

Management of Avulsed Mandibular Incisor Tooth with six Months Follow Up

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ABSTRACT

Background: The term dental avulsion refers to the loss of tooth from the alveolar socket. The incidence of dental avulsion is more common in young children between the age group of 7 to 9 years with a slight male predilection. A 17 year old male walked into the department of Conservative Dentistry and Endodontics at Asan Memorial Dental College with an avulsed tooth. After eliciting the history, replantation of avulsed tooth was planned followed by splinting for two weeks. Follow up was done subsequently for next six months with radiographs and pulp testing. No radiological and symptomatic changes were noted.

Keywords: Avulsion, Doxycycline, Splinting, Replantation, storage media.

INTRODUCTION

The term dental avulsion refers to the loss of tooth from the alveolar socket ^(1, 2). The incidence of dental avulsion is more common in young children between age group of 7 years to 9 years with a slight male predilection. This is attributed to the resilient and fragile dento-alveolar complex in children that tends the tooth to ex-articulate from the socket even to milder forms of trauma ⁽³⁾. Most commonly involved teeth are the Maxillary central incisors. Avulsion contributes to 1-15% of all traumatic injuries to the permanent teeth. The causes for avulsion include sports injury, road traffic accidents and domestic violence ^(4, 5). Replantation of an avulsed tooth has been a well-documented and is an accepted treatment protocol. However the long term prognoses of such cases are governed by multiple external factors such as extra oral time, storage media and subsequent splinting procedures employed. All these have a direct effect on the viability of periodontal ligament cells. The commonly associated complication in managing an avulsed tooth is ankylosis of the replanted tooth and tooth resorption ^(3,4).

CASE REPORT

A 17 year old male walked into the Department of Conservative Dentistry and Endodontics at Asan Memorial Dental College with a chief complaint of trauma to the mandibular anterior region with an avulsed tooth. On eliciting the history cause of avulsion was known to be domestic accident. The patient had reported to a nearby general hospital for emergency treatment within 10 minutes, where the avulsed tooth was recommended to be stored in milk. Subsequently the patient reported to our department with the avulsed tooth stored in milk. The extra oral dry time of the avulsed tooth was less than 30 minutes. The patient did not have any relevant medical history. On extra-oral examination there were multiple lacerations in his upper and lower lip with bruising on the chin. Intra oral examination revealed a missing right mandibular lateral incisor (42) with an empty alveolar socket (figure 1). Radiovisiography was taken for the 42 region to rule out any dento-alveolar fracture (Figure 2). The avulsed tooth was evaluated for the presence of cracks/ fractures under magnification. The crown portion was intact with a completely

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formed apex. After obtaining consent from the patient it was decided to replant the avulsed tooth 42 with a semi-rigid splint into the socket.



Fig 1: Pre operative.

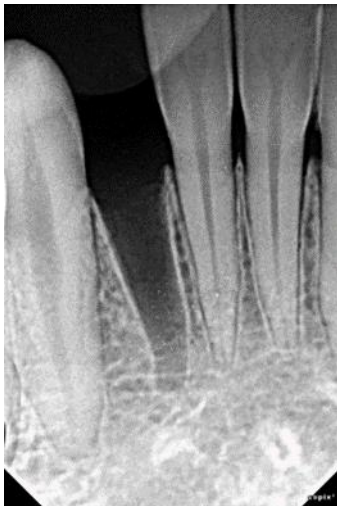


Fig 2: Pre operative radiograph.



Fig 3: Post splinting.

The alveolar socket was prepared by irrigating with saline and Betadine solutions. The avulsed tooth was carried using gauze and held at the CEJ in order to prevent damage to the PDL fibers of the root. The surface of root was treated with Doxycycline for five minutes to increase the viability, survival of periodontal Ligament cells and also aid in pulp

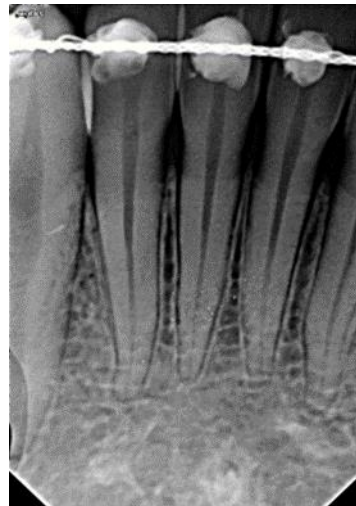


Fig 4: Radiograph after splinting.

