

Case Study

“Replantation of knocked out tooth after traumatic avulsions.”

Abstracts:

Background: Management of permanent tooth avulsion often challenging for dental practitioner, as avulsion resulting complete exfoliation of tooth from its socket, is usually associated with damage to the supporting structures. Managing the edentulous area to improve aesthetics, phonetics, function is better achieved by replanting the avulsed tooth rather than prosthesis. **Report of cases:** This article report a case avulsed tooth management of 12-years-old-girl due to accidental knocked out of both central incisor. Immediate after injuries patient report to the emergency department over phone and asked to collect and keep the avulsed tooth sinking into milk. Patient was managed by dentist within 60minutes of the accident and have follow-up by radiologically and clinically 1year post accidentally. **Conclusion:** Replantation of tooth immediate after avulsion can be managed by replantating into its socket.

Keywords: Tooth Replantation, Tooth avulsion, Athletic injuries, Tooth injuries,

Introductions:

Traumatic injuries to teeth are common, with between 6-34% of children aged 8-15 experiencing damage to their permanent teeth¹. One of the most severe dento-alveolar injuries is avulsion, where the tooth or teeth are completely knocked out of the mouth. This injury accounts for between 0.5 to 3% of dento-alveolar trauma to permanent teeth². The active movement of children at this age group and relatively resilient alveolar bone with minimal resistance to extrusive forces might be reason behind this age group being affected children. An avulsed tooth is one that has been knocked out accidentally from the alveolar socket for a number of reasons: a blow to the mouth, accident involving the face or during contact sports. It is possible to replace the tooth in the socket successfully if the action is taken as soon as possible³. Certain predisposing factors like protruded maxillary incisors and insufficient lip closure may affect the extent of the

dental trauma². Healing with periodontal ligament (i.e. regeneration) after replantation will occur only if the innermost cell layer along the root surface is viable⁴. Clinical studies revealed that the prognosis is best for teeth replanted within 5 minutes after avulsion².

Prolonged non-surgical storage of avulsed teeth before replantation results in total necrosis of the periodontal ligament and healing by replacement root resorption (i.e. repair) becomes the only option⁴. Some characteristics of storage medium i.e. p^H, osmolarity⁵ and temperature should be compatible with the survival of periodontal ligament⁶. Storage media as milk, Hanks balanced salt solution and viaspan have been proved to maintain cell viability after long periods⁷.

This article reports the case of accidentally knocked out of two maxillary central incisors that were kept in milk from the moment of trauma until its replantation within 60 minutes later. The successful clinical and radiographic findings observed after 12-months follow-up are described.

Report of the cases:

A 12-years-old-girl had and accidental fall down from stairs at her own house. Immediately her mother gave a phone call to the emergency section of the Update dental college and hospital, Dhaka, upon instruction from the Dental officer her two knocked out incisor were kept shrink within milk. The endodontist attended her case within 60minutes of the accident.

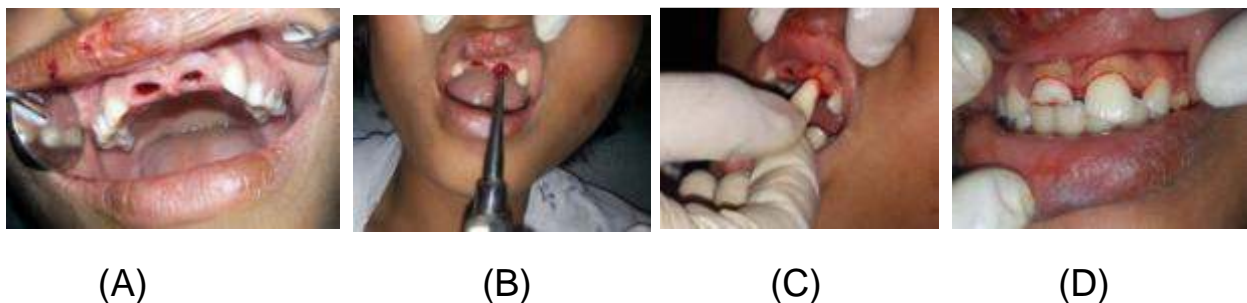


Figure 1: Intraoral photograph showing immediate after reported to dentist (A), removal of clot and debris from the alveolar socket (B), Immediate

61 placing the tooth to corresponding socket (C), to evaluate the occlusal
62 relationship (D).



