

A Case Report On the Immediate Endodontic Management Strategy of Transverse Fracture and Associated Traumatic Injury

Alyami Yahia*, Alzamanan Mohammed, Almansour Hamad

Department of Dentistry, Najran Dental Center, Ministry of Health, KSA, Najran, Saudi Arabia

ABSTRACT

This case report details the management of transverse fracture and associated dental trauma to the adjacent teeth. The importance of immediate splinting to prevent further movement of the tooth is taken into consideration. The appropriate utilization of calcium hydroxide in the management of root fracture and apexogenesis was performed. The benefits of biocompatible putty in transverse fracture repair are sensed and utilized promptly. A long-term follow-up of the case is required to understand the benefit of the timely use of materials in this case.

Keywords: Dental trauma, Transverse fracture, Subluxation, Lateral luxation, Extrusion

HOW TO CITE THIS ARTICLE: Alyami Yahia, Alzamanan Mohammed, Almansour Hamad, A Case Report On the Immediate Endodontic Management Strategy of Transverse Fracture and Associated Traumatic Injury, J Res Med Dent Sci, 2023, 11 (9): 7-9.

Corresponding author: Alyami Yahia

e-mail✉:

Received: 26-August -2023, Manuscript No. jrmds-23-112623;

Editor assigned: 28-August-2023, PreQC No. jrmds-23-112623(PQ);

Reviewed: 11-September-2023, QC No. jrmds-23-112623(Q);

Revised: 19-September-2023, Manuscript No. jrmds-23-112623(R);

Published: 26-September-2023

INTRODUCTION

Management of root fractures is considered to be complex with different clinical outcomes and variable results [1]. Understanding the complex nature of the fracture and its timely appropriate management is essential for the success of the fractured tooth [2]. Vertical fracture of the tooth is always considered to be having poor prognosis and often requires extraction [3]. However, transverse fracture of the root may have variable treatment outcomes and prognosis, depending on the level of the fracture [4].

Transverse fracture of the tooth/root at different levels is to be managed in different ways. Several factors are considered to affect the treatment plan and the prognosis of the tooth with transverse fracture. They are the stage of root development, type of concurrent injury, degree of displacement (if present) of the coronal fragment, the diastasis between the fragments after the fracture, mobility of the coronal fragment, and the response to pulp sensibility tests [5]. Depending on the possible expected prognosis and treatment plan rendered, the classification of fractures has been modified as follows:

a. the apical third of the tooth root; b. The middle third of the tooth root; c. The coronal third of the tooth root (further classified as sub-crestal and supra-crestal) [6]. In addition, there may be a concurrent injury to the coronal portion of the tooth which may complicate the prognosis. Such injuries are crown fracture, concussion, subluxation, lateral luxation, extrusion, or avulsion of the coronal fragment [7]. This case report presents the management of such a case of transverse fracture with lateral luxation of the tooth.

Case Report

A 9-year-old medically fit boy came to the emergency dental service with trauma. He presented with a history of fall-down from the bicycle. The patient complained of pain in the tooth with a slight separation of the crown. On clinical examination of the patient, there was no extra-oral injury. Intraoral examination revealed that the patient is having pain with #11 and #21. There was slight lateral luxation of #21. On radiographic examination, it was found that #11 had a horizontal root fracture in the middle third and # 21 had sub-luxation of the coronal segment and also an immature apex. Since the fracture was in the middle third, it was decided to follow the wait-and-watch approach. To prevent further change in the position of the tooth and to reposition the slightly subluxated teeth, a flexible splint placement with semi-rigid wire using nanocomposite was planned to place for 2 weeks (Figure 1). An analgesic was prescribed for the patient and recalled at 2 weeks.

At 2 weeks, a vitality test of all anterior teeth was performed. Except for #11 and #21, all other anterior

teeth had a normal response to the cold test. Since #11 and #21 were not responding to the vitality test, Root Canal Treatment (RCT) with BioCompatible (BC) putty was planned for both teeth. At the first visit, RCT was initiated with the establishment of working length and chemo-mechanical preparation was performed. For better healing, especially for the management of the open apex (Figure 2), calcium hydroxide dressing was given (Figure 3), following which temporary restoration with Cavity was placed.

At the second visit, a thorough washout of calcium

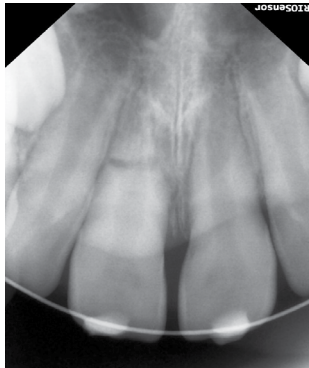


Figure 1: Splinting of the Anterior Teeth.



Figure 2: Placement of calcium hydroxide.



Figure 3: Biomechanical preparation.



