International Journal of Enhanced Research in Medicines & Dental Care (IJERMDC),
ISSN: 2349-1590, Vol. 11 Issue 4, April 2024, Impact Factor: 8.325

Delayed Replantation of avulsed tooth with 26 hours extraoral dry storage time: A Case Report

Dr. Rishi Nanda[1], Dr. Meetu Rani[2], Dr. Gaurav Gaur[3], Dr. Kaushambi Sharma[4]

[1]Department of Pedodontics and Preventive Dentistry/ Eklavya Dental College and Hospital, Kotputli (Rajasthan)/ India
[2,]Department of Orthodontics/ Eklavya Dental College and Hospital, Kotputli (Rajasthan)/ India
[3]Department of Oral Surgery; Eklavya Dental College and Hospital, Kotputli (Rajasthan)/ India
[4]Department of Operative Dentistry and Endodontics/ Eklavya Dental College and Hospital, Kotputli (Rajasthan)/ India

Correspondence Author:- Dr. Rishi Nanda, (M.D.S. Pedodontics and Preventive Dentistry) Associate Professor, Department of Pedodontics and Preventive Dentistry, Eklavya Dentyal College and Hospital, Kotputli, Rajasthan – 303108, Email - nanda.rishinanda.rishi@gmail.com

ABSTRACT

Tooth avulsion is a serious injury and immediate replantation of avulsed tooth is often considered as a treatment of choice. The success of replantation depends on various factors such as extra-oral time and choice of storage media. The case report presents a case of delayed replantation of avulsed tooth after extra-oral dry time of 26 hours.

Keywords: Avulsion, Extraloral Time, Replantation, Transport Media

INTRODUCTION

Tooth avulsion is a complete loss of tooth from it's socket. Incidence of avulsion is 0.5- 16% of all traumatic injuries in permanent dentition. Avulsion is most commonly seen in children and young adults between 8 to 12 years old, because at this age alveolar bone is resilient and provides only minimal resistance to extrusive forces. [1]

Prevalence of avulsion in higher in boys than girls, but this difference was only significant for age groups 12 and 13 [2]. Avulsion occurs most commonly due to falls. Other causes of avulsion are fight, sport injuries, automobile accident and child abuse.

Maxillary central incisors are most commonly affected teeth. Increased overjet and incompetent lips are identified as potential etiological factors of exarticulation. Although avulsion usually involves a single tooth, but tooth supporting structures and lip injuries may also occur. [3]

In these cases, the best results are achieved with immediate replantation of avulsed tooth but it is not always possible due to lack of knowledge in management of such injuries. This article describes the replantation of avulsed permanent central incisor after delayed extraoral dry time of 26 hours.

CASE REPORT:

A12 year's old girl child reported with a chief complaint of tooth loss due to falling on to the floor 26 hours back. There was no history of loss of consciousness or vomiting. The patient and her parents went to a dental practitioner after the injury. The dental practitioner prescribed systemic antibiotics and analgesics and advised for prosthetic replacement of tooth after complete wound healing. No concomitant systemic disease was defined by patient's parents. The avulsed tooth was kept dry in a piece of paper and reported to the department next day of injury. Examination of avulsed tooth reveled, that the tooth had closed apex and the tooth crown had a dentine fracture. The clinical examination showed avulsed left maxillary central incisor and intruded right maxillary central incisor. The tooth socket 21 did not reveal any fracture of bony wall or tooth segment. (Figure 1)

Figure 1: Preoperative OPG showing avulsion of Left Maxillary Central Incisor

After taking the written informed consent from the guardian of patient, local anesthesia was administered and blood clot was removed from the socket. Socket was cleaned and irrigated with normal saline. The avulsed tooth was rinsed gently with normal saline and socked in 2% Sodium Fluoride for 20 minutes. The avulsed tooth was seated into socket and splinted to adjacent teeth (53,12,21,22,63). Intruded right maxillary central incisor was left untreated for self eruption of tooth. (Figure 2)

Figure 2: Splinting of avulsed tooth with adjacent teeth

On the same appointment access cavity preparation was done in 21 and pulp was extirpated from canal followed by through irrigation with 5.2% Sodium Hypocloride and normal saline. Canal was dried with paper point and filled with calcium hydroxide, and access cavity was sealed with Zinc oxide eugenol cement. Systemic antibiotics were prescribed and oral hygiene instructions was given and twice daily rinse of 0.2% Chlorhexidine mouthwash was recommended. Intracanal dressing was renewed by 15 days interval. During the third appointment canal was obturated with gutta purcha with zinc oxide eugenol based sealer and tooth was restored with Type 2 Glass Ionomer Cement. Splint was removed after 6 weeks. (Figure 3)