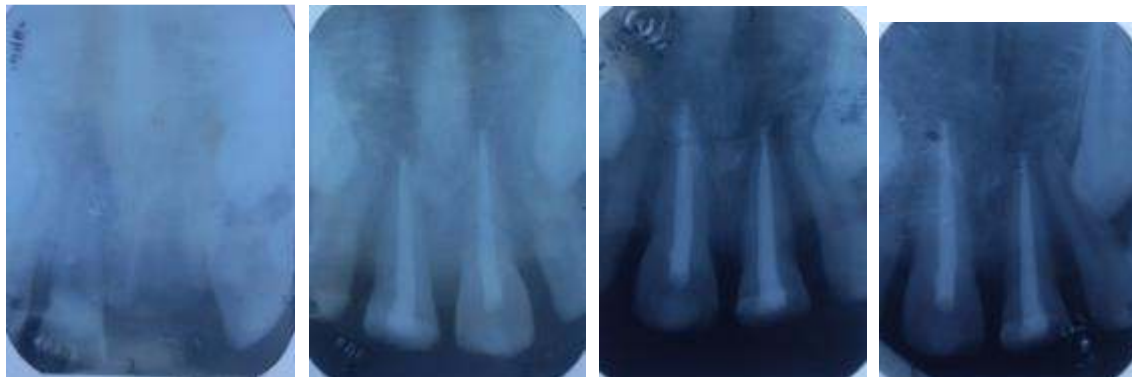
(A)

(B)

(C)

(D)

Figure 2: The avulsed tooth at saline before endodontic procedure(A),
access cavity preparation(B), extirpation of pulp (C), and endodontic
obturation by lateral condensation (D).



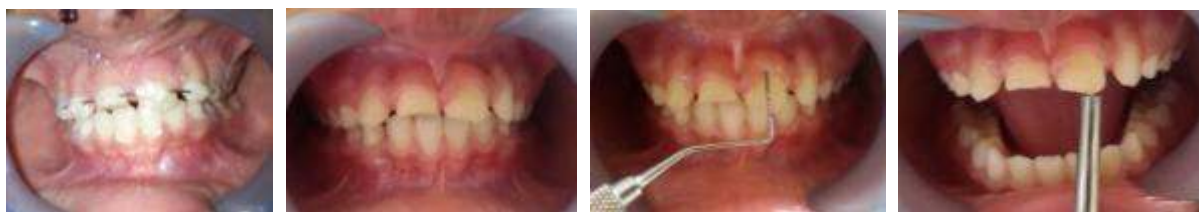
(A)

(B)

(C)

(D)

Figure 3: Periapical radiographic evaluation of the socket area immediate
after reporting to dentist (A), 10days prost Replantation after removal of
bonded wire (B), at six month recall visit (C), and at one year recall visit
(D).



(A)

(B)

(C)

(D)

Figure 4.1: Post treatment intraoral photograph on the 10day recall visit after management (A), immediate after removal of bonded wire (B), checking of periodontal pocket at 6month recall visit (C), checking of functional at one year recall visit (D).

