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Olgu Sunumu Case Report

A Complicated Trauma Case In Immature Permanent Teeth

İmmatür Sürekli Dişlerin Etkilendiği Komplike Bir Travma Olgusu

ABSTRACT

Dental traumatic injuries in children are usually seen in the anterior region, where the development of the teeth continues, and the root formation is not yet complete. In this case report, we aimed to present the treatment of anterior teeth with three different types of dental injuries as a result of trauma.

An 8-year-old male patient was referred to the clinic one day after the traffic accident. As a result of clinical and radiographic examination, uncomplicated crown fracture in the maxillary right lateral incisor and subluxation in the maxillary right central incisor were detected. It was learned that the maxillary left central incisor was avulsed and was not found at the accident site. After the treatment of the maxillary right central and lateral incisors, a removable space maintainer was planned to protect the maxillary left central incisor cavity until the age of appropriate prosthetic treatments.

Following treatment, periapical healing, thickening of dentin walls, and increase in root length were observed of maxillary right central incisor at 3,6,9 and 12 months follow-up. In addition, the vitality of the maxillary right central tooth continues and the maxillary left central tooth cavity is preserved.

Dental Trauma, Immature Tooth, Regenerative Endodontic Treatment, Removable Space Maintainer

Key words: Dental Trauma, Immature Tooth, Regenerative Endodontic Treatment, Removable Space Maintainer

ÖZ

Çocukların dişlerinde travmatik yaralanmalar genellikle dişlerin gelişiminin devam ettiği ve kök oluşumunun henüz tamamlanmadığı anterior bölgede görülür. Bu olgu sunumunda travma sonucu 3 farklı tipte dental yaralanmanın görüldüğü anterior dişlerin tedavisinin sunulması amaçlanmıştır.

8 yaşındaki erkek hasta trafik kazasından bir gün sonra kliniğimize başvurdu. Yapılan klinik ve radyografik muayenede 12 numaralı dişte komplike olmayan kron kırığı, 11 numaralı dişte sublüksasyon tespit edildi. 21 numaralı dişin avülse olduğu ve kaza yerinde bulunamadığı öğrenildi. 11 ve 12 numaralı dişlerin tedavilerinin tamamlanmasının ardından 21 numaralı diş boşluğunun uygun protetik tedavilerin yapılacağı yaşa kadar korunması için hareketli yer tutucu planlandı.

Tedavi sonrası 3,6,9 ve 12 aylık takiplerde maksiller sağ santral dişte periapikal iyileşme, dentin duvarlarında kalınlaşma ve kök boyunda uzama görülmüştür. Ayrıca maksiller sağ santral diş vitalitesi devam etmektedir ve maksiller sol santral diş boşluğu korunmuştur.

Anahtar sözcükler: Dental Travma, İmmatür Diş, Rejeneratif Endodontik Tedavi, Hareketli Yer Tutucu

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INTRODUCTION

Injury of young permanent teeth is a common finding after orofacial trauma in children and adolescents. (1)

The most common type of traumatic dental injury in permanent teeth is crown fractures. Enamel-dentine crown fractures expose a large number of dentinal tubules. These tubules create a thermal and chemical irritant pathway that can trigger bacteria and pulpal inflammation (2). Therefore, to prevent further injury, it is urgent to restore the tooth, especially if the remaining dentin wall is thin.

If the pulp viability of a traumatized immature tooth disappears, endodontic treatment may be complicated. Since the root end of these teeth has not yet closed, it is difficult to obtain a suitable apical seal using conventional obturation methods. Recently, regenerative endodontic procedures have become widespread. The advantage of this treatment method compared to the apexification process is that it permits root maturation by forming vital tissue (3).

The 'dental avulsion' term is used to describe the removal of the tooth from the socket as a result of trauma. Avulse of the tooth is an emergency and requires immediate intervention. Intervention within the first 30 minutes is essential for the prognosis of the tooth. (4)

CASE

In this case report, it is aimed to present the treatment three different types of dental injuries due to the trauma of anterior teeth.

