

Management of Avulsion tooth within golden period in young permanent tooth

Dimas Surya Saputra, Rosiana Dewi Prayogo, Putri Andarini, Herninda, Mega Moeharyono Puteri and Soegeng Wahlujo *

Department of Pediatric Dentistry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

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Abstract

Introduction: Tooth avulsion is described as a displacement of the tooth from its socket. It may occur due to trauma and most often involves the maxillary teeth. Numerous studies have shown that this injury is one of the most serious dental injuries, so prompt and correct emergency management is essential for attaining the best outcome after this injury. Factors that determine healing after replantation are media storage, periodontal tissue damage, extra-alveolar period and intact alveolar socket.

Case History: A 11-years-old male patient was referred from Puskesmas Perak to the Department of Paediatrics Dentistry at RSKGM-P Airlangga Surabaya with complaints that his upper tooth was off from its socket. The incident occurs after his head hit the table around 30 minutes ago. The patient had no history of systemic disease and didn't have any allergic to food and medicine. The tooth was soaked on normal saline.

Discussion: The optimal treatment option following an avulsion injury is to replant avulsed tooth at the earliest. Appropriate emergency management, significant treatment plans, and prompt action influence good prognosis in the management of an avulsion injury. In the past, it was advised to perform root canal therapy extra-orally before replantation. However, the current guidelines recommend root canal therapy be performed intra-orally to minimize the extra-oral time. After the replantation, we continue to observe the tooth every month to see the vitality, mobility, ankylosis and resorption.

Conclusion: Replantation is the treatment of choice following avulsion to facilitate restorative therapy and quality of life.

Keywords: Avulsion; Replantation; Dental Injuries; Golden Period; Quality of Life

1. Introduction

A quick impact to the teeth and the structures around them causes dento-alveolar trauma, which can result in a variety of problems, including the total loss of the tooth from its socket. One type of severe traumatic dental injuries is an avulsion [1]. Avulsion is the term that describes a tooth's total separation from its alveolus. Exarticulation is a different term for it, and the maxillary teeth are often involved [2]. The most prevalent causes of tooth avulsion include sports injuries, falls from heights, and car accidents that apply direct force to the teeth and periodontal ligaments [3]. Permanent tooth avulsion accounts for 0.5% to 16% of all traumatic injuries. Because of their exposed position, the maxillary central incisors are the teeth that are most frequently damaged, and the younger population is the most affected [4].

* Corresponding author: Soegeng Wahlujo

The primary objective of avulsion treatment is to preserve the tooth, or keep it functioning, in order to prevent ankylosis and resorption and allow the alveolar ridge to grow normally [5]. Although it is the preferred course of treatment, transplantation is not always possible. A treatment plan and appropriate emergency management are critical for a positive outcome. Replantation may not be necessary in certain cases, such as serious periodontal or dental disease, severe immunosuppression, a difficult patient, significant cognitive impairment necessitating sedation, or severe cardiac problems [6].

2. Case History

A 11-years-old male patient was referred from Puskesmas Perak to the Department of Paediatrics Dentistry at RSKGM-P Airlangga Surabaya with complaints that his upper tooth was off from its socket. The incident occurs after his head hit the table around 30 minutes ago. The tooth was soaked on normal saline. The patient had no history of systemic disease and didn't have any allergic to food and medicine. The patient have cooperative behaviour. Based on the Frankl behaviour rating scale, the patient showed a rating scale of 3 which is positive [7]. The parents want a treatment to make their child have a tooth again.

On extraoral examination, there is no defect founded. However, during the intraoral examination we found that socket of tooth 11 is bleeding and there is a blood clot (Figure 1). There are no mobility founded on the other teeth. But there is an enamel fracture on avulsed tooth.



Figure 1 Intraoral Examination

For the first step, we do extraoral asepsis with alcohol and intraoral with povidone iodine 1%. After that, local anesthesia with pehacain (Lidocaine 20 mg dan Epinephrine 0.0125 mg/mL) was performed around the socket of 11 tooth. After anesthesia was done, curettage was performed to all of the socket walls. Curettage is carried out vertically along the socket wall. The aim of curettage is to remove blood clot and debris from the socket. Irrigation with NaOCl and aquadest is followed after the curettage.

After the socket is clean, the tooth is replanted to the socket by holding the crown of the tooth. Its not allowed to hold the root of the teeth because it can contaminate the tooth and bother the healing process. Make sure that the tooth is on the correct position like before its avulsed. In this case, tooth 11 is on a same level and align with tooth 21 but there is a diastema due to mesiodens. After make sure the position is right, the bracket was inserted to teeth 13, 12, 11, 21 and 22. The tooth was replanted using bracket that connected with ligature wire and ss 0.014. Follow-up instruction were provided for a day after, one week after and every month to see the vitality of the tooth

After a week, we do follow up to the patient. There are no complain from the patient about the pain. The injured gingiva is healing. X-ray showed that there are no apical problem from the tooth (Figure 2).



Figure 2 Follow up after one week

3. Discussion

A tooth avulsion is the total rupture of the periodontal ligament, complete loss of connection between the tooth and the socket, and cemental damage. The most crucial element for reattachment after tooth replantation is the viability of the periodontal ligament cells [8]. Factors such as extraoral dry time, storage media, and the presence of any root abnormalities affect the outcome and survival rate of avulsed teeth [9]. An avulsed tooth should ideally be replanted right away or should only be kept in a physiological medium, like saline, for a short period of time before being replanted. Before being replanted, avulsed teeth can also be stored for a longer period of time in saline solution, milk, saliva, ViaSpan, Eagle's Medium, Hank's balanced salt solution (HBSS), propolis, and other media [2, 5, 10].

