International Journal of Community Medicine and Public Health
Tomar S et al. Int J Community Med Public Health. 2025 Mar;12(3):1493-1495
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20250644

Case Report

Management of avulsed tooth having extra oral dry time more than 48 hours: a case report

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Received: 04 September 2024
Accepted: 13 February 2025

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ABSTRACT

Tooth avulsion is one of the most common type of dental traumatic injuries which is one of main reason of loss of teeth. Loss of tooth causes aesthetic and functional problems in which the patient is not only affected physically, but socially or psychologically also. If extra oral dry time exceed 60 minutes' prognosis of treatment, then prognosis of replantation becomes very poor. In this case report, we discussed about delayed replantation of avulsed tooth. After the clinical examination, extra oral root canal treatment was done and tooth is placed in sodium fluoride solution for 20 minutes and then dexamethasone immediately before procedure then platelet-rich fibrin (PRF) is placed in socket and tooth is replanted into the socket and flexible splint is placed from canine to canine for 4 weeks. The patient was re-evaluated in the subsequent follow-up, the patient was asymptomatic with favourable soft tissue healing and good aesthetics. This case report includes proper history taking, diagnosis, and treatment of avulsion by delayed replantation in order to maintain the tooth in arch and preserve the alveolar bone.

Keywords: Tooth avulsion, Splinting, Storage media, Platelet rich fibrin, Extra-oral dry time

INTRODUCTION

Avulsion is an injury in which a body structure is torn off by either trauma or surgery. The term most commonly refers to a surface trauma where all layers of the skin have been torn away, exposing the underlying structures (i.e., subcutaneous tissue, muscle, tendons, or bone).

Whereas avulsion of tooth is also very common in children in which there is complete detachment of tooth from its socket. This leads to rupture and damage to periodontal ligament and cementum.

Etiological causes of tooth avulsion vary according to the type of dentition. Avulsion in primary dentition occurs as a result of hard objects hitting the teeth, and avulsion in permanent dentition is generally occur as a result of falls, fights, sport injuries, automobile accidents, and child abuse.[1-3]

Though the best treatment for avulsed teeth is immediate replantation of avulsed tooth. because in case of delayed implantation periodontal ligament undergoes extensive dehydration especially after 15-20 minutes which ultimately delays healing or prevent reattachment of periodontal ligament. This leads to further complications like external inflammatory resorption, ankylosis related resorption, and pulp necrosis.

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. If there is delayed implantation aim is to preserve the tooth in order to maintain arch stability. In this case report we presented a management of a case of 13-year-old female patient having avulsed tooth in lower anterior segment and extended extraoral dry time of more than 48 hours with 1.5 year of follow up.

CASE REPORT

A 13-year-old girl was referred to the department of pediatric dentistry at Himachal Pradesh Government Dental College and Hospital, Shimla (HP) with a chief complaint of pain and dislodgement of tooth from socket. The patient gave a history of accident where she fell down from stairs. Avulsed tooth was not kept in any storage media for first 24 hours and then after 24 hours till next 24-hour tooth is kept in milk. Patient reported to pediatric dental outpatient department (OPD) after 48 hour of trauma. No significant medical history was elicited by the patient. On examination, extra-oral injury (lacerations on lip and chin) was detected. Intra oral examination reveal the avulsion of 42 and extrusive luxation of 41.

The patient had permanent dentition, with mild crowding and incisal overjet. No carious lesions were detected clinically, and his oral hygiene was fair. On radiographic examination, panoramic and periapical radiographs revealed no alveolar bone fracture and extrusive luxation of 41. On examination of avulsed tooth, there was no fracture on tooth and apex of root is closed. After determining all these findings, delayed replantation of tooth 42 is done. This treatment option is opted in order to maintain aesthetic and functional integrity of arch which not only maintain aesthetic, but preserved the volume of alveolar bone for future prosthetic rehabilitation by dental implants.

Initially tooth was cleaned and wipe with gauze, after this extra oral root canal treatment was performed. Starting with access opening using round bur followed by biomechanical preparation using rotary files (protaper gold till F2). Root canal was cleaned with 5.25% sodium hypochlorite (NaOCl) followed by 17% liquid ethylene diamine tetraacetic acid (EDTA). After this obturation was done by gutta percha and permanent restoration of crown is done with composite Filtek Z250 (3M ESPE, Maplewood, USA).

Immediately before replantation, tooth was kept in 2% sodium fluoride solution for 20 minutes to slow down osseous replacement and in doxycycline solution just before replantation. Local anesthesia was given followed by removal of coagulum from socket and cleaning and irrigation with normal saline, after this platelet rich fibrin freshly prepared from patient blood (4 ml) centrifuged at 600 rpm for 3 minutes and then inserted into socket. Then tooth is re-implanted into the socket. Extruded 41 is placed in its original position by a firm finger pressure. Cleaning of tooth surface is done using gauze piece flexible wire having diameter of 0.4mm was used to stabilize tooth placed from canine to canine and tooth was splinted for 4 weeks. The patient was prescribed capsule Amoxicillin 500 mg three times a day for 5 days with analgesics for pain relief. Oral hygiene instructions and soft diet advice were given. The patient was recalled after 3 months, 6 months, and 9 months. On follow up of 1.5-year tooth is immobile, asymptomatic, and radiographically mild external apical replacement resorption was seen.