Figure 4: Obturation of the root canals.

hydroxide was done. After ensuring the dry canal, obturation of #11 in both segments was done using BC putty. The apical plug was achieved in # 21 with BC putty and the remaining canal was obturated with the Obtura (Figure 4) once the proper obturation was ensured, the final composite restoration was done. The patient was recalled regularly every 6 months for follow-up.

DISCUSSION

The management of transverse or horizontal fracture of the root is presented here. One has to be cautious in the management of such cases. Diagnosing cases correctly at the first appointment and assuring the patient is important. In the present case, on the day of the patient's visit to the emergency, there was a slight subluxation of #21 and an open apex. There was a transverse fracture at the middle third with #11. As the universal recommendation, the wait-and-watch approach was used to assess the vitality of the tooth. However, the patient was given a flexible splint with a semi-rigid wire. Splinting the tooth at this appointment is mandatory as it will stabilize the tooth and redistribute the occlusal force. A systematic review by Cho et al. concluded that, depending on the type of luxation, splint therapy results in acceptable outcomes and may be a feasible treatment option. They found the following complications in the splint group with pathological root resorption (31.1%) dominating, followed by pathological tooth loss (25.0%). However, they followed up on cases in which a splint was used for 6 months in primary teeth. Nevertheless the splinting in the root fracture was considered to be having good prognosis [8]. RCT was initiated only after 2 weeks after assessing the vitality of the tooth.

After chemo-mechanical preparation, calcium hydroxide was used. The reason for using calcium hydroxide is ubiquitous since it has several advantages. It has anti-microbial activity and tissue-dissolving ability. In addition, it is considered to be inhibiting tooth resorption and induce repair by hard tissue formation. In the present case, hard tissue repair is required in the transverse fracture area. Furthermore, calcium hydroxide is considered useful in endodontic conditions

including, apexification, apexogenesis, and after trauma to prevent or resolve external resorption [9]. Although calcium hydroxide is getting replaced by mineral trioxide aggregate, it is still the preferred short-term intracanal medicament of choice [10]. Since the long-term use of this calcium hydroxide is considered to affect the physical property of dentin, it was used for the short term in this case [11]. BC putty was used for root canal obturation since it is commercialized as a root repair material that can be used for perforation repair, resorption repair, root-end closure procedures, pulp capping, and as a retrograde filling material during surgical procedures. The manufacturer claims that it has osteogenic potential [12]. Thus, expecting some benefit from this material over some time. The goal in the present case was to achieve an acceptable root repair and retain the normal physical property of the dentine and the root over a long period, thus retaining the tooth in the arch. However, follow-up of this case for the long term is essential to assess if there is any complication that may arise as a consequence of the root fracture or the use of various materials used in the repair process.

CONCLUSION

This case report discusses the commonly used agents in the management of transverse or horizontal root fractures. Long-term follow-up is essential to further assess the success of the treatment rendered.

REFERENCES

1. Cvek M, Andreasen JO, Borum MK. Healing of 208 intraalveolar root fractures in patients aged 7-17 years. *Dent Traumatol* 2001;17:53-62.
2. RIVERA EM, WALTON RE. Longitudinal tooth fractures: Findings that contribute to complex endodontic diagnoses. *Endod Topics* 2007; 16:82-111.
3. Rivera EM, Walton RE. Longitudinal tooth cracks and fractures: An update and review. *Endod Topics* 2015; 33:14-42.
4. Abbott PV. Diagnosis and management of transverse root fractures. *J Endod* 2019; 45:S13-27.
5. Malhotra N, Kundabala M, Acharaya S. A review of root fractures: Diagnosis, treatment and prognosis. *Dent Update* 2011; 38:615-28.
6. Matny LE, Ruparel NB, Levin MD, et al. A volumetric assessment of external cervical resorption cases and its correlation to classification, treatment planning, and expected prognosis. *J Endod* 2020; 46:1052-8.
7. Lauridsen E, Hermann NV, Gerds TA, et al. Pattern of traumatic dental injuries in the permanent dentition among children, adolescents, and adults. *Dent Traumatol* 2012; 28:358-63.
8. Cho WC, Nam OH, Kim MS, et al. A retrospective study of traumatic dental injuries in primary dentition: treatment outcomes of splinting. *Acta Odontol Scand* 2018; 76:253-6.
9. Behnen MJ, West LA, Liewehr FR, et al. Antimicrobial activity of several calcium hydroxide preparations in root canal dentin. *J Endod* 2001; 27:765-7.
10. Kim D, Yue W, Yoon TC, et al. Healing of horizontal intra-alveolar root fractures after endodontic treatment with mineral trioxide aggregate. *J Endod* 2016; 42:230-5.
11. Lee Y. Effect of calcium hydroxide application time on dentin. *Restor Dent Endod* 2013; 38:186.
12. <https://brasselerusadental.com/products/bc-rrm>