When it comes to treating an avulsed tooth, the available treatments can differ based on the stage of root formation. Conventional root canal therapy is the preferred course of action for an avulsed tooth with a fully formed apex, whereas apexification or revascularization operations are considered possibilities in the case of an avulsed tooth with an open apex. The apex in this case is not fully closed. Revascularization, which occurs without the intervention of growth factors or stem cells, is the process of restoring the vascular supply to the pulp-dentin complex by inducing bleeding into an empty root canal area, much like a blood clot repairs from surgical treatment [11]. Cell homing plays a significant part in this procedure. Cell homing is made up of two steps. Cell homing consist of 2 processes. The first one is migration of cells to the tissue that got injured. The second process is differentiation of cells. The stem cells has an ability to differentiate into odontoblast and pulp fibroblast in pulp and dentin regeneration [12].

Orthodontic splints require particular materials, including as wires and brackets. These devices use button brackets or fixed orthodontic appliances that are cemented to the teeth and joined by wrapping flexible wire around the buttons. The ability to synchronize the teeth's movement is the benefit of utilizing a bracket in this situation. The major concern regarding these splints is their ability to exert forces on the teeth that can interfere with healing. A study analyzing that splints constructed with orthodontic materials revealed that they always generate some force; however, the amount of force exerted can be modified by parameters like the type of ligature, the form of the arch wire (straight or performed) and the cross-section of the wire [13, 14].

However, we still do follow up every one month to see the vitality, mobility and resorption of the tooth. Besides the that, we also do x-ray to see the periodontal adaptation (if there any possibility for ankylosis to happen). Root canal treatment was planned if the discoloration of the crown or any apical problem was founded.

4. Conclusion

Replantation is the common treatment due to avulsion tooth. However, we still have to consider several aspect to do the replantation. Storage media and extra-alveolar time have the most important key to successful treatment.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this document.

Statement of informed consent

Informed consent was obtained from patient included in the study.

References

- [1] Nishad Kadulkar, Rubi Kataki, Adrija Deka, Salouno Thonai. Replantation of an Avulsed Tooth: A Case Report. *Cureus*. 2023; 15(5). DOI 10.7759/cureus.39198
- [2] Marwah, Nikhil. *Textbook of Pediatric Dentistry*. 3rd ed. Jaypee Brothers Medical Publishers; 2014.
- [3] Adina Widyastuti, Lukita Wardani, Diatri Nari Ratih, Prisca Bernadeti Sri Widayanto, Antonius Surya, Wignyo Hadriyanto. Replantation of Anterior Avulsed Teeth: A Case Report. *Knowledge E*. 2022; 200-207. DOI 10.18502/kme.v2i1.10852
- [4] Soukaina El Kharroubi, Sofia Drouri, Bouchra Doumari, Sara Dhoun, and Hafsa El Merini. Management of 3 Avulsed Permanent Teeth: Case Report of a 3- Year Follow-up. *Hindawi*. 2022. <https://doi.org/10.1155/2022/2081684>
- [5] Dr. Nishana K, Dr. Prasanth Balan, Dr Jayasree S., Dr Revathy M Nair, Dr Ashique M. Reimplantation of an Avulsed Permanent Tooth: A Case Report. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. 2021; 20(2): 41-43
- [6] Fouad AF, Abbott PV, Tsilingaridis G, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Dent Traumatol*. 2020; 36(4): 331-342. <https://doi.org/10.1111/edt.12573>
- [7] Riba, Hicham. A Review of Behavior Evaluation Scales in Pediatric Dentistry and Suggested Modification to the Frankl Scale. *EC Dental Science*. 2017;16: 269-275.
- [8] Luísa Bandeira Lopes, João Botelho, Vanessa Machado. Severe Case of Delayed Replantation of Avulsed Permanent Central Incisor: A Case Report with Four-Year Follow-Up. *Medicina*. 2020. doi:10.3390/medicina56100503
- [9] Revathy Parthasarathy, Srividhya Srinivasan, Vikram C, Yashini Thanikachalam, Anupama Ramachandran. An Interdisciplinary Management of Avulsed Maxillary Incisors: A Case Report. *Cureus*. 2022; 14(4): e23891. DOI 10.7759/cureus.23891
- [10] Sahar Ameli, Karim Jafari, Firouz Zadfatih, Mehrdad Blurian, Somayeh Hekmatfar. Delayed Replantation of Avulsed Teeth: A Case Report. *Zahedan J Res Med Sci*. 2021; 23(2): e95795
- [11] Ayman M Abulhamael, Stefan Zweig, Abrar S Kutbi, Rayan S Alrehili, Ziyad T Alzamzami, Yousef M Alharbi. Combination of Revascularization and Apexification in the Treatment of an Avulsed Tooth: A Case Report. *The Journal of Contemporary Dental Practice*. 2020; 21(7): 803-807
- [12] Wahluyo, Soengeng. *Endodontik Regeneratif Pada Gigi Imatur Anak*. Surabaya: Revka Prima Media; 2021
- [13] Hanna Sobczak-Zagalska, Katarzyna Emerich. Best Splinting Methods in Case of Dental Injury–A Literature Review. *The Journal of Clinical Pediatric Dentistry*. 2020; 44 (2). doi 10.17796/1053-4625-44.2.1
- [14] Mazen Ahmad Almasri, Raja Kummoona. *Maxillofacial Surgery And Craniofacial Deformity*. IntechOpen; 2020