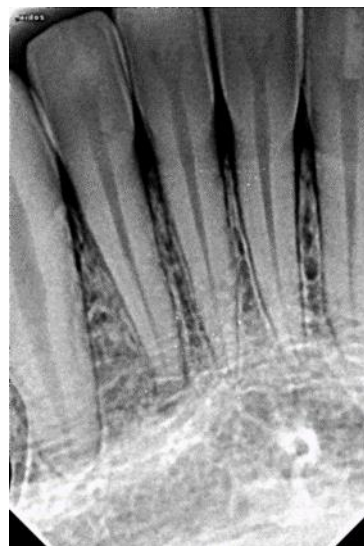


Fig 5: One month follow up.

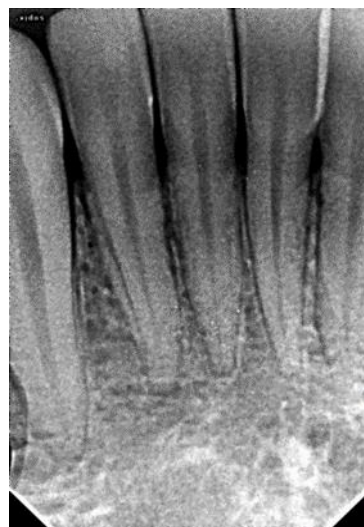


Fig 6: Three month follow up.



Fig 7: Six month follow up.

revascularization. The tooth was replanted into the socket with digital pressure and occlusion was verified. The tooth was then splinted using 21 gauge (figure 3) orthodontic wire and light cure composite for two weeks. The position of the tooth in the socket was confirmed using a digital x-ray (figure 4). The extra oral lacerations were sutured and the patient given analgesics and antibiotics. The patient was reviewed after two weeks and sutures were removed. The patient was asymptomatic and the splint was removed. No mobility was observed. On the first month follow up (figure 5) pulp vitality testing was done using EPT. The tooth responded normal to vitality test and digital X-ray showed no further peri-apical changes. Subsequent follow ups at the end of 3 (figure 6) and 6 months (figure 7) showed no changes with normal pulp vitality testing to EPT.

DISCUSSION

Replantation of avulsed permanent tooth is a universally accepted treatment modality in dental literature to preserve natural dentition. However, there are several factors which control the long term success of replanted avulsed tooth. The first and foremost factor amongst them is the extra oral dry time of the avulsed tooth.. Ideally if the extra oral dry time is less than 20 minutes it is considered optimal for periodontal healing to take place. If the extra oral dry time is more than 60 minutes the survival of periodontal ligament cells are unlikely due to dehydration leading to lysis of periodontal ligament cells ^(6, 7,8). In the current case report the

total extra oral time was less than 30 minutes and hence favourable prognosis could be expected.

In comparison between teeth with closed and open apices, teeth with open apices had higher chances of pulp revascularization. In such instances surface treatment with Doxycycline or Minocycline is recommended which could facilitate re attachment of PDL cells and also promote pulp revascularization. More recently materials such as Emdogain have been used successfully in cases where extra oral dry time extended beyond 60 minutes. Though surface treatment protocols are recommended only when the extra oral dry time extended beyond 60 minutes ⁽⁸⁻¹⁰⁾, Doxycycline treatment for five minutes was done in our case report.

Storage media of avulsed tooth is another parameter to determine success of replanted avulsed tooth. Literature recommends the use of Milk, patient's own saliva, Hank's balanced salt solution, Normal saline, distilled water. Of all the storage media HBSS have shown superior ability to maintain viability of PDL cells. However it is impractical to have HBSS at the time of avulsion. Hence milk is considered as a practical alternative HBSS to store avulsed teeth. Water is considered the least desirable storage medium of all as the hypotonic environment could lead to lysis of PDL cells. In the current case milk was used as storage medium

Splinting of avulsed tooth is done to stabilize the tooth in its socket. Semi rigid splints are best recommended for splinting of avulsed teeth as compared to rigid splints which are only used for dento-alveolar fractures. Semi rigid splints allow for physiologic movement of tooth during healing and minimize the chances of tooth ankylosis. Splinting usually is recommended for a period of two weeks ⁽¹¹⁻¹³⁾. In the current case semi rigid splinting was done with 21 gauge orthodontic wire with light cured composite. More recently titanium trauma splint (TTS) is used effectively for splinting avulsed tooth.

The possible consequences associated with replantation of avulsed teeth are resorption and ankylosis. Ankylosis is usually associated with splinting time and splinting technique employed. Splinting time beyond 4 weeks and the use of rigid

splints that does not allow for physiologic tooth movement could lead to ankylosis of tooth ^(4,14).

