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Crown Fracture Case and Complications

Kron Kırığı Vakas ve Komplikasyonları

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Abstract

When the treatment of dental trauma cases is late, success decreases and complicated approaches are needed. This case report aims to present the problems encountered in the late intervention of the uncomplicated crown fracture, treatments applications and results of 1-year follow-up. In the intraoral examination of an eight-year-old male patient who applied to our clinic, there was an uncomplicated crown fracture in the left permanent maxillary central incisor. Radiological examination showed that the root development of the tooth was incomplete and there was a lesion in the apical region. The patient was decided to go under a root canal treatment with calcium hydroxide placed in the canal for 2 weeks. Then, triple antibiotic paste was applied for 2 weeks for disinfection of the root canal. At the next appointment, a culture sample was received after placing a drain in the root canal due to recurrent infection and drainage; the anaerobic medium culture was negative. When the drainage stopped, the drain was removed, calcium hydroxide was placed for 2 more weeks, and the permanent filling was completed by Mineral Trioxide Aggregate. In the dental volumetric tomogram taken due to the mobility of the relevant tooth, severe hard tissue loss was observed and, then, apical resection procedure was applied by using a splint. No pathological condition was observed in the follow-up periods of 3, 6 and 12 months, and hard tissue formation was observed on the received radiogram. In traumatic cases, early treatment is vital to minimize the encountered complications of the treatments. Therefore, informing patients and parents on this issue will increase the success of the treatments.

Keywords Pediatric dentistry, dental trauma, uncomplicated crown fractures

Öz

Dental travma vakalarının tedavisi geç kaldığında, tedavi başarısı azalır ve kompleks yaklaşımlar gerekir. Bu olgu sunumunda komplike olmayan kron kırığının geç müdahalesinde karşılaşılan problemler, tedavi uygulamaları ve 1 yıllık takip sonuçları sunulmuştur. Kliniğimize başvuran sekiz yaşında erkek hastanın yapılan intraoral muayenesinde, daimi sol üst santral dişinde komplike olmayan kron kırığı mevcuttu. Radyolojik incelemede dişin kök gelişiminin tamamlanmadığı ve apikal bölgede lezyon olduğu görüldü. Tedavisinde kök kanal tedavisi kararı verilerek, kanala kalsiyum hidroksit yerleştirilerek 2 hafta bekletildi. Ardından kök kanalının dezenfeksiyonu için 2 hafta boyunca üçlü antibiyotik patı uygulandı. Bir sonraki randevuda, tekrarlayan enfeksiyon ve drenaj nedeniyle kök kanalına dren yerleştirildi, kültür örneği alındı; anaerob besiyerine ekilen kültür sonucu negatifti. Drenajın sonlanmasının ardından dren çıkarıldı, kök kanalına 2 hafta daha kalsiyum hidroksit uygulandı ve takibinde kök kanalının kalıcı dolgusu Mineral Trioksit Agregat ile yapıldı. İlgili dişin mobilitesi nedeniyle alınan dental volumetrik tomografide şiddetli sert doku kaybı görüldü ve ardından splint uygulanarak apikal rezeksiyon prosedürü uygulandı. 3, 6 ve 12 aylık takip periyotlarında patolojik bir durum gözlenmedi ve alınan radyografide sert doku oluşumu gözlendi. Travma vakalarında tedavilerde karşılaşılacak komplikasyonların en aza indirilmesi için bu vakalarda erken tedavi önemlidir. Bu nedenle hasta ve ebeveynlerin bu konuda bilgilendirilmesi tedavilerdeki başarıyı artıracaktır.

Anahtar kelimeler *Çocuk diş hekimliği, dental travma, komplike olmayan kron kırığı*

INTRODUCTION

Dental injuries constitute 26-76% of all traumatic injuries although oral region creating only 1% of total body. Crown fractures in the permanent dentition are the most frequent dental injuries.[1,2] Anatomic factors such as increased overjet, inadequate lip coverage of the upper anterior teeth and etc. are the most important reasons for dental injuries that mainly involve the maxillary incisor teeth.[3] Fallings, sports activities, bicycle and car accidents and violence are the most prevalent causes and boys are exposed to dental traumatic injuries more than girls.[2,3] Dental traumas are most frequent in 7-12 age range.[2]

