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Replantation of Anterior Avulsed Teeth: A Case Report

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Abstract.

Background: Tooth avulsion is described as a displacement of the tooth from its socket. Replantation on an avulsion permanent dentition is a condition that needs immediate treatment. Replantation of the avulsed tooth can be done in a span of less than 12 hr. Avulsion of tooth may occur due to trauma. Factors that determine healing after replantation are media storage, periodontal tissue damage, extra-alveolar period and intact alveolar socket. The main goal of the replantation is to maintain and treat the periodontal tissue and alveolar contour, and thus retain the dentition for esthetic condition.

Objective: To find out the effectiveness of replantation for preserving avulsion of tooth.

Case Report: A 42-year-old woman was referred to Universitas Gadjah Mada Dental Hospital with avulsed secondary mandibular incisor (32) after a motorcycle accident that had taken place the night before. The patient was traumatized for more than 12 hr. Based on the clinical examination, tooth 32 was avulsed. Radiographic examination showed no bone fracture. Root canal treatment was performed, and then replantation was carried out, followed by splinting using archbar. Three months after replantation, clinical and radiographic examinations were performed.

Results: All mandibular incisors were in good condition. The patient showed good result, and even the replantation was done by exceeding the golden period time. The patient was instructed to maintain her oral hygiene.

Conclusion: Immediate treatment of avulsion tooth and the right procedure can affect the success of the treatment. From this viewpoint, replantation is one of the appropriate treatments for preserving avulsion of tooth.

Keywords: avulsed tooth, replantation, splinting

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1. Background

Tooth avulsion is defined as complete displacement from its socket [1]. Direct force on the teeth and periodontal ligaments in the alveolar socket causes avulsion. One to sixteen percent of traumatic injuries occurred in permanent teeth. Sports, falling from height, and traffic accidents are the most common causes of tooth avulsion [2,3]. The

recommended treatment for tooth avulsion is immediate replantation. The implantation in 20-30 minutes after the teeth avulsed will affect the succeeded treatment. The viability cell rate of pulp and periodontal ligament become low by shortage of blood supply, dryness, and existence of bacterial contamination.

If reimplantation is not possible, the tooth is stored in a physiological solution to allow longer extraoral time with fewer resorption complication after replantation. In an emergency, the condition of the roots affected the treatment, depending on the tooth's maturity and extraoral dry time. Sixty minutes of dry time is considered as a survival point for periodontal ligament cells [4]. Pulp and periodontal ligament injuries can take place in avulsed or traumatized teeth. Pulp necrosis always occurs in avulsed teeth in permanent teeth and close apex. Necrotic tissue in the dental pulp is susceptible to bacterial contamination that requires endodontic therapy or an extra-oral approach and retrograde placement of a titanium post. If root canal treatment is not performed, the pulp chamber is infected. The presence of bacteria in the root canal and cementum damage on the external surface may result in external resorption and cause rapid tooth loss [5].

Tooth should be replanted as soon as possible after the avulsion and splinting functionally. Tooth replantation should be followed by splinting onto adjacent teeth for 7-10 days for periodontal tissue healing and then root canal treatment is carried out to prevent root resorption. A long review period is important for the replantation cases [2].

The patient had been traumatized for the 15 hours before that it had been more than 12 hours. It also affects the treatment of avulsed teeth performed. Avulsed teeth are placed in dry conditions for a long period of time that it affects the extraoral time. The case report is an emergency approach. Treatment was carried out by multidisciplinary dentistry specialists, so it requires teamwork.

2. Objective

The aim of this report is to present a case of dental avulsion with replantation treatment. Replantation is to maintain and treat the periodontal tissue and alveolar contour, and thus retain the dentition for esthetic condition by replantation.

3. Methods

A 42-years-old female patient was referred to Universitas Gadjah Mada Dental Hospital with avulsed secondary mandibular incisor (32) due to motorcycle accident that occurred 15 hours before. The tooth was avulsed into the oral cavity then the patient vomited it into the hand. The tooth was washed under running water then dried it with a handkerchief and stored in dry plastic for 15 hours. On clinical examination, tooth 32 was avulsed (Figure 1 a, b) and tooth 31 was luxated. Tooth 31 luxation was resulted from the traumatic impact of the accident. The injured part of tooth's socket was not hurt. Thus, there was no history of systemic disease. There were no occurrences of unconsciousness, nausea and vomiting. To complete examination, periapical and panoramic radiographs were taken (Figure 2). Radiographs examination showed a normal socket for tooth 32 and inexistence of fracture. The procedures performed included endodontic treatment; replantation followed by splinting of several teeth.

(a) (b)

Figure 1: (a) Clinical condition of the socket of tooth 32; (b) Avulsed tooth 32.

The patient was informed about the treatment procedure and the expected prognosis. After obtaining an informed consent from the patient, replantation of tooth 32 was decided. Extraoral root canal treatment was performed on tooth 32 and the tooth was obtured with gutta-percha (Figure 3 a-e). The apical of the tooth was cut along for 3 mm and tooth was obturated using retrograde filling technique with MTA. The empty socket was curettage then irrigated with normal saline. Replantation of tooth 32 was carried out, followed by splinting using archbar and ligation with 0.4 mm ligature (Figure 4).

