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Treatment of a horizontal root fracture without repositioning: A case report

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Abstract

When the incidence of teeth injuries is considered, horizontal root fractures are rare with a reported rate ranging between 0.5%-7.0%. Clinically, the fractured tooth is often extruded and palatally displaced. In these issues, repositioning and fixation of teeth with splints is suggested as the conservative treatment to give a chance to the pulp tissue for spontaneous healing with no further intervention. However, immediate treatment and repositioning may be impossible if the appeal of the patient is delayed. The aim of this report is to present the treatment and follow-up of a case who referred with a traumatized tooth including horizontal root fracture. Since delayed appeal, the coronal fragment could not be repositioned. The coronal fragment of the tooth was treated by using MTA, and the apical fragment was left without any treatment. After 24 month clinical and radiographic follow-up, complete healing of the tooth was observed with no pathological symptoms. The procedure including the treatment of coronal fragment by using MTA and giving a chance to apical fragment for spontaneous healing may be an appropriate solution for teeth with horizontal root fractures when the repositioning of the dislocated fragments is impossible.

Keywords: Horizontal Root Fracture, MTA, Repositioning, Splint

1. Introduction

Horizontal root fractures are rare when compared to other types of injuries, with an incidence rate between 0.5%-7% reported in the literature. These injuries involve various dental tissues such as dental pulp, dentin, cementum, and supportive tissues^[1, 2]. Clinically, the fractured tooth is often extruded and displaced palatally, but the definitive diagnosis is made based on radiographic findings^[2]. Immediate treatment comprises repositioning and stabilization of the coronal fragment in its ideal position, after which the tooth is monitored for an extended period to observe pulp health. However, immediate treatment and repositioning may be impossible if the appeal of the patient is delayed^[2-5]. The aim of this report is to present the treatment and 2-year-follow-up of a case who referred late with a traumatized tooth including horizontal root fracture.

2. Case Report

A 12-year-old girl was referred with a complaint of mobility and tenderness in her permanent maxillary right central incisor caused by an orofacial trauma occurred 2 months ago. Clinical examination showed Grade II mobility with approximately 2-mm extrusion of the tooth. Radiographic examination of the tooth revealed a horizontal root fracture in the apical third of the root and 2-mm displacement of the coronal fragment. Additionally, a radiolucent lesion was observed between the coronal and apical fragments (Fig. 1A). The tooth showed no vitality in the electric pulp test.

The repositioning of the coronal fragment could not be possible since the lack of adequate intervention during the long period of time before the referral of the patient to the clinic. So, the treatment was planned to fix the existing complaints of the patient, and a splint was constructed by 0.3 mm orthodontic wire and composite resin (Grandio, VOOCO, Cuxhaven, Germany) that was bonded between the permanent maxillary canines. At the same session, following anesthesia and placement of rubber dam, the root canal of the coronal fragment was instrumented to the working length by using K-files, which was 1 mm short of the fracture line. The tooth was temporarily treated by using calcium hydroxide (CH) root canal filling material to eliminate the clinical symptoms. Two weeks later, CH was removed by using

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an #80 H-file and copious sterile saline solution. The root canal finally irrigated with 5 ml of 2,5% sodium hypochlorite and 10 ml of sterile saline solution, respectively. Then the root canal was dried with sterile paper points. The entire root canal of the coronal fragment was filled white MTA (MTA-Angelus, Londrina, PR, Brazil). A radiograph was exposed to assure proper placement (Fig. 1B), and a wet cotton pellet was placed on the MTA. The cavity was closed temporarily with glass ionomer cement. 24 hours later, the final restoration was completed with adhesive composite resin (Grandio, VOCO, Cuxhaven, Germany).

After the coronal restoration was completed, a long term clinical and radiographic follow-up sessions were planned. The splint was removed at the 4th month, and it was observed that the mobility of the coronal fragment was eliminated. After 24 month clinical and radiographic follow-up, complete healing of the tooth was observed with no pathological symptoms, and the radiolucency disappeared in the fracture area (Fig. 1C). The tooth was functional without any complaints. Periodic follow-up appointments are resuming to evaluate the long-term success.



Fig 1A: Radiographic view of the traumatized tooth before the treatment.



Fig 1B: Radiographic view of the MTA in the root canal of the coronal fragment.



Fig 1C: Radiographic view of the tooth at the 24th month.

3. Discussion

Repositioning of the coronal fragment and splinting for four weeks is the first choice for treatment of horizontal root fractures [2, 4, 6]. However, repositioning of the coronal fragments could not be performed in the present case since the delayed application of this patient, although reattachment of the fragments as soon as possible is suggested [2]. Although the clinical and radiographic outcomes are commonly favorable, complications such as necrosis of the pulp tissue, radicular resorption and pulpal canal obliteration may occur [6]. Pulp necrosis generally occurs in pulp tissue of the coronal fragment whereas the same situation rarely appears in apical fragment [2, 4]. In the present case, delayed appeal may be considered as the main reason for unhealing in this case. Despite these unfavorable conditions, the endodontic treatment of the tooth was planned. Thus, elimination of the necrotic pulp tissue and obturation of the root canal of the coronal fragment to provide appropriate conditions for healing was suggested in these situations [6].

On the other hand, presence of an open apex which is caused by the dislocation of the fragments makes the filling process of the coronal part harder because it may be impossible to achieve an apical stop [7]. Usage of MTA was strongly advised to create an apical plug and shown to be effective as a one-visit apexification material in treating teeth with open apices [8, 9]. The suggestions for creating MTA apical plug were based on the advantageous properties of the material such as having an excellent biocompatibility providing the regeneration of periapical tissues to a normal condition and the bone deposition without an inflammatory response. Additionally, MTA prevents the continued irritation of periapical tissues with its good sealing ability, and it provides a proper environment for healing of periapical tissues [8-11]. Since it is similar to apexification procedure, same apexification procedure is suggested to fill the root canal of the coronal fragment [5], and MTA may be a suitable option for these cases. Therefore, in the present case, the suggested procedure was performed.

There are limited reports in the literature regarding usage of MTA in treating horizontal root fractures [12-14], that report successful healing which were described as; being functional with asymptomatic status, signs of repair between fractured

segments and absence of apical periodontitis. Similar to these results, successful healing was observed in the present case without any clinical and radiological pathology at the end of the 24th month. Additionally, tooth was functional without any complaints.

4. Conclusion

According to clinical outcomes of the present case, it can be considered that the usage of MTA may be a successful solution for teeth with horizontal root fractures, even the coronal fragment is not ideally repositioned. On the other hand, further clinical and long term follow-up studies are required to support this result.

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