Resorption is mostly associated with extended extra oral dry time of more than 60 minutes or contamination of roots. It can be minimized by using surface treatment protocols such as doxycycline, fluoride and citric acid which retards resorption ^(15,16).

CONCLUSION

A favourable prognosis could be accomplished in this case during a six month follow up. More long term follow up of the case is required to assess potential long term consequences of resorption.

CONFLICT OF INTEREST

No potential academic conflict of interest relevant to the above article was reported.

REFERENCES

1. J. O. Andreasen and F. M. Andreasen, "Classification, etiology and epidemiology," in *Textbook and Color Atlas of Traumatic Injuries to the Teeth*, J. O. Andreasen and F. M. Andreasen, Eds., pp. 151–179, Mosby, Munksgard, Copenhagen, Denmark, 1994.
2. J. O. Andreasen and F. M. Andreasen, "Examination and diagnosis of dental injuries," in *Textbook and Color Atlas of Traumatic Injuries to the Teeth*, J. O. Andreasen and F. M. Andreasen, Eds., pp. 195–217, Mosby, Copenhagen, Denmark, 1994.
3. L. Andersson, J. O. Andreasen, P. Day et al., "International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth," *Dental Traumatology*, vol. 28, no. 2, pp. 88–96, 2012.
4. A. D. Kaba and S. C. Maréchaux, "A fourteen-year follow-up study of traumatic injuries to the permanent dentition," *ASDC Journal of Dentistry for Children*, vol. 56, no. 6, pp. 417–425, 1989.
5. M. J. Kinirons and J. Sutcliffe, "Traumatically intruded permanent incisors: a study of treatment and outcome," *British Dental Journal*, vol. 170, no. 4, pp. 144–146, 1991.
6. J. O. Andreasen, "Etiology and pathogenesis of traumatic dental injuries. A clinical study of 1,298 cases," *Scandinavian Journal of Dental Research*, vol. 78, no. 4, pp. 329–342, 1970.
7. I. Brin, Y. Ben-Bassat, I. Heling, and N. Brezniak, "Profile of an orthodontic patient at risk of dental trauma," *Dental Traumatology*, vol. 16, no. 3, pp. 111–115, 2000.
8. A. Filippi, Y. Pohl, and H. Kirschner, "Replantation of avulsed primary anterior teeth: treatment and limitations," *Journal of Dentistry for Children*, vol. 64, no. 4, pp. 272–275, 1997.
9. J. O. Andreasen and F. M. Andreasen, *Essentials of Traumatic Injuries to the Teeth: A Step-By-Step Treatment Guide*, Munksgaard, Copenhagen, Denmark, 2nd edition, 2001.
10. J. O. Andreasen and F. M. Andreasen, "Avulsions," in *Textbook and Color Atlas of Traumatic Injuries to the Teeth*, J. O. Andreasen and F. M. Andreasen, Eds., pp. 383–425, Mosby, Munksgard, Copenhagen, Denmark, 1994.
11. N. Cohenca, S. Karni, D. Eidlitz, E. Nuni, and J. Moshonov, "New treatment protocols for avulsed teeth," *Refuat Hapeh Vehashinayim*, vol. 21, pp. 48–53, 2004.
12. U. Glendor, A. Halling, L. Andersson, and E. Eilert-Petersson, "Incidence of traumatic tooth injuries in children and adolescents in the county of Västmanland, Sweden," *Swedish Dental Journal*, vol. 20, no. 1-2, pp. 15–28, 1996.
13. J. O. Andreasen, "Effect of extra-alveolar period and storage media upon periodontal and pulpal healing after replantation of mature permanent incisors in monkeys," *International Journal of Oral Surgery*, vol. 10, no. 1, pp. 43–53, 1981.
14. D. Ram and O. N. Cohenca, "Therapeutic protocols for avulsed permanent teeth: review and clinical update," *Pediatric Dentistry*, vol. 26, no. 3, pp. 251–255, 2004.

15. M. Cvek, P. Cleaton-Jones, J. Austin, J. Lownie, M. Kling, and P. Fatti, "Effect of topical application of doxycycline on pulp revascularization and periodontal healing in reimplanted monkey incisors," *Endodontics & Dental Traumatology*, vol. 6, no. 4, pp. 170–176, 1990.
16. J. O. Andreasen, M. K. Borum, and F. M. Andreasen, "Replantation of 400 avulsed permanent incisors. 3. Factors related to root growth," *Endodontics & Dental Traumatology*, vol. 11, no. 2, pp. 69–75, 1995.