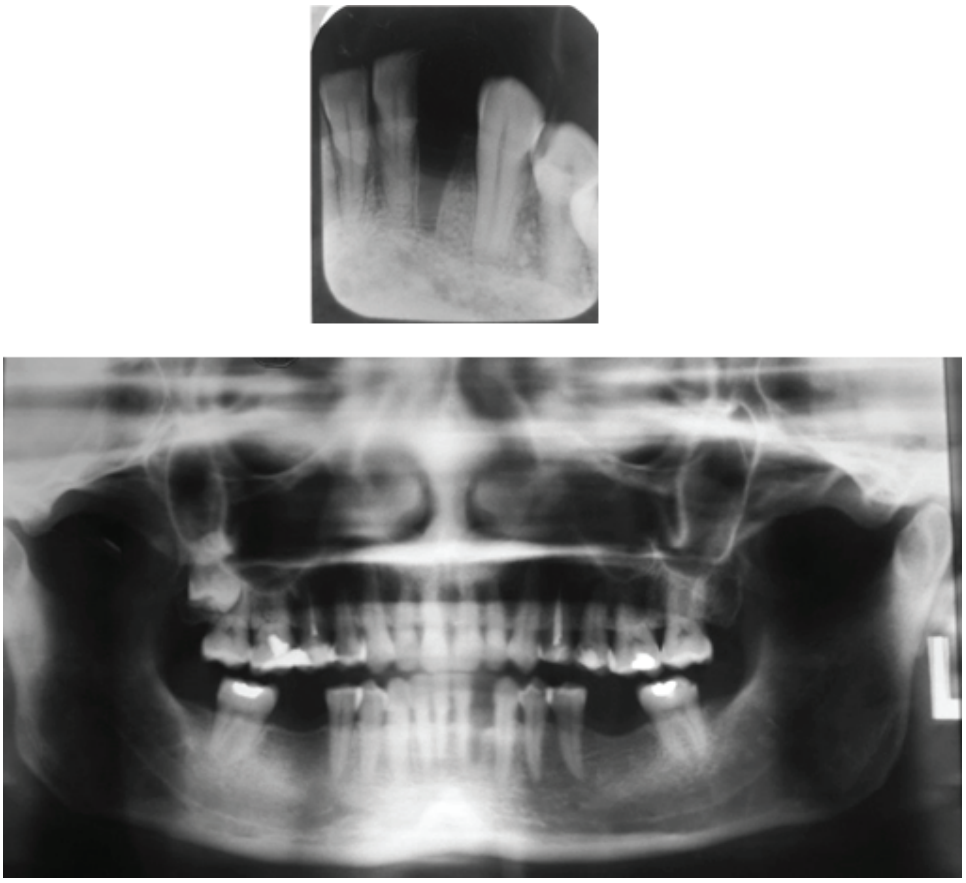

Figure 2: Periapical and panoramic radiographs.

4. Treatment Results

The patient was reviewed in 3 months after replantation. On clinical examination, there was archbar fixation and ligature was in a good condition. Luxation was not found on teeth 31 and 32. Radiograph examination revealed improved condition in alveolar bone (Figure 5).

In the present case, the tooth was avulsed in 15 hours of extraoral time and in a dry storage media. The ideal treatment for avulsion cases is immediate replantation[6]. Prognosis in replantation of avulsed permanent incisor according to clinical and radiographic examination is influenced by dry extraoral time <15 minutes due to the viability of periodontal ligament cells [7]. There were 4 different criteria for evaluating the prognosis of replantation of the permanent incisor. These include the quantity of physical damage on the root surface (cementum and periodontal ligament cells), extraoral dry time, type of storage media and the amount of root formation of avulsed tooth. Other factors such as the age of the individual, type of splinting, mastication, socket treatment, endodontic treatment, antibiotics, the time of replantation and macroscopic contamination, can also