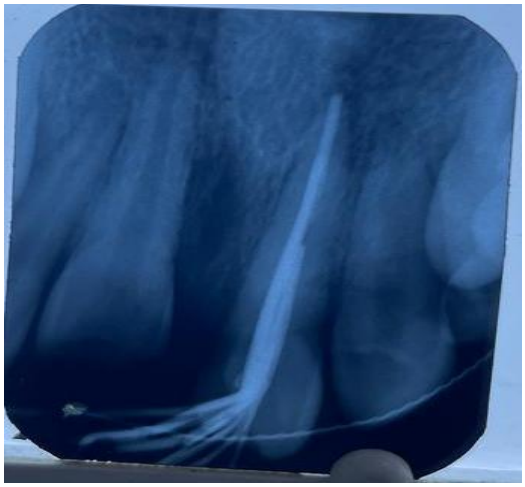

Figure 3: Obturation of Avulsed tooth

Even after sixth week there was no change in position of intruded right maxillary central incisor. Orthodontic extrusion was planned for that and bracket was placed on maxillary teeth except the replanted left maxillary central incisor. After the subsequent visits right maxillary central incisor was successfully extruded to its normal position. (Figure 4,5)

Figure 4: Orthodontic Extrusion of Right Maxillary Central Incisor

Figure 5: Composite Restoration of Left Maxillary Central Incisor

DISCUSSION

The treatment of dental avulsion is complex especially since it mostly occurs between age of 7 and 9 years and requires a high degree of cooperation from the patient. [4]

A large number of factors, including patient's general health, status of avulsed tooth, maturity of root, period of extraoral dryness and storage medium can affect the success of replanted tooth. The extra alveolar time and the storage medium have the most critical effect on the status of periodontal ligament cells. [5],[6]

Generally there are two main reason of delayed replantation. The first is that the people present at the time of injury do not know how to treat these injuries, and second is when a serious accident occurs; teeth are not the subject of greatest interest. While teeth are not of primary interest in an emergency situation endangering life, they are important for function and esthetic [4],[1]. According to International Association of Dental Traumatology (IADT) 2017, delayed replantation has a poor long term prognosis in cases with extraoral dry time is over 60 minutes. [5]

Panzarini et al in a previous study, demonstrated that the average time range of other replanted teeth was between 1 to 4 hours, after which the success of replantation was determined by medium of storage. Success has also been reported in a study conducted by Sottovia in 2010, where the tooth was replanted after 8 hours, but was stored in Euro-Collins solution. In many studies, it was observed that even 10 minutes of storage leads to desiccation of periodontal ligament cells and eventual loss of tooth.

A study conducted by Day and Duggal showed that reimplantation after 60 minutes without storage medium, may result in retention of tooth. However in a study by Partrovic et al. showed that reimplanted teeth in a dry storage between 15 minutes to 9 hours have low survival rates and reduced chances of retention. [7]

Considering the patient's age our treatment objective was to retain the avulsed incisor, to maintain esthetic appearance, occlusal function, and to maintain alveolar bone support and tooth to bone and tooth relationship. After completion of alveolar bone and jaw growth, the replanted tooth can be replaced with fixed partial denture if any sign of complication like ankylosis or external resorption occurs. [8]

The choice of storage for preserving traumatically avulsed tooth is also important for the success of replantation. Some of storage media for avulsed tooth includes, Hanks balanced salt solution (HBSS), modified Eagles solution, Via Span, Euro-Collin solution, Emergency medical tooth saver, pasteurized milk and egg white. [7]

However it is considered to be impractical as most of these storage solutions are not generally available at the sites of injuries, except for a few areas of the world. [6]

Milk is most readily available good storage media because of its physiologically compatible pH osmolarity and therefore has been shown to preserve periodontal ligament adhering to the root surface [4]. However in this case no adequate storage media was used to keep and transport the tooth before replantation.

