Evaluation of Delayed Splint Removal and Root Resorption due to Pandemic: Case Report

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Abstract

Avulsion, defined as the complete dislocation of the tooth from the alveolar socket, is considered one of the most serious traumatic injuries. In these injuries; Many tissues are affected, including dental pulp, gingiva, periodontal fibers, cementum and alveolar bone.In the prognosis of the tooth replanted as a result of avulsion, the duration of splinting and initiation of treatment are as important as the duration of the tooth in the external environment and the environment in which it is transported.In this case report, the diagnosis and treatment of a 15-year-old patient, whose treatment was started but could not come to his appointment due to pandemic conditions, is discussed with the clinical and radiological evaluation of root resorption following root canal treatment and splint removal approximately 1 year later.

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Keywords: Pandemic, late splint removal, root resorption.

Introduction

Avulsion is defined as the complete removal of the tooth from the alveolar socket. The blood flow to the pulp is impaired and a serious condition occurs when the periodontal ligament cells are exposed to the external environment. Avulsion causes ischemic damage to pulp tissue and periodontal ligament tissue (1). The risk of dental trauma increases in orthodontic anomalies, overjet cases with protrusion and inadequate lip closure (2). Avulsion is seen in 0.5–3% of trauma cases. Since the alveolar bone is highly flexible in childhood and adolescence, it causes a low rate of resistance to external forces (3). Therefore, avulsion injuries occur most frequently in the upper incisors (75%) of patients aged 12-21 years (4).

An avulsed tooth can be held in place by reimplantation; however, the prognosis of the treatment depends on the duration of the tooth outside the mouth, the environment in which the tooth is stored, the condition of the avulsed tooth, the age of the patient and root development (5).

The immediate treatment for avulsion is reimplantation. The splint is used to support, protect or immobilize the tooth and other tissues to prevent possible damage to the pulp and periodontal tissue. The fixation method in traumatic dental injuries can be rigid, semi-rigid or flexible. In teeth with semi-rigid splints, periodontal fibers heal better and root resorption occurs less (6). Semi-rigid splinting of the avulsed tooth after trauma is recommended after replantation (3). Splint is applied for 4 weeks. Control appointments are very important after splint removal. Control appointments allow early diagnosis and treatment of complications such as root resorption that may occur long after trauma (2). In the past, it was believed that constant and long-term stabilization is beneficial; It is known today that when fixed splint is used for a long time, the risk of pulp necrosis and external resorption of teeth increases (7).

The main disadvantage of post-avulsion reimplantation is root resorption. The length of time to stay out of the mouth and the extent of PDL damage are the main factors that determine resorption (8). Root resorption is defined as the loss of cementum and dentin as a result of odontoclastic reactions. Root resorptions are divided into two as internal root resorption and external root resorption according to their localization. External resorption is seen more clinically than internal resorption (9). External resorption has no clinically characteristic symptoms.Sometimes it can progress to the pulp and devitalize the pulp. Pulp vitality values vary in each case. Fractures may occur in severely resorbed teeth. It is more common in men than women. It is most common in the upper central and lateral teeth, and least in the lower and upper first molars. Its localization is mostly seen in the apical region, then in the middle third, and at least in the cervical and bifurcation regions (10).

Local and systemic factors causing external resorption have been identified. Local factors; impacted teeth, tumors and cysts, trauma and reimplantation, excessive mechanical forces applied in orthodontic treatment, periradicular infections. Systemic factors; hypothyroidism, hyperparathyroidism, Calcinosis, Turner syndrome, Gaucher and Paget's disease (10).

The aim of this case is to evaluate the root resorption following late splint removal and to monitor the prognosis of the treatment in a patient whose treatment was delayed due to pandemic conditions.

Case Report

A 15-year-old male patient was admitted to the Harran University Faculty of Dentistry Pediatric Dentistry clinic after hitting his lower jaw on a flat concrete floor. Clinical intraoral examination revealed that the maxillary anterior central tooth was avulsed. Subluxation was noticed in the other central tooth. No pathology was found in other intraoral soft and hard tissues. Extraoral examination revealed a contusion injury in the soft tissue of the lower jaw. In the anamnesis taken, it was learned that he applied to a private dental clinic half an hour after he fell, and the avulsed tooth was placed in saline there and was referred to our university hospital. When the patient applied to our clinic, approximately 15 hours had passed since the trauma. In the radiographic examination, it was noticed that tooth number 11 was avulsed and there was an enlargement of the periodontal ligament in tooth number 21 (Figure 1). No pathology was found in alveolar bone and other hard tissues. In the systemic anamnesis, it was learned that he did not have any disease.

In the treatment planning, first of all, the socket and its surroundings were washed with sterile saline solution and the debris was removed. The avulsed tooth was repositioned by washing in sterile saline solution.A splint was performed using a semi-rigid wire with support from the teeth 12,22,23. A broad spectrum antibiotic and chlorhexidine mouthwash were prescribed to the patient, and an appointment was made for a week later.However, the patient did not come to his appointment due to the pandemic conditions and when he applied to our clinic for the second time, it had been about a year since the splint was made.