Immediate treatment should be the major concern in dental trauma cases not only for restoring the aesthetic and functional features but also for sustaining the pulp vitality.4 Crown fractures through the exposed dentinal tubules, which allow the microorganisms and their metabolic products to reach the pulp tissue, cause the inflammatory response.[4, 5] Although the survival prevalence of the pulp is reported to be very high, periodontal injury, root maturation level and exposure time of dentine are effective factors in the formation of pulp necrosis.[4-6]

This case report aimed to present the problems encountered in the late intervention of the patient with uncomplicated crown fractures of the left permanent maxillary central incisor due to trauma, the treatments applied and the results of 1-year follow-up.

CASE REPORT

An 8-year-old male patient referred to treatment of the left permanent maxillary central incisor with complaint of pain. Anamnesis revealed a history of dental trauma a year ago. Intraoral examination revealed that the left permanent maxillary central incisor had an uncomplicated crown fracture. Radiographic evaluation showed that tooth had an open apex associated with a radiolucent lesion. (Figure 1) Negative response was received to the electronic pulp test. Tooth was diagnosed with pulp necrosis and periapical periodontitis caused by trauma. Endodontic treatment of the related tooth was planned.

Figure 1: Initial periapical radiograph

In the first session, after written informed consent was obtained from parent of the patient, an access cavity was prepared and working length was determined by using an electronic apex locater and a periapical radiogram. The root canal was prepared by using K-files, and during the preparation, the canal was consecutively irrigated with 5.25% sodium hypochlorite solution and saline. The root canal was dried with sterile paper points and filled with calcium hydroxide paste temporarily. Following this, the access cavity was sealed with a temporary filling material. As the patient failed to attend his regular appointments, a periapical radiogram that was taken four months later revealed the persistent radiolucent lesion. The root canal was irrigated with 5.25% sodium hypochlorite and normal saline, dried with paper points and filled with calcium hydroxide paste temporarily, again, for two weeks. Following that, a triple antibiotic paste (ciprofloxacin/metronidazole/minocycline mixture in a 1:1:1 ratio) was placed in the canal as an intracanal medicament for another two weeks. In the next visit, because of recurrent infection and observation of a purulent exudate draining from the root canal, it was decided to get a microbiological culture sample. The sample was incubated under anaerobic conditions, but the sample showed no microbial growth. An 18-gauge injection needle was prepared in working length and placed as a

drain in the root canal for two weeks. (Figure 2)

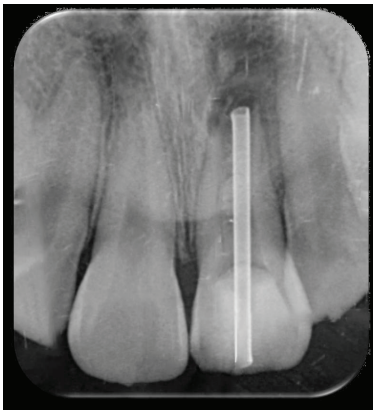

Figure 2: Drain-inserted periapical radiograph

Severe mobility was detected after removing the drain, and dental volumetric tomogram showed severe hard tissue loss. (Figure 3)

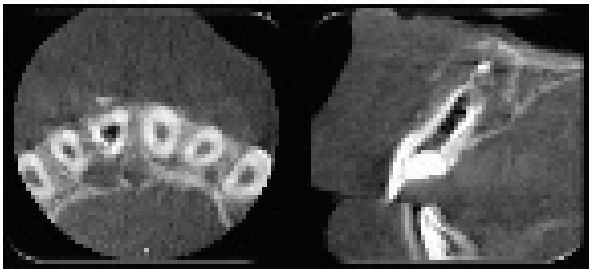

Figure 3: Dental volumetric tomography images

The root canal was irrigated with 5.25% sodium hypochlorite, chlorhexidine and normal saline, dried with paper points and filled with calcium hydroxide paste temporarily for two weeks again. Two weeks later, the root canal was filled with MTA, a moist cotton pellet was placed over the MTA and removed 24 hours later and the need for apical resection surgery was diagnosed. After the final restoration, a splint was applied considering the mobility and crown-to-root ratio of the tooth, and apical surgery was performed in the same session. (Figure 4)

