the teeth were cut and extra-oral root canal treatment was performed. Then the teeth were immersed in antibiotic solution (clindamycin, Dalacin C). As the teeth had had contact with the soil the patient received tetanus vaccine booster shot. In local anaesthesia (2% lignocaine with norepinephrine) the broken apex of tooth 21 was removed, then teeth were placed in the sockets and fixed using metal wire splint (Fig. 2, Fig. 3). The recommendation was avoidance of fatigue and liquid diet. Patient was instructed how to maintain good oral hygiene and systemic antibiotics were prescribed (Cefuroxime, Zinacef). In order to improve the process of healing the patient received 10 sessions of biostimulation laser therapy. During the healing period, there was no pain, swelling nor infection. After 30 days the splint was removed. During 8-year follow-up no major complications or complains from the patient were noted. Discolouration of teeth and demineralisation in cervical area, resulting from endodontic treatment and use of metal wire splint, affected esthetical outcome. On the follow-up radiographs loss of alveolar bone may be seen between teeth 11 and 21, also mild replacement resorption is visible, especially in apical area (Fig. 4, Fig. 5). Further observation may be required.



Fig. 2. Orthopantomogram after reimplantation



Fig. 3. Radiographic images of teeth 11 and 21 after reimplantation



Fig. 4. Radiographic images of teeth 11 and 21 after 5 years from reimplantation

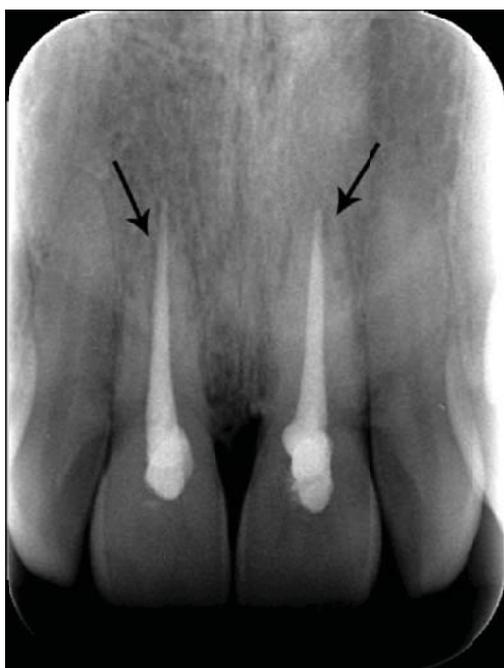


Fig. 5. Radiographic images of teeth 11 and 21 after 8 years from reimplantation

DISCUSSION AND CONCLUSIONS

Unfavourable periodontal healing after reimplantation is associated with complications, which may eventually lead to tooth loss, therefore reimplantation usually has a poor long-term prognosis. It is possible to achieve medium term survival even when reimplantation takes place many hours after avulsion. Teeth after delayed reimplantation are able to last for many years in spite of pending complications and this kind of treatment is a good solution, which may preserve function and aesthetics. It also gives extra time to plan final treatment before eventual tooth loss. Resorption is the main reason of tooth loss after reimplantation.

The speed of replacement resorption depends on bone turnover, which is fastest in children and decreases with age. In the presented case, patients' growth was finished, so progression of replacement resorption during the follow-up was relatively slow during follow-up period.

Some studies suggest that treatment of the root with fluoride, before reimplantation can slow down the process.

In this case, anaesthetic was used with vasoconstrictor (norepinephrine), although concerns may be raised whether vasoconstrictors can impair healing. IADT does not indicate omitting the use of vasoconstrictors for reimplantation. In order to improve healing, teeth may be immersed in different medications. According to systematic review performed by Cochrane Collaboration, available literature does not indicate which medication is the best choice for immersing prior to reimplantation [2]. In this case, clindamycin (Dalacin) which proved to be effective was used. In addition, systemic antibiotics may be used, but there is no sufficient data on the use of systemic antibiotics after reimplantation, which proves their efficacy in this term. In the presented case, also soft laser therapy was applied in order to improve healing. The use of lasers after reimplantation was reported with positive effect, pain was reduced faster, inflammatory state decreased earlier and the time of treatment shortened [5].

The reported case shows that in spite of long extraoral time without securing teeth in proper storage media, reimplantation may be successful. Presence of replacement resorption visible on the radiographs allows us to expect that tooth will survive only in medium term, but further survival time is hard to assess. In conclusion, reimplantation is a good solution giving satisfying mid-term functional and aesthetical effect.

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