An 8-year-old male patient referred to Tokat Gaziosmanpaşa University Faculty of Dentistry Department of Pedodontics with the complaint of one of his upper anterior teeth broken and one of the mobility. As a result of clinical and radiographic examination, uncomplicated crown fracture in the maxillary right lateral incisor and subluxation in the maxillary right central incisor were detected. (Figure 1)

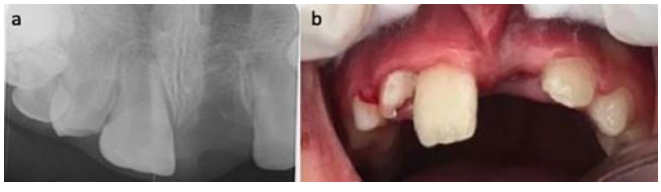

Figure 1: (a)Intraoral periapical radiography and (b) intraoral photograph at the first appoinment after trauma

It was learned that the maxillary left central incisor was avulsed and was not found at the accident site. Maxillary right primary first molar, maxillary right primary canine, maxillary right central incisor, maxillary left lateral incisor, and maxillary left primary canine was splinted with 0.5 mm stainless steel wire. (Figure 2)

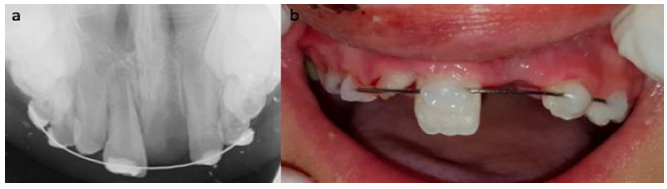

Figure 2: (a) Intraoral periapical radiography and intraoral photograph after flexible splint

The splint was administered for two weeks. Since the maxillary right lateral incisor had not yet completed its eruption, the restoration was postponed until it was completed, and the fracture line was closed with glass ionomer cement. The maxillary right central incisor was detected as devital. Regenerative endodontic treatment was planned for immature maxillary right central incisor tooth, which was still devital after four weeks.

The pulp chamber was accessed after local anesthesia with 4% articaine hydrochloride and 1:100,000 epinephrine. The coronal pulp was removed by gates glidden burs 3-4 and the canal entrance was reached. Length determination was performed with # 15 k file. Root canal irrigation was performed passively with 20 ml of 2.5% sodium hypochlorite (NaOCl) and saline. No instrumentation was performed in the root canal. After irrigation, the root canal was dried with paper points. The double antibiotic paste consisting of metronidazole and ciprofloxacin were prepared in a ratio of 1: 1, homogeneously mixed with distilled water, and made into pat form and applied into the root canal. After placing cotton into the canal entrance, the cavity was temporarily filled with glass ionomer cement, and an appointment was made two weeks later. In the second session, percussion control was performed, and temporary restoration under local anesthesia with 3% cefacaine was removed, and the canal was reached.

Irrigations were performed with EDTA. The root canal was dried with paper points. Bleeding from the periapical region was induced with a #15 K-file 1-2 mm beyond the apex. Bleeding was expected to reach the enamel-cement junction. After this process, the top of the blood clot was hermetically sealed with 3 mm white Mineral Trioxide Aggregate (MTA Plus, Prevest Denpro Limited, Jammu, India), which was prepared in accordance with the recommendations of the

manufacturer and carefully closed without pressure. A moist cotton pellet was placed over the MTA, and the patient's permanent restorative treatment was completed two days later. Periapical healing, thickening of dentin walls, and increasing at the root length in the maxillary right central incisor at 3,6,9 and 12 months follow-up. (Figure 3)

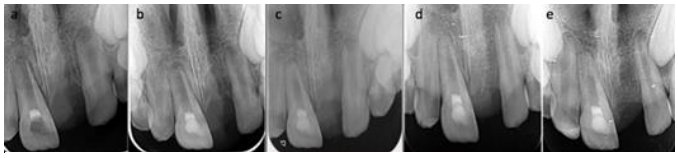

Figure 3: (a) Periapical radiography after regenerative therapy has been completed. (b) 3rd month follow-up. (c) 6th month follow-up. (d) 9th month follow-up. (e) 12th month follow-up.

