

Delayed Replantation of Avulsed Maxillary Central Incisor: A Case Report

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ABSTRACT

Background: This case report presents a case of delayed replantation of avulsed maxillary central incisor after an extended dry extra-alveolar period. Fifteen-year-old boy presented with avulsed maxillary central incisor due to trauma occurring more than 24 hours earlier, respectively. Treatment guidelines for avulsed mature permanent teeth with prolonged extra-oral time were carried out for the teeth and the extra-oral endodontic treatment was completed. After having been repositioned, the teeth were stabilized for 4 weeks and prophylactic antibiotic was prescribed. Clinical and radiographic controls were done after 12 months. During the follow-up periods the teeth reported in these cases have remained in a stable, functional position did not revealed clinical initial replacement resorption and ankylosis.

Keywords: Avulsed tooth, Reimplantation, Maxilla.

INTRODUCTION

Tooth avulsion is complete displacement of a tooth from its socket and is seen in 0.5–3% of all dental injuries.^{1,2} The prevalence of avulsion cases in children increases between the ages of 7 and 9 years due to incomplete root development and minimal resistance of the alveolar bone/periodontal ligament (PDL) against extrusive forces during the eruption period of the teeth.² The etiology of tooth avulsion varies according to the type of dentition. Avulsion in primary dentition is typically a result of hard objects hitting the teeth, whereas avulsion in permanent dentition is generally a result of falls, fights, sport injuries, automobile accidents, and child abuse.^{3,4} In permanent and primary dentition, avulsion generally occurs in the maxilla, and the most commonly affected teeth are the maxillary central incisors. Increased overjet and incompetent lips were identified as potential etiological factors in such avulsion cases.⁴ Although avulsion usually involves a single tooth, tooth-supporting tissue injuries and lip injuries, multiple avulsions have also

been documented.^{5,6} The primary goal in treating an avulsed tooth is to preserve and treat the supporting tooth tissues and to replant the avulsed teeth. The success of replantation depends on the patient's general health, the maturity of the root, the time the tooth is out of its socket, and storage medium.^{7,8} The period of extra-oral time and the storage medium have the most critical effect on the status of the PDL cells.^{9,10} The aim of this case report was to present a case of delayed replantation of avulsed maxillary central incisor after an extended dry extra-alveolar period.

CASE REPORT

A 15-year-old boy was referred to the Department of Conservative Dentistry, Government Dental College and Hospital, Hyderabad, after a fall that resulted in dental trauma. The trauma occurred 24 hours ago while the child was playing in the park. The child had already been seen by the medical staff of the emergency unit of a local hospital who had detected no neurological damage or medical

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Fig 1: Picture showing avulsed maxillary right central incisor (tooth 11).



Fig 2: Picture showing extra-orally root canal treated 11.



Fig 3: Picture showing replantation of 11.



Fig 4: Picture showing splinting of 11 with wire and composite material.



Fig 5: IOPA radiograph of 11 after one year.

complications. His parents had let the avulsed tooth dry in a piece of paper and brought it to the clinic. The intraoral examination revealed that the maxillary right permanent central incisor (tooth 11) was avulsed (Figure 1). An uncomplicated crown fracture, with dentin involvement and luxation of the upper left permanent central incisor (tooth 21), was detected. In a vitality test, the adjacent teeth gave a positive response. Periapical and panoramic radiographs revealed no alveolar bone wall fracture or other hard tissue injuries. Examination of the avulsed tooth showed that the crown had no enamel fracture, the root had closed apex, and the root surface was covered with dried remnants of periodontal tissue. After informing the parents of the patient about possible risks, the socket of the tooth

