



**TREATMENT OF A COMPLETELY FORMED ROOT WITH HORIZONTAL
FRACTURE USING INTRARADICULAR SPLINTING TECHNIQUE:
A CASE REPORT**

**KANAL İÇİ SPLİNTLEME TEKNİĞİ UYGULANARAK APEKSİ KAPANMIŞ
DIŞTEKİ HORIZONTAL FRAKTÜRÜN TEDAVİSİ:
BİR OLGU BİLDİRİMİ**

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ABSTRACT

The aim of this case report was to present the treatment of a horizontal intra-alveolar root fracture using an alternative fixation technique with Hedström file. When the patient referred to our clinic, the first visit of endodontic therapy was already performed by a dentist in another clinic. Horizontal root fracture was found radiographically. Clinical examination revealed marked mobility without a periodontal pocket. The canal was obturated and the fragments were fixed internally through insertion of an endodontic instrument. Favorable result was obtained in a short time period. These results obtained from the study showed that using this technique may be advantageous.

Keywords: Tooth Fractures; Splints, Trauma

ÖZET

Bu vaka raporunun amacı Hedström eği ile alternatif bir fiksasyon tekniği kullanarak intra-alveolar horizontal kök kırığının tedavisini sunmaktır. Hasta kliniğimize başvurduğu zaman, başka bir klinikte endodontik tedavinin ilk seansı yapılmıştı. Kökteki horizontal kırık radyografik olarak tespit edildi. Klinik muayenede periodontal cep olmaksızın belirgin bir mobilite mevcuttu. Kök kanalı dolduruldu ve endodontik enstrüman vasıtasıyla kırık parçalar sabitlendi. Kısa bir sürede olumlu sonuçlar elde edildi. Elde edilen bu sonuçlar uygun vakalarda bu tekniğin kullanımının avantajlı olabileceğini göstermektedir.

Anahtar Kelimeler: Diş Kırıkları, Splint, Travma

INTRODUCTION

Intra-alveolar root fractures involving cementum, dentin and pulp are relatively rare, and they account for probably less than 7% of all dental injuries.¹ The diagnosis of root fracture is determined by radiographic and clinical examination.² There are many treatment options for this type of fracture. If there is no mobility and the tooth is symptomless, treatment is not necessary or if the coronal fragment is mobile, the coronal segment must be repositioned and the tooth splinted. If the coronal pulp is necrotic, treatment options include a root canal treatment of the coronal segment or of both the coronal and apical

segments, intraradicular splinting, and root extrusion (if the root fracture is at or near the alveolar crest).^{3,4}

The healing process of horizontal root fractures depends on different variables such as the mobility of the coronal fragment, location of the fracture, the stage of the root formation and the age of the patient.⁵ Sequelae to horizontal root fractures may be divided into four types: (i) calcified tissue, (ii) interproximal connective tissue, (iii) interproximal bone and connective tissue or (iv) interproximal inflammatory tissue without healing. While the first three types are considered favorable and the 'healing with hard tissue' is the most desired, the last one represents inflammatory state, and is unfavorable.⁶

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Intraradicular splinting has been recommended previously⁴. In this procedure, after root canal treatment of the coronal and apical fragments, a post was used for stabilizing the root segments. This case report describes the treatment of a maxillary central incisor with horizontal mid-root fracture using intraradicular splinting through insertion of an endodontic instrument.

CASE PRESENTATION

A 21-year-old male was referred to the Department of Endodontics at the Faculty of Dentistry, Atatürk University, four weeks after a trauma to his maxillary anterior teeth. He had visited a dentist, and the treatment of the central incisors had been initiated by a dentist. However, the patient did not attend the appointment with his doctor. He decided to apply to the Faculty of Dentistry because of increasing mobility in his teeth and associated discomfort. Clinical examination revealed grade II mobility (marked mobility) of the maxillary right central incisor without a periodontal pocket. Complaints were noted during percussion and palpation. Radiographic examination showed a horizontal root fracture in the middle third of the maxillary right central incisor and an obturated root canal in the left central incisor (Fig. 1, 2). Finishing the root canal treatment and intraradicular splinting were planned for the maxillary right central incisor. The temporary filling material was removed, and the working length was obtained. The root canal was prepared to size 40 with K-files. Irrigation was applied 2, 5% sodium hypochlorite. Finally, complete obturation of the canal was performed with gutta-percha and Sealapex sealer (Kerr, Italy) using the lateral-compaction technique.

As described previously,⁷ before the completion of the root canal filling, a size 40 Hedström file was inserted into the root canal with clockwise winding motion to further reduce the fracture and also to achieve anchorage from the apical fragment for the coronal fragment (Fig. 3). Then the teeth were restored with composite resin. The patient was dated up for followed-up. When he appeared six months later, radiographs showed healing between the root fragments and the periodontal space of a normal width and normal lamina dura continuity (Fig. 4). The tooth was clinically asymptomatic and had no mobility.



Figure 1. Initial radiograph revealed horizontal root fracture in the middle third of the root.



Figure 2. Radiograph taken before the obturation of the canal showing fracture space clearly.



Figure 3. Immediate post-obturation radiograph after the internal fixation.



Figure 4. Post-operative radiograph confirming the healing of the horizontal root fracture.

DISCUSSION

Root fractures occurring in the cervical, middle or apical portion of the root may heal spontaneously without any treatment.⁸ Additionally, the authors demonstrated that following initial treatment without endodontic therapy by reduction and stabilization, root fractures healed successfully.^{9,10} In our case, because the first visit of the root canal treatment was performed in another clinic, we could not try these treatment options.

Intraradicular splinting has been recommended by Weine *et al*⁴ posts and metal pins which were placed passively into the root canal with endodontic cement were used for this same purpose.¹¹ Recently, however, a few studies have showed that endodontic files can be used for intraradicular splinting. In this technique, the file was inserted into the root canal with clockwise winding motion. In this way, the space between the fragments can be reduced, and the anchorage from the apical fragment for the coronal fragment can also be achieved. Reduction of the space between the fragments has some advantages. First, the blood coagulum which is a substrate for bacteria can be eliminated. Second, the possibility of healing with calcified tissue increases due to the reduction of the space between the fragments. Finally, the technique is appropriate for patients who cannot comply with a regimen of periodic visits to the dental office.⁷ Additionally, in our case the healing with calcified tissue occurred. We think that this is attributable to the reduction.

The prognosis of a tooth that presents with a horizontal root fracture depends on the modality of repair of the fractured fragments.¹² Although the outcome of a horizontal root fracture is generally favorable, complications such as pulpal necrosis, radicular resorption, and pulpal canal obliteration can arise.¹³

In this report, the treatment of a horizontal root fracture using the intraradicular splinting technique was presented. This technique may be advantageous in certain cases.

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