In the clinical examination, gingivitis and plaque formation were observed, especially in the maxillary anterior region, due to the lack of oral hygiene, while the splint wire was in place (Figure 2).In the anamnesis, it was learned that the patient did not have any pain or swelling. Percussion and palpation were negative.In the periapical radiograph taken, it was observed that external resorption progressed in the replanted tooth and the pulpal canal borders disappeared from place to place (Figure 3).Root canal treatment was started in the same session and 5.25% NaOCl and saline were used as intracanal medicament. A second periapical radiograph was taken with a size 30 H-Files (Golden Star H-Files, China) (Figure 4).On the radiograph, it was seen that the resorption progressed in the cervical and middle third of the root canal and the canal merged with the periapical tissues. Pulp residues were removed without further enlargement and calcium hydroxide was sent to the canal.Since the external resorption of the root was advanced, the calcine could not be sent up to the apex. The canal entrance was closed with glass ionomer (Nova Glass F), and the patient was given an appointment 1 month later.When the patient came to his appointment, calcine residues were cleaned and irrigated with physiological saline. MTA (Pro RootMTA, Dentsply Tulsa, Tulsa, OK, USA) was sent to the channel and the patient was called for a control appointment 1 month later.At the same time, splint removal was performed in this session. On the radiograph, it was observed that MTA overflowed into the periapical tissues due to the advanced size of the resorption. (Figure 5)

When the patient came to the control appointment 6 months later, it was observed that there was no pain. There was no pain on percussion and palpation and mobility was negative. It was observed that the resorption continued, albeit partially, in the periapical film taken. (Figure 6)

Figure 1. Panoramic View.

Figure 2. Intraoral Image.

Figure 3. Periapical View.

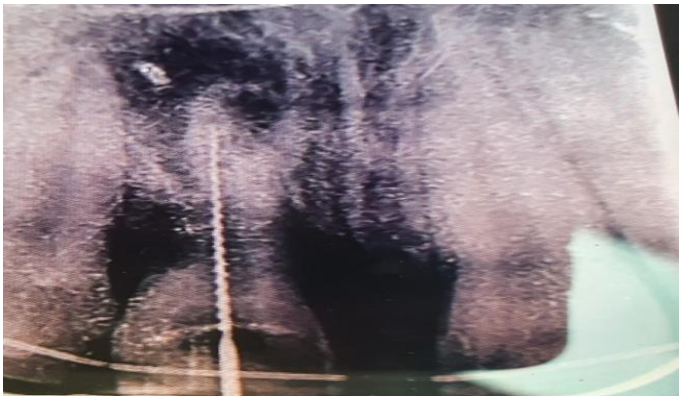

Figure 4. Periapical View.

Figure 5. Periapical View.

Figure 6. Periapical View.

DISCUSSION

The spread of the coronavirus disease(COVID-19) has created significant challenges for dental and medical schools in all affected countries.(11)Dentistry is one of the most important health services that aims to keep the mouth and surrounding tissues, which are an integral part of the body, primarily healthy, and if a disease has occurred, it provides diagnosis and treatment.COVID-19 disease, which was declared a pandemic by the World Health Organization, has directly affected dental services both globally and nationally (12).

In this case, the treatment of the patient was interrupted due to the covid-19 pandemic and the negative effect of the pandemic on the treatment of the patient was observed. It was predicted that with the application of appropriate treatment procedures, root resorption could be slowed down and the patient would be able to use the tooth for longer years.

In cases where the avulsed tooth remains outside the mouth for more than 60 minutes or there are other reasons that cause the periodontal ligament cells to lose their vitality; With the help of gauze, the necrotic

periodontal ligament residues on the root surface are cleaned and the socket is washed with saline solution.Root canal treatment can be performed before or 7-10 days after reimplantation without removing the splint. The tooth is reimplanted and fixed for 4 weeks with a flexible or semirigid splint (13).

In this case, root canal treatment was started approximately 1 year later, and since the infected pulp was not removed within 7-10 days, it was observed that the resorption progressed rapidly. It was observed that a more effective result could be obtained by removing the factors causing resorption and removing the splint in a timely manner.

Complete resorption of the root takes 3-7 years in patients aged 8-16 years and longer in older patients. Ankylosis occurring in permanent anterior teeth during childhood and adolescence locally inhibits the growth of alveolar bone. Therefore, the possibility of infraocclusion is higher in the replantation performed before the growth spurt (14). In this case, replantation was performed in a 15-year-old male patient after growth spurt. No infraocclusion occurred in the tooth. Root resorption should progress more slowly, whereas root canal treatment procedures started late, so resorption has accelerated.

Almost all treatment procedures used for dental traumas are still not evidence-based today, making it difficult to analyze the long-term consequences of healing and its relationship to treatment (15).

CONCLUSION

The purpose of replantation of the permanent incisor in patients who encounter avulsion injury during the growth and development period; It is to keep the tooth in place until the patient's bone development is completed, to provide aesthetic, psychological and functional benefits and to keep the tooth in the mouth until the patient is old enough to be implanted or prosthesis.The result we can observe in the absence of PDL in delayed replantation is replacement resorption. Especially in patients who start root canal treatment late, resorption accelerates.

Check-up appointments are very important after trauma. Control appointments allow early diagnosis and treatment of complications such as root resorption that may occur long after trauma.

Randomized clinical trials are needed for types of dental trauma. Tooth reposition, effects of splinting, removal and duration of infected pulp should be further investigated. However, for ethical reasons, it will be difficult to conduct randomized studies on trauma victims and in the future we will have to rely on experimental animal studies supported by clinical observational studies.

Descriptions

Author Contributions:

MSD, AT and MK: study design, data collection/processing, analysis, interpretation, literature review, and manuscript writing contributed in its departments and stages, design, consulting and critical review in the study

Conflicts of Interest: The authors declare that they have no conflict of interest.

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