was gently rinsed with saline solution under local anesthesia. The root of the tooth was cleaned carefully to remove necrotic and dried remnants of periodontal tissue. Extra-oral endodontic treatment was carried out on the tooth, the root canals were filled with gutta-percha points (Figure 2) and the tooth was then soaked in 2% stannous fluoride for 5 min and then it was replanted slowly, with slight digital pressure (Figure 3). Moist cotton pellet and glass-ionomer cement (Ketac Molar, 3M/ESPE Dental Products, St. Paul, MN, USA) were used to restore the access cavity temporarily. The position of the replanted tooth was verified both clinically and radiographically. The tooth was stabilized using a flexible splint (0.195 inch round arch wires, 3M Unitek, Monrovia, CA, USA) and the acid-etch composite resin technique (Clearfil Majesty Esthetic, Kuraray, Tokyo, Japan) (Figures 4). Moreover, oral hygiene instructions and advice about a soft diet and the need to use a chlorhexidine (Klorhex, Drogas, Ankara, Turkey) mouth rinse during the stabilization period were provided at this time. Prophylactic antibiotic therapy with amoxicillin trihydrate/potassium clavulanate (Beecham Laboratories, Bristol, TN, USA) at a dose of 625mg/day was prescribed for one week. The patient was also referred for an antitetanus booster. The parents were informed about the importance of regularly returning for clinical and radiographic follow-up. The patient was reviewed after two weeks, and no clinical pathological changes were detected. The patient was seen again four weeks after replantation, and the splinting wire was removed at this appointment. At a recall visit 12 months later, the left central incisor (21) gave a positive response in a vitality test and permanent restoration of the fractured 21 was completed with resin composite (Clearfil Majesty Esthetic, Kuraray Tokyo, Japan). During an 12- month follow-up period, the replanted tooth remained in a stable, functional position did not showed initial replacement resorption and ankylosis (Figure 5).

DISCUSSION

The guidelines for the treatment of avulsed permanent teeth vary, but the consensus is that the ideal treatment for an avulsed tooth is immediate replantation.⁴ However, it cannot always be carried out immediately. The treatment decision regarding avulsed teeth is related to the maturity of the root

apex (open or closed) and the condition of the PDL cells. The condition of PDL cells depends on the storage medium and the time the tooth has been out of the mouth.^{11,12} The extra-oral period significantly affects the outcome and has a direct correlation with the survival of PDL cells. Clinical studies have indicated that teeth replanted within 5 minutes after avulsion have the best prognosis.¹³ After a dry time of 60 minutes or more, all PDL cells are nonviable.³ The storage and transport media during the extra-oral time are also of vital significance. In patients with a prolonged extra-oral time, the tooth should be maintained in a suitable media, such as HBSS, saline, milk, or saliva until it is replanted by a dentist.^{14,15} In the present case, the teeth were kept in dry pieces of paper, and the extra-oral dry time was more than 24 hours. The management of the case presented here was in accordance with the accepted replantation protocol described by the International Association of Dental Traumatology.³ It is indicated that, if the tooth has been dry for more than 60min before replantation, the root canal treatment may be done extra-orally prior to replantation or later. Because there were no chances of obtaining pulp space revascularization and the periodontal ligament will be necrotic and not expected to heal, it was decided to treat the root canals extra-orally. According to traumatology guidelines and articles on delayed replantation cases, PDL cells will be necrotic following delayed replantation, resulting in a poor long-term prognosis.¹⁶ Most avulsion trauma occurs before the patient's facial growth is completed. Preventing resorption of the surrounding bone and maintaining the tooth in the space of the arch are critical until facial growth is completed. Replantation can restore the patient's esthetic appearance and occlusal function and prevent physiological trauma, which may be associated with a missing anterior tooth. If the avulsed incisor had not been replanted in the present case, other treatment options might have included prosthetic replacement of the missing incisor, space closure with orthodontic treatment, or auto transplantation of another tooth to the empty space. Replanted teeth must be monitored carefully and clinical/radiographical findings should be recorded. In children and adolescents, ankylosis is frequently associated with infraposition of the replanted tooth. The replanted teeth of a case presented here did not show any signs of resorption or ankylosis after one year.

CONCLUSION

Despite an extended extra-alveolar dry storage time, teeth with delayed replantation might be retained in a stable and functional position in the dental arch. In patients for whom growth has not ceased, using the replanted tooth to maintain the surrounding bone for a few years until the patient is a viable implant candidate can be considered a suitable therapeutic option.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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