

A rare case of an immature incisor with horizontal root fracture traumatized at the time of eruption

Merve Erkmen Almaz¹, Işıl Şaroğlu Sönmez², Aylin Akbay Oba¹

¹ Kırıkkale University Faculty of Dentistry, Department of Pediatric Dentistry, Kırıkkale, Turkey

² Adnan Menderes University Faculty of Dentistry, Department of Pediatric Dentistry, Aydın, Turkey

Correspondence:

Dr. Merve ERKMEN ALMAZ
Kırıkkale University, Faculty of
Dentistry, Department of Pediatric
Dentistry, Kırıkkale, Turkey.
E-mail: dt.merveerkmen@gmail.com

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Abstract

Dental trauma resulting in root fracture is a rare condition that affects up to 7% of permanent teeth, and injury to immature teeth is even rarer. This case report aimed to show the prognosis of a horizontal root-fractured immature maxillary incisor traumatized at the time of eruption.

Because of an accident, a 6-year-old boy was referred to our clinic with horizontal root fracture of the permanent maxillary left central incisor associated with an extrusive luxation. The coronal segment was repositioned, and a dental splint was applied for 7 weeks. After 48 months, clinical examination revealed a positive response to electrical pulp testing and an absence color change of the tooth. Continuation of root development and calcification of the coronal pulp space was observed radiographically. It was concluded that fixation of teeth is a conservative treatment for immature teeth with horizontal root fractures, resulting in the pulp vitality and spontaneous healing with no other treatment.

Keywords: Child trauma, incisor, tooth eruption, horizontal root fracture.

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Introduction

Traumatic dental injuries resulting in root fracture represent a rare condition that affects up to 7% of permanent teeth, and injury to immature teeth is even rarer (1). Although less frequently observed, horizontal root fractures have a poor prognosis. Because the damaged tissues include pulp, dentin, cementum and supporting tissues, management is often complex (2).

Root fractures are diagnosed by both clinical and radiographic examination (3). Clinically, a luxation injury of the coronal fragment, varying in severity, is

usually observed (4). The diagnosis of root fracture is confirmed by radiographic examination, and in the radiograph, a horizontal/radiolucent line separating the displaced coronal fragment from the apical part is monitored (5).

Management of root fractures is complex because prognostic considerations, such as the patient's age, stage of root growth, mobility of the coronal fragment, degree of displacement of fracture fragment and diastasis of the fragments, should be considered (6). Immediate treatment requires repositioning of the coronal fragment and splinting (7). The following case

report aims to describe the prognosis of an immature maxillary incisor with horizontal root fracture traumatized at the time of eruption.

Materials and Methods

A 6-year-old boy was referred to Kirikkale University, Department of Pediatric Dentistry Clinic, following a fall from a bicycle resulting in trauma to the anterior maxilla. As the accident occurred in the evening hours, he could only refer to our clinic 1 day after the accident.

Clinical examination revealed wounds of different regions of the face, especially the external and internal sides of the upper lip, as well as swelling on upper lip and gingival hemorrhage (Fig. 1). The permanent maxillary left central incisor and left primary lateral incisor were displaced palatally with extrusion, and they were severely mobile. The permanent maxillary central incisors had not yet completed the eruption period. Radiographic examination revealed a horizontal root fracture nearly in the middle third of the root, extrusion of the coronal fragment and a large open apex with thin root walls. The diastasis between the coronal and apical fragments was greater than 1 mm (Fig. 2).

Under local anesthesia, the coronal fragment was gently repositioned, and a semi-rigid splint was applied. Because of severe luxation, the left primary lateral incisor was extracted. The patient was advised to maintain good oral hygiene and rinse with chlorhexidine gluconate for a week. After a week, the tooth was asymptomatic. At the end of 3 weeks, the splint's connection to the traumatized tooth was lost, but the patient could not attend our clinic immediately; he came 3 days later. Clinically, displacement of the coronal fragment was observed, and the fragment could not be repositioned appropriately. After repositioning, a semi-rigid splint was re-applied. After 7 weeks in total, the splint was removed, and the tooth was clinically asymptomatic, with a positive response to the pulp test. The clinical crown of the permanent maxillary left central incisor appeared greater in length than that of the right central incisor.

The patient was recalled under a regular follow-up regime. After 48 months, clinical examination showed normal tooth color and a positive response to the pulp test. Radiographically, continuation of root development and calcification of the coronal pulp space was observed (Fig. 3 and 4). The patient is still under follow up.



Figure 1. Initial intraoral view showing displacement horizontal root fracture



Figure 2. Initial radiographic view showing of the coronal fragment



Figure 3. Clinical view after a 48-month follow up.



Figure 4. Radiographic view after 48 months

Discussion

In the literature, spontaneous healing of horizontal fractures has been reported (1, 4, 7, 8), but no case has been reported where there was trauma at the time of eruption with a follow-up time of 48 months. Andreasen et al. (2004) described that the risk of the development of pulp necrosis increases when the limit is usually reached at 1 mm of diastasis, and mobility of the coronal fragment appears to have a negative influence on healing (8). In the present case, although the coronal fragment was severely mobile and the diastasis between the coronal and apical fragments was greater than 1 mm, healing was observed. The patient's age and stage of root development may have influenced healing positively. In addition, radiographically, the pulp space of the coronal fragment was calcified. Because the diastasis between the coronal and apical fragments was greater than 1 mm, we may conclude that the pulp was damaged. It has been reported that, if the pulp is torn, the revascularization process provides healing of the pulp and calcification of the coronal pulp space occurs, as in the present case. In addition, in the previous literature, the authors stated that if the fragments are separated or mobility is present, the formation of a hard tissue is inhibited, and a fibrous connective tissue (periodontal ligament-like tissue) is formed between the fragments (9, 10). In this case, the patient presented at our clinic 1 day after the accident. Delayed treatment did not exhibit a significant effect on healing, a possibility mentioned in the previous literature (11, 12). Although the splint was lost after 3 weeks, and the patient was without a splint for 3 days, root fracture healing was observed between the fractured fragments. We observed that, for initial healing of the root fracture, it was important to splint for at least 3 weeks. However, this may vary on a case-by-case basis, and the present case had advantages like an open apex, rich blood supply and high healing potential.

When the splint was lost after 3 weeks, the coronal fragment could not be repositioned appropriately; therefore, clinically, the patient had an aesthetic problem. The parents were informed about the need for orthodontic treatment, as the patient also had anterior deep bite and agenesis of the permanent premolar teeth. The parents wanted to wait for a while for orthodontic treatment.

Conclusions

It can be concluded that fixation of teeth with a semi-rigid splint is a conservative treatment for immature teeth with horizontal root fractures. This results in maintaining pulp vitality and spontaneous healing with no treatment.

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

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