

Reimplantation of an Avulsed Permanent Tooth: A Case Report

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Abstract

An avulsed tooth or avulsion (exarticulation) is an emergency traumatic experience. Tooth avulsion results in damage to attachment apparatus and pulp necrosis. Although the possibility of the eventual loss of the tooth should be explained to the patient, replantation reduces the traumatic / physiological effect to the accident. Clinically, successful replantation result in prolonged retention which improves esthetic appearance, arch form, chewing, and integrity of the arch. This case report presents successful emergency management of an avulsed maxillary right central incisor of a 15 year old male patient with extra oral time of 45 minutes. Treatment at the dental office involved immediate replantation and acid-etch composite splint followed by root canal treatment of the tooth and subsequent follow-up.

Key Words: Avulsion, Replantation, Periodontal Ligaments, Composite splint.

Date of Submission: 03-02-2021

Date of Acceptance: 18-02-2021

I. Introduction

During the last decades, tooth trauma has been considered an increasing problem of public health, unlike dental caries which is decreasing for years.¹ Mean prevalence of dental and oral injuries is between 14% and 27%. One of the most severe dento-alveolar injuries is avulsion where there is complete displacement of the tooth out of its alveolar socket.

It is a relatively uncommon type of traumatic injury representing 1–16% of the traumatic dental injuries and occurs frequently between 7 and 14 years of age. In most of the times, the lesion involves a single tooth only, and maxillary central incisor is the most avulsed tooth.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 due to falls, fights, sport injuries, automobile accidents, and child abuse.³

Avulsion of tooth is a special form of injury which requires immediate attention and management, and the prognosis is associated with the duration between the time the tooth is avulsed and is replanted.⁴

The first goal of avulsion treatment is to keep the tooth vital or at least functional in place avoiding resorption and ankylosis resulting in normal growth of the alveolar ridge. When the tooth is not replanted at the moment of its avulsion, the patient should be guided to keep it in an appropriate medium and search for a dentist.⁵

The following study reports case of periodontal healing of a replanted maxillary central incisor with an extra oral period of 45 minutes, and its 1 year follow up observations.

II. Case Report

A 15-year-old male reported to our department with a right maxillary central incisor, which was avulsed 45 minutes before following trauma. The patient had stored the tooth in milk immediately after the incident. On clinical examination the alveolar socket of 11 was found to be filled with blood clot and there was no evidence of alveolar fracture. There was subluxation of 21 with grade I mobility and it also had an Ellis class II fracture. Radiographic examination (Fig 1) revealed no tooth remnants in the avulsed tooth socket, and also no dento- alveolar fractures were detected. The avulsed tooth was inspected for fracture and debris. The crown portion was intact and the root was completely formed. After taking from the milk, tooth was washed with saline while holding it over the coronal part and was then kept in saline. The alveolar socket was gently irrigated with saline and povidone iodine and then the tooth was placed back into the socket with a light digital pressure (Fig 2).



Fig 1



Fig 2

It was secured in place with the help of using acid-etch composite and orthodontic ligature wire splint extending from tooth 13 to 23 (Fig 3). Access opening and biomechanical preparation of the tooth 11 was done immediately after replantation (Fig 4) and intracanal calcium hydroxide medication was given for a period of 2 weeks. In the second appointment, splint was removed and calcium hydroxide therapy repeated. In the next appointment obturation was done (Fig 5). Vitality test of 21 indicated normal response in the subsequent visits, hence composite filling was given on 21. The patient then reported after one year and on radiographic examination the pdl space and periapical region appeared to be intact (Fig 6).



Fig 3



Fig 4

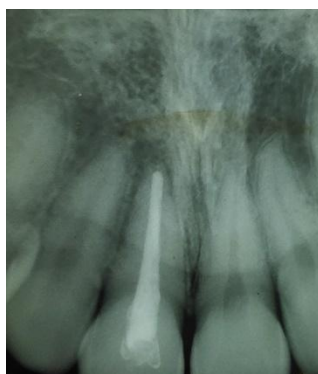


Fig 5

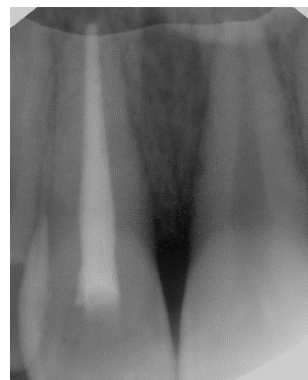


Fig 6

III. Discussion

Traumatic dental injuries are emergencies that the dentist must be able to assess rapidly and manage appropriately. The determination of treatment plan is very important in case of avulsed teeth. Avulsion causes more serious assault on the gingiva, periodontal ligament and the pulp. Ideally, an avulsed tooth should be replanted immediately or should be stored in a physiological medium such as saline for only a short period before replantation. Other media used for extended storage of avulsed tooth before replantation include milk, saliva, ViaSpan, Eagle's Medium, Hank's balanced salt solution (HBSS), etc.⁶

The treatment decision regarding avulsed teeth is related to the maturity of the root apex (open or closed) and the condition of the periodontal ligament (PDL) cells. The outcome and success rate of the

replantation depend on many factors such as status of the avulsed tooth, root development stage, dryness during extra-alveolar period, storage environment, treatment time and modality. The condition of PDL cells depends on the storage medium and the time the tooth has been out of the mouth.^{7,8}

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. After a dry time of 60 minutes or more, all PDL cells become nonviable.

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, milk, or saliva until it is replanted by a dentist. In the present case report, we used milk as the storage medium, which has a compatible osmolality with the PDL cells of an avulsed tooth and has been tested effective to store teeth for no more than 2-3 hours. Milk does not contain necessary nutrients to maintain the PDL cells for longer periods of time. Additionally, there are issues related to the practicality of using milk that severely affects its efficacy. Milk sounds, like an easy, inexpensive method for storage, however, using milk is not as effective as other available media and is logistically more difficult than other, more effective options.⁶

Replanted tooth should be splinted flexibly to adjacent teeth for maximum of 7 to 10 days to enhance periodontal healing. In the present case, the avulsed incisor had a closed apex and was stored in milk for 45 minutes before replantation. So, after explaining the possible consequences to the patient and his parents, it was replanted and splinted to adjacent teeth immediately, maintaining aesthetics and function and it was maintained for 2 weeks. Root canal treatment was started immediately and intracanal medicament was given to prevent root resorption and improve prognosis.

The avulsed tooth can maintain aesthetic and functional properties for some years after the replantation. In this case, the replanted tooth remained in a stable functional position and did not reveal clinical ankylosis or replacement resorption during the 12 months follow-up period. Although the complications such as root resorption and ankylosis occur by a majority in the first year after replantation, the mentioned complications can also be seen in later periods. Therefore, long follow-up period is essential for the replantation cases.

IV. Conclusion

Emergency management of the avulsion is very important for the physiologic aspect of the patient. The success of a successful replantation is dependent upon the amount of time the tooth has been out of the socket. As the outcomes of replantation is mostly dependent on the timely and appropriate management of the avulsed teeth, it is important to disseminate the knowledge among healthcare providers, as well as to lay people, in order to bridge the gap. This can be facilitated through the development of appropriate training modules and quick references.

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Dr.Nishana k, et. al. "Reimplantation of an Avulsed Permanent Tooth: A Case Report." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(02), 2021, pp. 41-43.