According to Trope, when severe damage and drying of periodontal ligament of avulsed tooth cannot be avoided, certain steps are taken to slow down the process of resorption. Pretreatment of delayed replanted tooth with various agents such as tetracycline, dexamethasone, sodium fluoride and stannous fluoride have been suggested by various authors. [8]

Andreasens and Andreasens recommends that the tooth should be soaked with 2.4% acidulated sodium fluoride solution for 20 minutes before replantation assuming that demineralized dentin surface would be more prone to fluoride incorporation and become more resistant to resorption. Fluoride act on bone tissues, cementum and dentin, by converting hydroxyapaitite into fluorapatite which is more resistant to resorption. [9]

The pretreatment of root surface with sodium fluoride has been hypothesized since 1968 due to its beneficial effect by decreasing the rate of osseous replacement in replanted teeth of monkeys. A similar study in humans also demonstrated 50% reduction in progression of root surface resorption after replantation. Stannous fluoride is an alternative that has been used for treatment of root surface before replantation, however its use was associated with long standing inflammatory reaction in periodontal ligament. Due to this sodium fluoride solution has remained as the only useful and tested method for root pretreatment before replantation. [10]

Avulsion causes rupture of neurovascular bundle, leading to necrosis of pulp, which promotes bacterial contamination in mature teeth. RCT is thus required in case of avulsed teeth [11]. So in this case, endodontic access was prepared in the same visit and pulp debrided. Thereafter, the root canal was filled with calcium hydroxide because of its antibacterial effect on microbes that are considered an etiology behind root resorption and hence may cause rapid loss of tooth. Calcium hydroxide changes the environment to a more alkaline pH, which promotes hard tissue formation. The calcium hydroxide was placed in canal for a period of 1 month in present case and obturation was completed after removal of calcium hydroxide. [10]

Although complications such as ankylosis or root resorption may be unavoidable, delayed reimplantation should be performed, as it ensures adequate space maintenance in the arch, aesthetics, function and prevents psychological trauma, associated with a missing anterior tooth. [11],[3]

Delayed replantation can lead to an acceptable level of functionality and stability in a tooth despite the prolonged extra-alveolar dry storage time. There is also a need to create awareness among general public, primary school teachers, physical education teachers, primary health care professionals including nurses about importance and method of preserving an avulsed tooth.

Conflict of Interest: None

REFERENCES

[1]. B.S. Keshava Prasad, Praveen P; Delayed Replantation of Avulsed Teeth- A Case Report; Indian Journal of Dental Sciences; 2011; 2(3); 26-28
[2]. Diana Ram, Dr Odont Nestor Cohenca; Therapeutic Protocols for Avulsed Permanent Teeth: Review and Clinical Update; Pediatric Dentistry; 2004; 26(3) 251-255
[3]. Selcuk Savas, Ebru Kucukyilmaz,Merve Akcay,Serhat Koseoglu; Delayed Replantation of Avulsed Teeth:Two Case Reports; Case Reports In Dentistry; 2015; 197202; 1-5
[4]. Lluís Brunet-Llobet; Replantation of an avulsed tooth after one day of storage in adverse extraoral dry conditions: Acceptable outcome after 10-year follow-up; Quentessence International; 2017;39268;1-7
[5]. S Ameli, K Jafari, F Zadfatah , M Blurian, S Hekmatfar; Delayed Replantation of Avulsed Teeth: A Case Report; Zehadan J Res Med Sci.;2021;23(2); 1-4
[6]. Raja Belgacem, Farah Chouchène, Fatma Masmoudi, Ahlem Baaziz, Fethi Maatouk, Hichem Ghedira; Delayed Replantation of avulsed permanent incisor with 16 H Extra-oral time; EAS Journal of Dentistry and Oral Medicine; 2020;2(6); 155-159
[7]. IN Ize-Iyamu, BDO Saheeb; Reimplantation of Avulsed dry permanent teeth after three days: A report of two cases; Nigerian Journal of Clinical Practice; 2016; 16(1); 119-122
[8]. R Saha, A Bora, Mukta Pandey, Piyali Datta, S Banerjee, P Das, S Zahir, G Kundu; Replantation of Avulsed Permanent Toothafter Extended dry storageof Ten Days: A Case Report; IOSR Journal of Dental and Medical Sciences; 2016; 15(1); 39-44
[9]. M Manju, Srinivas L Shanthraj, Natasha Sethi; Delayed Replantation of Avulsed Incisor with Prolonged Extraoral Dry Storage; Journal of Orofacial Research; 2015; 5(3); 104-107
[10]. D. Sardana, A.Goyal, K.Guba; Delayed replantation of avulsed tooth with 15 -hours extraoral time: 3 year follow up; Singapore Dental Journal; 2014 (35); 71-74
[11]. H. Ozkan, Nezahat Kayar; Delayed reimplantation of avulsed Central Incisor: A 12 year follow-up; Turk Endod J; 2021;6(1); 31-34
[12]. Gauri Nayak, Sheetal Mali, Ashish Jain, Harshil Patel, Akshay Punjabi; Delayed replantation of an avulsed tooth with 48-hours extraoral time: A Case Report; International Journal Of Advanced Research; 2020; 8(2); 513-521