



OUTCOME OF DELAYED REPLANTED AVULSED MAXILLARY INCISORS

Dental Science

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ABSTRACT

Tooth avulsion occurs most frequently in the age group of 7 to 14 years with maxillary central incisors predominantly affected. Avulsion usually occurs in patients during the period of facial growth, therefore in such situation, it is necessary to maintain the replanted tooth and the surrounding bone till the growth is complete. This case report describes the progressive replacement resorption of delayed replanted avulsed maxillary central and lateral incisors following dental trauma after four years

KEYWORDS

Delayed replantation, Tooth Avulsion, Closed Apex, Maxillary incisors

INTRODUCTION

An avulsed tooth in a permanent dentition is one few real emergency situation faced by the clinician. The healthcare professionals, parents, teachers and public should be educated regarding procedures to be followed during these severe unexpected injuries to prevent their eventual complications.

Tooth Avulsion is generally seen in maxillary central incisors and is found in 0.5–3% of all dental injuries¹. The causes of tooth avulsion are traffic accidents, violence, sports injuries and accidental falls especially in younger patients in the age group of 7 to 18 years. It is reported to be more common in males than females.

Such type of dental injuries requires immediate attention and management for its success. The primary factor in the management of tooth avulsion is to prevent further damage to the periodontal ligament and to replant the avulsed tooth within the shortest possible time. The factors which affects the success of replantation are patients general health, maturity of the root, the extraoral time and storage medium.

The delayed replantation of the avulsed tooth affects the treatment prognosis as there are chances of necrosis of the periodontal ligament with increased extraoral time which in turn results in replacement resorption and ankylosis². Also the infection related resorption³ may be initiated as a result of infection of the pulp canal, resulting in its inevitable loss. However if managed adequately, the replanted teeth with extended extraoral time can remain functional for a few years⁴. The case presented in this paper illustrates the successful management of delayed replanted avulsed right maxillary central and lateral incisors with four year follow up.

Case report

A 14 year old boy reported to the department a week after the replantation of avulsed permanent teeth for its management. No significant medical history was found.

The history revealed that the patient had an accidental fall in the school. The upper two teeth had come out from their socket. The parent of the child has taken him to the dental practitioner for emergency treatment and was advised to find the missing teeth from school. The two incisors were located from the school however both the teeth were in dry environment for almost four hours. It was found that the dental practitioner had treated the avulsed right central and lateral incisor teeth with sodium fluoride and doxycycline and then replanted the teeth with a wire splint. The tetanus toxoid injection was given and the patient was prescribed with systemic antibiotics, analgesics and was advised soft diet, chlorhexidine mouthwash.

On intraoral clinical examination, the right maxillary central and lateral incisor (11, 12) were splinted. The buccal mucosa was healthy. The crowns of teeth 11, 12 were intact. On radiographic examination, the teeth were with closed apices and were splinted to adjacent teeth. Root canal treatment of maxillary incisors were carried out. The access was made, the canals were debrided with 2.5% sodium hypochlorite solution followed by saline, working length was taken and prepared. The canals were filled with calcium hydroxide dressing (Metapex, META Biomed Co. Ltd Korea) and the access was closed

with temporary restoration (coltosol F, coltene). The splint was removed. The calcium hydroxide dressing was placed for 1 month and were subsequently filled with orthograde MTA (MTA Angelus, Brazil) and access was restored with composite resin (Te-Econom Plus, Ivoclar Vivadent). (Fig 1)

Patient was called for follow up. The follow up clinical examination showed teeth were intact and firm, radiographs revealed progressive replacement resorption in both incisors. The MTA placement has arrested the inflammatory resorption and assisted the healing by replacement resorption. The CBCT images was taken after four year. (Fig 2, 3)

DISCUSSION

Following tooth avulsion, every effort should be made to reduce the extraoral time for favourable prognosis. It has been shown that teeth replanted within 5 mins after avulsion have shown best prognosis⁵. However unavoidable situations at the time of avulsion and lack of knowledge may lead to extended extraoral time. The main drawback with extended dry extraoral time is the periodontal ligament cells become necrotic^{1,6}.

