Case Report

Immediate Self-Replantation of an Avulsed Tooth: 24-Month Follow-Up Case Report

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ABSTRACT

Avulsion is one of the most critical traumatic dental injuries. The prognosis of the treatment depends on the amount of vital periodontal fibrils and consequently the extraoral storage period, the storage medium, and the root development of the tooth. Immediate replantation is the most important factor for the prognosis. This case report presents the immediate self-replantation of an avulsed immature maxillary central incisor of an 8-year-old girl. Anamnesis disclosed that the tooth had been replanted within 5–10 minutes by the family. The teeth were splinted after extraoral, intraoral, and radiographic examinations had been performed. During 24 months of follow-up, positive results were obtained in examinations of the teeth. However, pulp canal obliteration (PCO) was observed in the maxillary left central incisor in the 12th month. PCO is regarded as the mechanism of healing of the pulp that occurs after replantation of avulsed teeth. However, follow-ups of the patient are continuing as recommended by the International Association for Dental Traumatology.

Key words: *Traumatic Dental Injury, Avulsion, Replantation, Immature Apex, Pulp Canal Obliteration*

In recent years, traumatic dental injuries have become a major public health problem. Avulsion is a complicated type of traumatic dental injury and represents 0.5%–3% of injuries in the permanent dentition [1,2]. It affects many tissues including the gingiva, alveolar bone, periodontal ligament, cementum, and dental pulp [2]. The prognosis of the treatment depends on the amount of vital periodontal fibrils, the extraoral-alveolar time, type of storage medium, condition of the pulp, and level of root development [2,3]. The most important factor that affects the prognosis positively is the tooth replantation, performed as soon as possible [2].

Immature teeth with an open apex, when replanted, suffer from various possible complications like pulpal necrosis, inflammation, infection resorption, ankylosis/replacement resorption, or standstill of root formation [3,4]. Expected results of the replantation are arrested or continued root formation and eruption [2,3]. There is also a possibility of intrapulpal hard tissue formation, known as pulp canal obliteration (PCO), following pulp revascularization [2,5]. Here, we present the immediate self-replantation of an avulsed immature maxillary central incisor of an 8-year-old girl.

CASE REPORT

An 8-year-old girl who had fallen at a playground 1 hour before was referred to the Department of Pediatric Dentistry, University of Dicle, Turkey. Clinical evaluation disclosed that the maxillary left central incisor had been avulsed. Subluxation was detected in the maxillary right central incisor at the same time. Anamnesis disclosed that

the tooth had been replanted within 5–10 minutes by the family (Fig. 1).

A radiograph was taken to check the proper placement of the avulsed tooth (Fig. 2). However, radiographic evaluation showed incomplete root formation of the teeth. After that, a flexible splint was applied using orthodontic wire & composite resin (Fig. 3). The electric pulp test (Pulp Vitality Tester; Parkell, Electronics Division, Farmingdale, NY, USA) was performed with unclear findings. In accordance with the recommendations of the International Association of Dental Traumatology (IADT), systemic antibiotic therapy and tetanus protection were provided [3].

After completion of the procedure, the patient was recalled for a follow-up examination. The patient was asymptomatic after 7 days. At the end of the second week, the electric pulp test was repeated and the teeth exhibited a positive response. Periapical tests showed no pain on palpation or percussion, and radiographic examination showed normal periapical tissue; therefore, a decision was made to remove the splint. No endodontic procedure was performed, considering the probability of pulp revascularization of an immature tooth. Informed consent was obtained from the patient's parents after an exhaustive explanation of the procedure. During 24 months of follow-up, positive results were obtained in examinations of the teeth. When radiographs were evaluated, it was observed that apexogenesis had been completed, with no periodontal ligament clearance and no resorption (Fig. 4a–d). Mobility and percussion tests were normal, and no abscess/fistula or spontaneous/provoked pain was encountered (Fig. 5). However, PCO developed in the maxillary left central incisor in the 12th month (Fig. 4c).

Figure 1 - Intraoral view of the patient after self-replantation

Figure 2 - Radiographic view of the patient after self replantation

Figure 3 - Splinting of teeth

Figure 4 - Periapical radiography: (a) 3-month follow-up, (b) 6-month follow-up, (c) 12-month follow-up, and (d) 24-month follow-up.

Figure 5 - Intraoral view of the patient after 24 months

DISCUSSION

An avulsed permanent tooth represents a critical emergency case in dentistry. Several factors are involved in planning the treatment procedure, including extraoral alveolar time, type of storage medium, condition of the pulp, and level of root development [2,3]. Many studies have shown that teeth replanted within 5 min after avulsion have the best prognosis [2-8]. According to the IADT's 2012 guidelines, the most appropriate treatment approach is immediate self-replantation after tooth avulsion. This approach allows proper reattachment of the vital periodontal ligament to the alveolar bone. At the same time, immediate replantation of an immature tooth with an open apex provides optimal conditions for revascularization [3].

In this case, the patient's family performed self-replantation and then brought the patient to the department within an hour. Factors such as minimal extraoral alveolar time, quick arrival at the department, and the young age of the patient increased the likelihood of a positive outcome in this case. Pulpal assessment varies from that in other types of traumatic dental injuries because of interruption of the blood flow in avulsed teeth [3]. In an immature tooth with an open apex, pulp revascularization may occur with the subsequent formation of PCO [4,6]. In a systematic review that evaluated PCO, Abd-Elmeguid et al. reported that PCO was observed in 96% of teeth as pulpal healing after the replantation of immature teeth [7].

Although considered a sign of healing, PCO causes a problem in the evaluation of the pulp canal if endodontic treatment is needed for any reason [9]. The yellow/tawny discoloration of the tooth and the reduction of pulpal precision are also reported as clinical complications [2,6,10]. The American Association of Endodontists Case Assessment criteria classified PCO teeth as a high-difficulty category [11]. Nevertheless, this situation cannot be avoided, and endodontic interference is not indicated as long as there are no signs of necrosis. Robertson et al [12]. reported that the probability of secondary pulp necrosis in PCO is limited. The same study concluded that restorative or orthodontic treatments and caries do not increase the probability of pulp necrosis.

It has been observed that avulsed immature permanent teeth usually have short roots and thin walls. This decreases the strength of the tooth and enhances the probability of root fracture [13]. Initiation of pulp revascularization immediately after replantation is a proposed treatment approach since necrosis develops in two-thirds of replanted immature teeth [7]. This approach would promote root apexogenesis. Therefore, PCO is regarded as a mechanism of healing of the pulp that occurs after the replantation of avulsed teeth.

CONCLUSION

Self-replantation of an avulsed tooth is the most appropriate treatment option. The follow-up procedure recommended by the IADT should be applied for up to 5 years for avulsed teeth. Thus, regular follow-ups are planned for this case for a longer period. Nevertheless, it should be noted that this replanted tooth has already served this patient for 24 months and that should be regarded as a success.

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