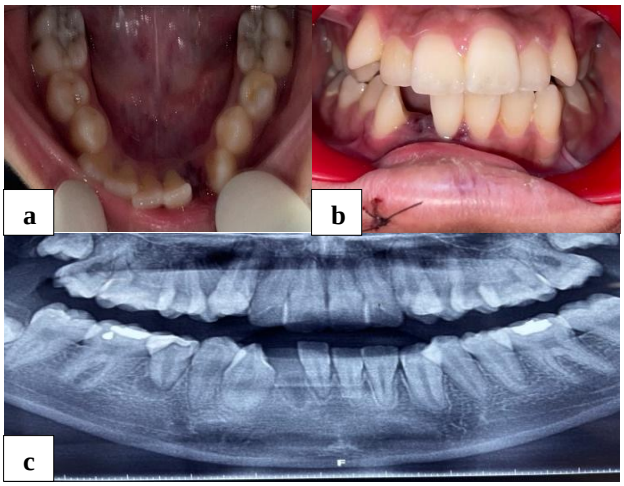

Figure 1: Intraoral pretreatment photographs and radiographs illustrating preoperative view (a) occlusal clinical view of anterior teeth, (b) buccal clinical view of anterior teeth, and (c) OPG showing avulsed 42.

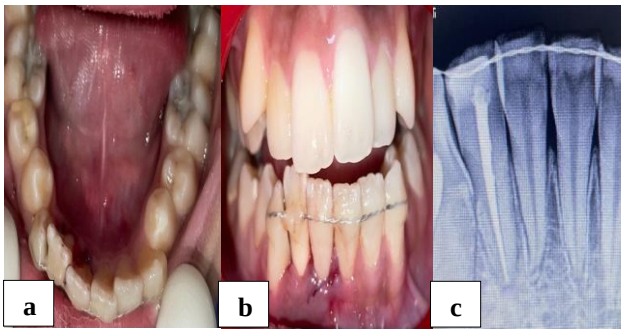

Figure 2: Intraoral post treatment photographs and radiographs illustrating preoperative view (a) occlusal clinical view of anterior teeth, (b) buccal clinical view of anterior teeth, and (c) RVG showing RCT treated 42 and repositioned 41 followed by splinting.

Figure 3: Intraoral photographs and radiographs at 1.5 years of follow up (a) occlusal clinical view of anterior teeth, (b) buccal clinical view of anterior teeth, and (c) RVG showing RCT treated 42 without any resorption.

DISCUSSION

The most common outcome of tooth avulsion is the necrosis of pulp and external root resorption. The outcome becomes unfavourable as the extraoral dry time exceeds 60 min.[4] In the present case, extra oral dry time is more than 48 hours, at this time periodontal ligament cells was not able to survive to prevent external osseous replacement resorption and to delay inflammatory response. As extra oral dry time is longer, pulp was expected to lost its ability to revascularize that's why extra oral root canal treatment was done. In order to delay osseous activity, tooth was placed in 2% sodium fluoride solution for 20 minutes. Immediately before re-implantation tooth is placed in dexamethasone solution which minimizes the root resorption and improves healing.[5,6]

The viability of PDL exposed to the extraoral environment, decreases rapidly after 18 min, making it necessary to reduce this time for successful replantation to occur.[7] However, so far no attempts have been made, to regenerate the degenerated PDL. In this case, PRF was used in the injectable form instead of the regular membrane form since it occupies less space and possesses better properties than the latter. Centrifuging blood at lower speeds causes the separation of platelets and significantly increases the number of leukocytes, platelets and growth factors compared to the conventional protocol. Injectable form of PRF also possesses the increased concentration of growth factors such as vascular endothelial growth factor and transforming growth factor (TGF-β1) required for angiogenesis and neovascularization as well as B- and T-lymphocytes, monocytes, and stem cells.[8]

In a study done by Tsai et al, they utilized combination of PDL stem cells along with PRF and showed regenerated PDL such as tissues and reduced the occurrence of ankyloses and inflammation in replanted tooth with 2 hours of dry storage time, compared to PRF alone.[9] In our study, as extra oral time is longer, PDL viability was lost, so only PRF is used from patients own blood.[10]

During the growth phase, delayed implantation leads to ankylosis related resorption which leads to infra position of teeth. So, further decoronation procedure is required to maintain aesthetic. In this case avulsion occurs in mandibular anterior teeth, where aesthetic requirement is less as compare to maxillary teeth and most of the growth in mandible anterior segment completed after eruption of lateral incisor. In this case, delayed re-implantation was done along with PRF placement which results in tooth remain asymptomatic, immobile, and integrity of arch is maintained. limitation of study is that, this was not the proper treatment protocol of avulsion with extra oral dry time exceeding 60 min. but to preserve alveolar bone and to maintain the teeth in arch for aesthetic reason this treatment is followed. Further, more follow up are required to determine the exact success of treatment.

CONCLUSION

Due to the higher incidence of injury to dental tissue and its supporting structures, it is important to have a working knowledge of the available techniques and their indications, as well as the risk-benefit balance. Delayed replantation of tooth is done only to maintain the aesthetic by keeping the tooth in arch and preserving the alveolar bone for prosthetic rehabilitation by dental implants.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Tomar S, Thakur S. Management of avulsed tooth having extra oral dry time more than 48 hours: a case report. Int J Community Med Public Health 2025;12:1493-5.