The dry extraoral time in the present case was four hours. The root surface of the teeth were treated with sodium fluoride and doxycycline before replantation. The pharmacologic management of the avulsed teeth were done to prevent resorption and to make it receptive for the regeneration of the periodontal ligament fibers. Sodium fluoride has been used in the previous studies and has shown that it reduces the rate of osseous replacement and made the tooth more resistant to resorption⁷. The topical application of doxycycline decreases the frequency of ankylosis and replacement resorption⁸. Previous studies have also used various medicament to treat the root surface in delayed replantation to increase their retention rate⁹.

The replanted maxillary central and lateral incisors in the present case were fully formed with closed apex. Following replantation, the teeth had become nonresponsive and endodontic therapy was initiated and calcium hydroxide was used as intracanal medicament for one month. Previous studies have found pulpal necrosis after avulsion injury and were managed by endodontic therapy¹⁰. The calcium hydroxide as an intracanal medicament can be placed for 2 weeks to 6 months or longer to promotes disinfection and prevents inflammatory root resorption^{11,12}. The root canals were obturated with orthograde mineral trioxide aggregate (MTA) in both central and lateral incisors. MTA has shown to provide excellent seal between the tooth and the external surfaces¹³ and also provides long term release of calcium and can maintain a high pH for longer period¹⁴. MTA obturation in the management of replanted tooth following trauma has also been used in the studies^{15,16}.

The semi rigid splinting with thin orthodontic wire of replanted teeth was done for 2 weeks. The semi rigid splint provides physiologic movement of teeth during healing and results in decreased incidences of ankyloses¹⁷. It was shown that rigid splint accelerates root resorption in both immature and mature teeth¹⁸.

The PDL cells very rapidly desiccate when left in dry conditions. The

present case was left dry for four hours , unfavourable PDL healing with replacement resorption was seen. In such cases the root will be gradually replaced by bone and eventually when no root left will cause fracture of the tooth crown leading to its loss¹⁹. The obturation using biocompatible material such as MTA is helpful in such cases as the root resorption process will eventually expose it to the periodontal tissues which in turn will produce less inflammatory response and more bone formation²⁰.

The infraocclusion of the replanted teeth relative to adjacent teeth was apparent in the present case. This was because the teeth adjacent to replanted teeth undergoes continued vertical bony growth while the replanted teeth which has undergone replacement resorption fuses with bone and fails to erupt further¹⁹. The vertical growth of alveolar bone is prevented by the interdental gingival and periodontal ligament fibres in the coronal region.

The studies pertaining to the delayed replantation^{1,6,21} has shown poor long term prognosis. In such events ankylosis and osseous replacement may lead to eventual loss of replanted teeth but the ankylosed tooth may serve for several years and preserve the alveolar bone and therefore should be replanted²². Also the replanted tooth provide aesthetic and occlusal function with simultaneous growth of the alveolar bone and helps in relieving the resultant psychological trauma to the patient as well as parent associated with the missing anterior teeth. The replanted teeth in the present case was functional at four year follow up.

CONCLUSION

The timely management of avulsed tooth provides the patient their aesthetic appearance, occlusal function and prevents physiological and psychological trauma associated with the missing anterior teeth. In addition the replantation of the avulsed teeth in the socket will result in their stable and functional position in the dental arch

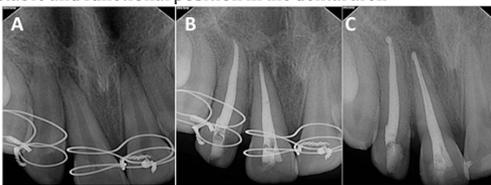


Fig 1: Intraoral Periapical radiograph Fig1 A: Teeth with splint and closed apices Fig1B: Calcium hydroxide dressing Fig1C: Calcium hydroxide dressing at 1mth.



Fig 2 : Follow up radiograph Progressive replacement resorption Fig2A: at 2yrs, Fig2B: at 3yrs, Fig2C: at 4yrs. Clinical photograph Fig2D: at 3yrs, Fig2E : at 4yrs

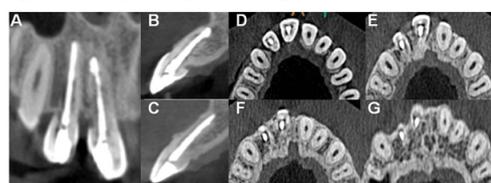


Fig 3: CBCT images showing replacement resorption of maxillary central & lateral incisor: A - Coronal images. B, C - Sagittal images. D, E, F, G - coronal, middle and apical axial images.

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