Figure 4: Splint application and apical surgery

The splint was removed four weeks later. The patient was recalled in the 3rd, 6th, 9th and 12th months postoperatively. The radiographs showed complete healing and the clinical examinations showed an asymptomatic tooth. (Figure 5)

Figure 5: 12th month intraoral appearance and periapical radiograph

DISCUSSION

Due the traumas that children are frequently exposed to, psychological problems may arise both in the child and family concerning aesthetic, functional and speech disorders. Traumatic dental injuries are more common in the upper jaw than the lower jaw, and the most affected teeth are central incisors.[7] The most common types of traumatic dental injuries are crown fracture and luxation injuries.[7,8] Guler et al. reported that most of the patients (45%) who had dental trauma applied to the clinic within 1-3 days after trauma and 19% of them after a year. An important part of patients (19%) were found not to seek treatment before symptoms occur.[8] Unfortunately, in this case, the patient applied to our clinic with the complaint of pain and did not consult any dentist immediately after dental trauma.

The treatment type in crown fractures and the prognosis

of the tooth after treatment depend on the degree of the fracture and the dental tissues it contains. The prognosis of uncomplicated crown fractures primarily depends on the injury status of the periodontal ligament and the amount of dentin surface exposed to the external environment.[9]

In uncomplicated crown fractures, bacteria and their products invade into exposed dentin tubules. Since the pulp's self-defense mechanism is limited, this can lead to the exposure of the pulp to bacteria and, consecutively, can cause inflammation. Covering the dentine contributes positively to healing.[10] Root canal treatment was necessary due to devitalization and inflammatory degeneration findings observed with the effect of late admission in our case.

Calcium hydroxide is the most often used medicament because of its antibacterial properties and high pH level. However, the microorganisms (including fungi) causing the persistent infection can be resistant to the alkaline environment. In case calcium hydroxide is not sufficient to eliminate bacterial growth, using triple antibiotic paste consisting ciprofloxacin, metronidazole and minocycline is recommended.[9-10] In undeveloped teeth, antibiotics are thought to reduce root resorption and increase pulpal revascularization.[9]

Apical periodontitis is an infectious disease led by microorganisms colonizing in the root canal. The success of the endodontic treatment depends not only on elimination of present microorganisms and also on prevention of the entrance of new microorganisms into the root canal.[11] The persistence of the apical infection can be caused by inaccurate access cavity preparations and inadequate instrumentations and debridement procedures and coronal leakage between the sessions.[12] The reason for the recurrence of our patient's infection may be that he does not come to his appointments regularly. Even though all the root canal treatment procedures are followed properly, apical infection cannot be eliminated because of the complexity of the root canal system formed by the main and accessory canals, their branches and anastomoses where the microorganisms can remain.[8] Therefore, apical resection was planned in this case to eliminate the apical infection.

Different types of splints can be applied to provide stabilization in the fractures and mobility following trauma during the treatment phase. Among these, the most preferred are composite splints, orthodontic wire-composite splints, fiber reinforced composite splints and titanium trauma splints.[7] In order to accelerate the healing of the surrounding tissues, to prevent malocclusion and early contacts, semi-rigid splint was applied in this case for 4 weeks. At the end of this process, splints were removed and in the clinical examination, the tooth was asymptomatic and its mobilization was close to physiological mobility.

Considering the patient's incompatibility to attend his appointments, single-visit apexification with MTA was preferred. MTA, a kind of hydrophilic cement, is very successful in the cases with periapical infection with exudates, blood and tissue fluids. In the presence of moist, MTA sets and seals the root canal properly.[9]

The restoration of crown fractures can be done prosthetic or conservatively.[10] In this case report, instead of a crown prosthesis that will require additional tooth cutting in teeth that have been lost due to trauma, composite resin restoration has been applied since it can easily intervene in possible fracture situations and is more economical.

CONCLUSION

In a 1-year follow-up period, tooth and periodontal tissue were observed to be healthy in clinical and radiographic evaluations. The tooth was in a position to supply functional and aesthetic requirements. In dental traumas, delaying immediate treatment causes a long and difficult treatment period. It is very important to raise the awareness of patients and their families about receiving the necessary health care after trauma. Dentists have a great responsibility in this regard.

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