Maxillary right lateral incisor with uncomplicated crown fracture was restored with composite resin after completing the eruption. After the completion of the treatment of maxillary right central incisor and maxillary right lateral incisor, a removable space maintainer was planned and applied to preserve the maxillary left central incisor cavity until the age of appropriate prosthetic treatments. (Figure 4)

Figure 4: (a) Removable space maintainer to protect the space of maxillary left central. (b) Intraoral photograph of the removable space maintainer . (c) Intraoral photograph of the patient after the treatment of the maxillary right central and lateral in

DISCUSSION

Proper treatment planning is essential for the prognosis of the teeth in trauma cases with more one tooth. In this case report, treatment and follow-up of immature anterior teeth with different trauma types are presented.

In all dental injuries, avulsion caused by trauma is a severe condition. When a tooth is avulsed, damage occurs to the periodontal ligament (PDL) and pulp tissue (5) Pulp necrosis usually occurs after a traumatic avulsion, and the necrotic tissue is highly susceptible to bacterial contamination.

In the case of luxation, the traumatized tooth should be intervened and repositioned as soon as possible and then supported with appropriate splints for stabilization (6). Different splint types can be used to ensure stabilization during the treatment phase. Composite, orthodontic-wire composite splints, fiber-reinforced composite splints, and titanium trauma splints are the most preferred among these (7). In a study comparing stainless steel-composite splints of different thicknesses (0.3mm, 0.4mm, 0.5mm thickness), mobility decreased as wire thickness increased (8). In our case, considering the mobility of the tooth, a 0.5mm stainless steel-composite splint was applied.

Pulp necrosis is the most common complication in dental luxation injuries. In the development of pulp necrosis, the severity of the trauma, the type, the stage of development of the tooth are considered among the most important factors. The incidence of pulp necrosis is higher in teeth that have completed root development than those who have not completed root development (6,7). In this case, the patient was admitted to our clinic shortly after the trauma. The immature tooth with luxation injury was devital at the time of admission to the clinic and during the follow-up period. Unlike the literature, we think that the reason for the devitalized tooth to remain devital is caused by severe trauma as a result of a traffic accident.

Apexification is the most common method used in the treatment of necrotic open apex teeth. However, the method of apexification with calcium hydroxide has many disadvantages, including a long course of treatment, a susceptibility to fracture on tooth root. (9). Due to these disadvantages, a single session apexification method with Mineral Trioxide Aggregate (MTA) was chosen as an alternative to apexification with calcium hydroxide Apexification performed with MTA in one session may cause root development to stop and a short, weakened root may increase the risk of fracture in the future (10). Because of these problems, regenerative treatment is considered as an alternative treatment model. Revascularization can occur when the root canal of the infected tooth is adequately disinfected and in the presence of a suitable cell scaffold (11).

Hoshino et al. defined by; the triple antibiotic paste (TAP) consisting of a mixture of ciprofloxacin, metronidazole and minocycline is the most widely used antibiotic paste in the regenerative treatment (12). It has been reported in studies the minocycline causes discoloration in dental tissues and demineralization in dental hard tissues by chelation with calcium. (13). Another antibiotic paste is a double antibiotic paste (DAP) consisting of ciprofloxacin and metronidazole. (14). It has been reported that the DAP does not cause tooth discoloration. The importance of a hermetic

sealing for successful vital pulp treatment and revascularization has been demonstrated in the studies (15,16). In our case, the clot was covered with MTA and resin-bonding restoration. Following regenerative endodontic treatment, periapical healing, thickening of dentin walls, and increase in root length were observed of maxillary right central incisor at 3,6,9 and 12 months follow-up.

CONCLUSION

In uncomplicated crown fractures, protecting the pulp against irritants is very important for the prognosis of the tooth. For this purpose, the tooth should be restored with a restorative material or, if possible, the reattachment of the tooth's own part should be provided. Regenerative endodontic treatment is one of the treatments that provide root development and thickening of dentin walls and can be preferred in the treatment of devital immature teeth in the clinic.

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