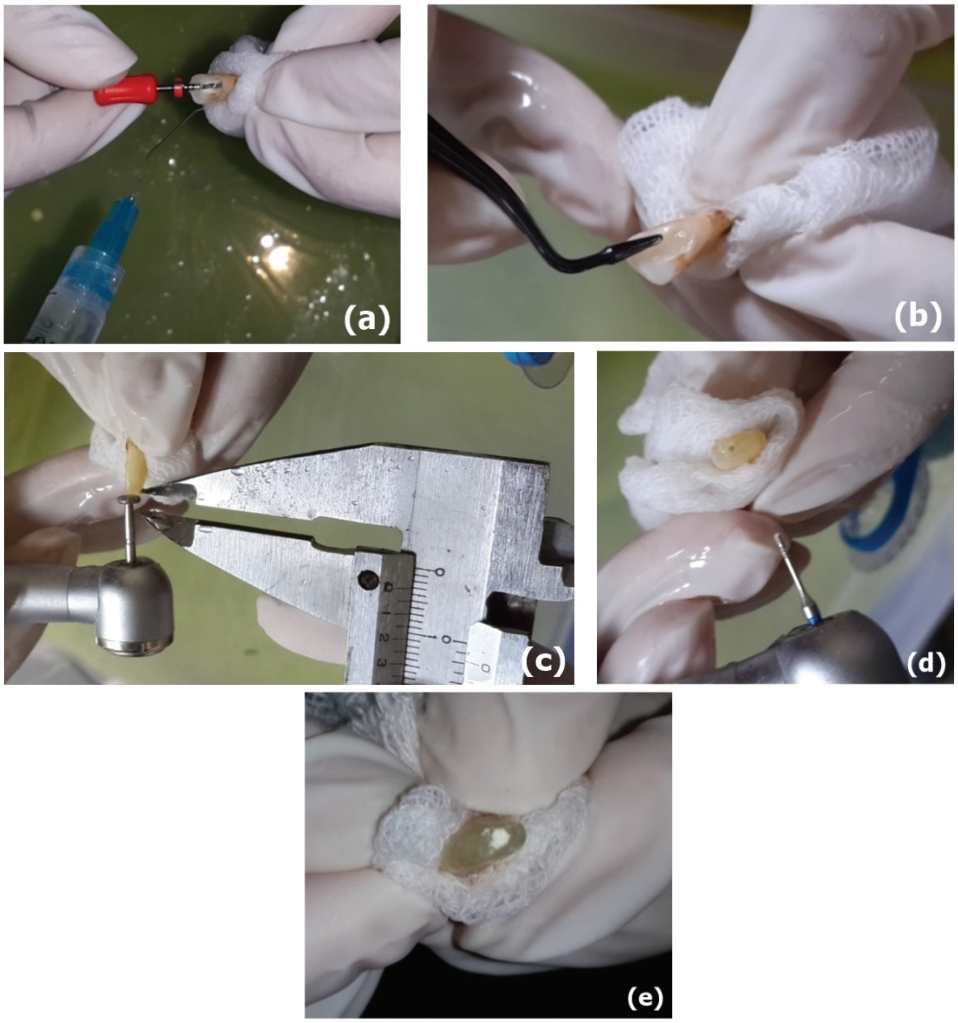

Figure 3: a, b. Extraoral root canal treatment; c, d. Apical root of tooth 32 cut along 3 mm; e. The tooth 32 was obturated using retrograde filling technique with MTA.

Figure 4: Clinical condition and a periapical radiograph examination of the tooth after replantation.

affect the clinical success of replantation. The most important thing is survival, which is followed by the healing of periodontal ligament cells. The long-term achievement of replanted avulsed permanent incisors is directly affected by the health of the periodontal

Figure 5: Clinical condition and a periapical radiograph examination after 3 months follow up.

ligament cells. Periodontal reactions to replantation occur in four different conditions, namely, healing with normal periodontal ligament, healing with surface resorption, healing with replacement of resorption (ankylosis), and healing with inflammatory resorption (infection) [7].

If immediate replantation is not possible, tooth is washed in running water and stored in the oral cavity. If patient is concerned about swallowing the tooth, the tooth can be stored on the transport media[6]. According to Resende et al.[8], natural products are reported to be more effective than synthetic media. Natural media that can be used from plant derivatives are propolis which has potential effects on cell viability, anti-inflammatory effects, and osteogenic differentiation. Other natural media are coconut water, aloe Vera and green tea. Other types of storage media are nonphysiologic media (e.g. tap water) and physiologic media (e.g. milk, HBSS, Eagle's medium, soymilk, egg white, and etc.) [9-11]. In this present case, it was mentioned that the avulsed tooth was in a dry storage media. The condition of the media is non physiologic media prior to replantation that can result in total necrosis of the periodontal ligament and healing by replacing root resorption. Periodontal ligament and tooth surfaces are resorbed and replaced with the surrounding alveolar bond resulting in ankylosis. If the treatment can be carried out properly, avulsion tooth with avital periodontal ligaments can be replanted and continue to function for several years [12].

The replanted avulsed tooth is recommended for splinting [13]. In this present case, the tooth 32 was avulsion and 31 was luxation. Splinting is done using archbar and ligase with 0.4 mm ligature. Splinting should allow the tooth to make physiological movements. This is to prevent ankylosis in the implanted tooth. The archbar is a semi-rigid splint that can provide less space for tooth movement and allows the periodontal ligament to continue to receive mastication load with a mild intensity. Another advantage is that it is more economical, low cost and can stabilize the luxation of tooth. Luxation of tooth

has a periodontal ligament injury or tear. Archbar has the ability to assist the healing process of the periodontal ligament to accommodate the mastication load [14].

This study showed successful replantation of avulsed teeth with no adequate storage media, and it was treated on more than golden period.

5. Conclusion

Tooth's maturity and extraoral dry time can affect the success of the treatment of an avulsion tooth. From this viewpoint, replantation is one of the recommended treatments for preserving avulsion of tooth.

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