At initial examination laceration on the lip and clot on the socket of the teeth 12 and 21 noticed. Teeth on the milk were found with intact pulp chamber with close root apex, however the crown fracture were noticed and patient's attendant was not able to present any fracture part of the crown. The patient was immediately anaesthetized, the alveolar socket was washed with saline and examined with a blunt instrument to check for the patency of the socket and to create fresh bleeding. Then both teeth were inserted into the respective alveolar socket to check the occlusion and alveolar patency. After revealing everything favorable both the teeth were removed from socket and then teeth were undergone extra oral endodontic treatment. The knocked out two maxillary central incisors were prepared by placing those we only immerse the teeth within tetracycline solution for 5 mins and replanted. Root canal were prepared with protaper hand instruments and obturated with gutta percha and zinc oxide eugenol sealer. Then the knocked out maxillary central incisors were replanted back into the alveolar socket with finger pressure and checked the occlusion as previously marked.

The teeth were splinted to the adjacent teeth with composite resin and gingival laceration was dressed with podon iodine. The patient was instructed about her biting habit and oral hygiene implement. A 7 days

course of systemic penicillin was prescribed and the patient was referred for an anti-tetanus booster. The splint was removed 10 days later and the replanted teeth were restored with composite resin. Radiograph and clinical examination were performed during 12 months follow-up period. During the above mentioned period, the teeth remained in a stable functional position and did not reveal any clinical ankylosis or resorption. Moreover, it remained functional stability and was aesthetically acceptable after 1 year follow-up.

Both the patient and her parents were satisfied with the treatment outcome and wanted to avoid complicated treatment, so it was decided to further follow-up and keep the replanted teeth as long as possible.

Discussion:

Literature review reveal that the important factor to ensure a favorable outcome after replantation is the extraoral time elapsed between the injury and the replantation of tooth^{2,4}. Most importantly care should be taken to the avulsed tooth to prevent from drying, which causes loss of normal physiologic metabolism and morphology of the periodontal ligament cells.⁴ Aim is to replant a clean tooth with which means that the patient should be brought to the office immediately. If delay occurs in replantation, the tooth should be quickly stored in an appropriate medium until the patient can go the dental office for replantation. Suggested storage media in order of preference are: milk, saliva (either in the vestibule of the mouth or in a container into which the patients spits), physiologic saline or water⁴. Water is the least desirable storage medium because the hypotonic environment causes rapid lysis and increased inflammation⁸. Hank's balanced salt solution has shown the superior ability in maintaining viability of the periodontal ligament fibers for extended periods⁹. However, they are presently impractical as they are not generally available at accident site.

Irrespective of the root surface treatment, there is consensus in the literature in that replanted teeth should be treated endodontically because the necrotic pulp and its toxins affect the periodontal ligament cells through the dentinal tubules and play a decisive role in the root resorption process⁹⁻¹¹. Some operator suggest that, If extra oral dry time exit 60 minutes in a closed apex the teeth should be treated endodontically outside the oral cavity¹¹. Another aspect of replantation is the preperation of socket which consists of removal of destructions as blood clots and bone fragments in order to facilitate the replantation.

The goal of antibiotic therapy is to avoid bacterial proliferation in the area of ongoing process and contribute to the prevention of inflammatory resorption. Ideally a broad spectrum antibiotic should be administered for seven days¹². It is necessary to splint the replanted tooth to the adjacent teeth flexibly during 7-10 days for periodontal healing and then to perform root canal treatment to prevent the inflammatory root resorption in case of immediate replantation of tooth with closed apex.

In our presented case, the avulsed incisors had close apices and were kept in milk from the moment of trauma until its replantation 60 minutes later. Prolonged extra oral time and closed apices were the factors that cause deficiency of pulpal and periodontal healing, so it was assumed that the prognosis will be negligible. But, in 12 months follow-up showed maintainence of root integrity, intact lamina dura and absent of tooth mobility, which are indicative of successful replantation. Moreover, It was aimed to prevent the teeth loss, maintain aesthetic and functional properties as well as allowing the alveolar bone growth. To achieve the goal of the treatment, the knocked out teeth were replanted back into the socket into its original position and splinted for 10 days.

Study found that mature teeth in children and adolescents exhibit more extensive inflammatory root resorption after replantation compared to adult¹³. The mentioned increase root resorption rate is related to the bone remodelling which is more extensive in children during the grow-up period.

