

Management of Horizontal Root Fracture: A Case Report

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ABSTRACT

Background: Horizontal root fractures are rare in comparison to other types of traumatic dental injuries and the reported prevalency is between 0.5% to 7%. The treatment and prognosis of root fractures depends on many variables, including the length of time between trauma and treatment, degree of dislocation and mobility, site of fracture, age of patient & stage of tooth development. The ideal healing type is hard tissue healing. The objective of this report is to demonstrate a clinical case in which treatment of horizontal root fracture is done by root canal treatment followed by fiber reinforced post fabrication with satisfactory healing.

Keywords: Horizontal root fracture; Glass fiber post; Traumatic dental injuries.

INTRODUCTION

The treatment of traumatic dental injuries is an important aspect of clinical dentistry. Root fractures are a type of traumatic dental injury and are defined as fractures involving cementum, dentin, and pulp.^[1] Root fracture trauma occurs at approximately 1% frequency within the permanent dentition and has a poor prognosis if not managed appropriately.^[2] Horizontal root fractures occur primarily in the anterior portion of the mouth, especially in the maxilla; and are often caused by physical trauma to the face.^[3] The diagnosis of root fractures is determined by clinical and radiographic examination.^{[4][5]} Pathological complications of horizontal fracture include pulp necrosis, root canal obliteration, external and internal inflammatory surface resorption, inflammation around the fracture, periapical inflammation. The space between the root fragments and the vitality of the periodontal ligament and pulp can also affect the treatment of a fracture, as well as the type of healing.^[6] The common types of healing include: healing with interposition of hard tissue, healing

with interposition of bone and soft tissue between the fragments, healing with interposition of soft tissue, or no healing.^[7]

The present case report describes the management of horizontal fracture at middle third of the maxillary right central incisor through non surgical approach.

CASE REPORT

A 19-year-old male patient reported to the department with chief complaint of broken teeth in the upper front tooth region of the jaw having a history of traumatic fall 5 years ago. Clinical examination revealed Ellis class IV fracture and associated grayish black discoloration in relation to #11 and class II fracture in relation to #21 without mobility. There was no tenderness to percussion & negative response to pulp sensibility tests. Periapical radiolucency (5mm x4mm) was seen involving #11 and #21 with horizontal fracture in the middle third region of root in relation to #11. The confirmatory diagnosis was Asymptomatic apical Periodontitis.(Figure1) A two visit root canal

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therapy was planned for tooth #11 & #21. After rubber dam isolation using wedgets access cavity preparation done and working length determined with Ingle's method (Figure-2) and confirmed with apex locator(Woodpex III, Guilin Woodpecker Medical Instrument Co.Ltd, China). Step-back technique for shaping was followed accompanied by passive irrigation with 3% NaOCl, normal saline, 17% EDTA and final irrigation with 2% chlorhexidine. Calcium hydroxide intracanal medicament was placed for two weeks and access cavity sealed with Cavit. On recall after 2 weeks obturation was done with gutta percha and AH Plus sealer using lateral condensation technique (Figure 3). Post space was prepared for tooth #11 beyond fracture line with peeso-reamers no.2 followed by placement of glass fiber post(Angelus) luted with dual cure resin cement[Paracore,coltene](figure -4). Temporary acrylic crowns were cemented in the subsequent appointments. At one month recall for follow up IOPA radiograph shows bone loss near the fractured site with no evidence of periapical radiolucency.(Figure 5).On clinical examination no sign of mobility and no pain or tenderness was found . At five months follow up IOPA radiograph was obtained which showed reduced signs of bone loss and clinically the tooth was asymptomatic .(Figure 6)



Fig 1: Pre operative.



Fig 2: Working length.

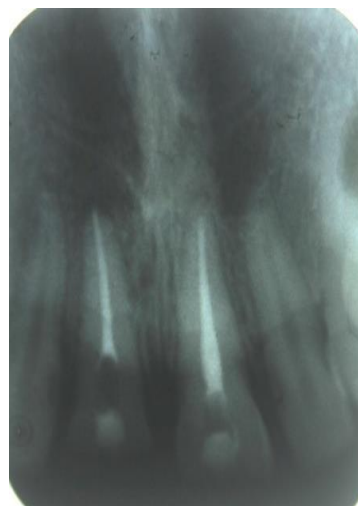


Fig 3: Obturation.



Fig 4: Glass fiber post



Fig 5: One month post operative.



Fig 6: 5 month post operative.

DISCUSSION

Table 1: Four types of conservative endodontic treatment were recommended for management of horizontal root fracture. [8,9]

TYPE	PROCEDURE
1	Cleansing and gutta percha filling of the root canal of the coronal fragment only
2	Cleansing and filling of root canal in both the fragments
3	Cleansing and gutta percha filling of root canal of the coronal fragment and surgical removal of the apical fragment
4	Chemomechanical preparation of coronal and apical fragments, filling the canal with calcium hydroxide dressing and posterior endodontic obturation of them.

In our case we have decided to go for the type 4 option as calcium hydroxide has antimicrobial and remineralizing actions. Glass fiber post was used for intra radicular anchorage as it is aesthetic, has high fatigue strength, high tensile strength and modulus of elasticity similar to that of dentin.^[10] Horizontal fracture repair occurred in our case as hard tissue forming cells originates from the intact periodontal ligament.^[11] Healing of horizontal root fracture undergoes four types of histological reaction.

Table 2: Histologic reactions

TYPES	HISTOLOGICAL REACTIONS
I.	Interposition of calcified tissue (callus formation); if coronal fragments not dislocated
II.	interposition of connective tissue, which is characterized by peripheral rounding of the fracture's ends;
III.	interposition of bone and connective tissue, radiologically characterized by the clear separation of the two fragments;
IV.	interposition of granulation tissue, caused by an infected or necrotic pulp.

Our case comes under type I category where the coronal fragment was not dislocated.^[12]

CONCLUSION

A permanent tooth with horizontal root fracture that was endodontically treated and a glass fiber post fabricated for intraradicular anchorage presents a good prognosis preserving aesthetic and psychological integrity of the patient and hence quality of life. Clinical and radiographic follow up is essential for success of treatment for a tooth with horizontal root fracture.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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