The root resorption and ankylosis may give rise to infraocclusion during the growing process¹³. Either prosthetic replacement of the missing incisors, or prosthetic implant placement might be alternative treatment options for our presented case, if replantation were not practicable. However, both of the options need time for complete root formation of the abutments as well as adequate bony thickness of implant. In this aspect, the period of sustainability of replanted teeth bear utmost importance.

The knocked out teeth can maintained aesthetic and functional properties for some years after the replantation. In this report, the replanted teeth remained in a stable functional position during 12 months follow-up period without any sign of ankylosis or resorption. Despite the positive results observed after 1 year, clinical and radiographic follow-up of the teeth also planned for further followup.

Conclusions:

Amount of damage to tooth and supporting structures, emergency treatment and follow-up period play a role in the prognosis of knocked out teeth. It can be recommended to keep that teeth in a suitable solution and treatment started as early as possible. According to the findings of the presented case, replantation can be advised for avulsed teeth with prolong extra oral time, but risk of resorption at long time should be considered.

Referances:

1. Chadwick BL, White DA, Morris AJ, Evans D, and Pitts NB. Non-carious tooth conditions in children in the UK, British Dental Journal; 2006: **200**, 379-84.
2. Andreasen JO and Andreasen FM (2007), Avulsions In *Textbook and color atlas of traumatic injuries to the teeth*, ed.4th Andreasen, J. O., Andreasen, F. M., and Andersson, L. pp. 444-88. Blackwell Munksgaard, Copenhagen.
3. Chowdhury SS, Howlader MR. RE-plantation of Accidentally Avulsed Tooth: A case report. J Bangladesh Coll Phys Surg 2013; 31: 39-44.

- 198 4. Andresen JO, Borum MK, Andresen FM. Replantation of 400 avulsed permanent
199 incisors. 4. Factors related to periodontal ligament healing. Endod Dent
200 Traumatol 1995; 11(2): 76-89.
- 201 5. Blomlof L, Otteskog P, Hammarstrom L. Effect of storage in media with different
202 ion strengths and osmolarities on human periodontal ligament cells. Scand J
203 Dent Res 1981;89(2):180-7.
- 204 6. Siglas E, Regan JD, Kramer PR, Witherspoon DE, Opperman LA. Survival of
205 human periodontal ligament cells in media proposed for transport of avulsed
206 teeth. Dent Traumatol 2004;20(1):21-8
- 207 7. Hiltz J, Trope M. Vitality of human lip fibroblasts in milk, Hanks balanced salt
208 solution and viaspan storage media. Endod Dent Traumatol 1991;7(2):69-72.
- 209 8. Blomlof L. Milk and saliva as possible storage media for traumatically
210 exarticulated teeth prior to replantation. Swed Dent J Suppl 1981;8:1-26.
- 211 9. Trope M, Friedman S. Periodontal healing of replanted dog teeth stored in
212 viaspan, milk and Hanks Balanced Salt Solution. Endod Dent Traumatol
213 1992;8:183-88
- 214 10. Elinevid H, Jansson L, Lindskog S, Weintraub A, Blomlof L. Endodontic
215 pathogens: propagation of infection through patent dentinal tubules in
216 traumatized monkey teeth. Endod Dent Traumatol 1995;11(5):229-34.
- 217 11. Ingle JI, Bakland LK, Baumgartner JC. Ingle's endodontics. 6th ed. Hamilton,
218 Ontario: BC Decker Inc; 2008. p 1348-51.
- 219 12. Sae-Lim V, Wang CY, Trope M. Effect of systemic tetracycline and amoxicillin on
220 inflammatory root resorption of replanted dogs' teeth. Endod Dent Traumatol
221 1998;14(5):216-20.
- 222 13. Ebelesender KA, Freihs S, Ruda C, Pertl C, Glockner K, Hulla H. A study of
223 replanted permanent teeth in different age groups. Endod Dent Trumatol
224 1998;14:274-8