



Case of the Month – November 2017

CLINICAL MANAGEMENT OF CROWN AND ROOT FRACTURE OF UPPER ANTERIOR TEETH – A CASE REPORT

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Introduction

Traumatic dental injuries cause damage ranging from minimal enamel loss to complex fractures involving pulp tissue. Among dental traumas, horizontal root fractures are relatively uncommon injuries as they comprise only 0.5 - 7.0% of injured permanent teeth. These injuries involve various dental tissues such as the dental pulp, dentin, cementum, and supportive tissues. Proper clinical and radiographic examination is required for correctly diagnosing root fracture. A clinician must check for mobility of the coronal fragment and the pulp vitality. Radiographically, a radiolucent line is seen separating the apical and coronal fragments. Two or three radiographs taken at different angulations may be sometimes needed to detect the angle of fracture. Treatment of trauma to anterior teeth, should aim at preserving the affected teeth so as to restore function and esthetic appearance.

Case Report

A 21-year-old female patient reported to the dental clinic following trauma to the maxillary anterior region due to road accident two days back (**Fig 1**). She complained of fractured maxillary incisors and presented a desire to get them restored in order to have an aesthetic smile. Clinical examination of the patient revealed complicated crown fracture of the upper incisors. A radiograph of the maxillary anterior region illustrated horizontal root fracture at the middle third of the upper Left central incisor (**Fig 5A**). Clinically mobility of the coronal fragment was evident. On the other hand, the roots of the upper right central and lateral incisors were intact. Radiographically fracture was observed in right central incisor involving pulp thus root canal therapy was planned for it too. Lateral incisors also showed a crown fracture but no pulp involvement was seen, hence no root canal therapy was performed in these two laterals but a ceramic crown was planned later along with central incisors for better functionality and esthetics.



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After explaining the treatment plan to the patient, consent was obtained. Endodontic treatment for the upper right and left central incisors was started and working length was correctly determined. The canals were cleaned and shaped using K files in a step-back manner. The remaining part of the canals were shaped using protaper rotary files to obtain a uniform taper from apex towards coronal. An interappointment calcium hydroxide dressing was given. At this stage composite resin restoration was temporarily done on central incisors to facilitate splinting (**Fig 5B**) and esthetics (**Fig 2**). A week later root canals of upper right and left central incisors were fully and sectionally obturated respectively with gutta percha cone and AH plus sealer. For the left central incisor, a gutta percha cone of the same size of the prepared root canal was selected and tried into the canal to obtain a snug fit. One end of gutta percha was cut and mounted to a heated Plugger and then carried into the canal to the desired length. After obturation, at this stage, gingiva was contoured in relation to upper central incisors to improve the gingival zenith line.

After two weeks, the patient was recalled for review. Since the tooth was asymptomatic, post endodontic restoration was initiated. Post and core was planned for left central and a core buildup only for the right central incisor. Appropriate glass fiber posts were tried into the canal, adjusted to the desired length until they just passively touched the apical gutta percha. Root canals were etched with 37% phosphoric acid gel and the fiber posts were luted with dual cure resin cement (**Fig 5C**). Only the post was luted with the cement so that it prevents the flow of excess cement laterally between the root fragments. This glass fiber post serves as an intraradicular splint, stabilizing the fractured fragments in position, and also has a modulus of elasticity closer to dentin. Composite cores were built over the post and also on the right central incisor. Composite restoration was done on both lateral incisors before crown preparation (**Fig 3**). All ceramic crowns were placed on all incisors and luted with dual cure resin cement (**Fig 4**).

Discussion

The survival rate of a horizontally root-fractured tooth is reportedly to be relatively high (83%) for up to 10 years of observation. Horizontal root fracture most commonly occurs in the middle third of the root and very rarely in the coronal and apical third. In approximately 25% of patients, permanent pulpal necrosis occurs in the coronal fragment and requires endodontic treatment. Endodontic treatment is usually indicated, exclusively for the coronal fragment. Achieving and maintaining satisfactory treatment results for a traumatically fractured incisor is challenging for clinicians. Esthetic and functional outcomes must be considered when determining the proper treatment method.

Conclusion

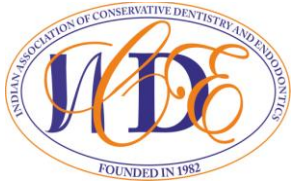


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The present case illustrates immediate esthetic and functional rehabilitation of a fractured tooth, leading to conservation and permanent restoration of the tooth. A root-fractured tooth requires proper initial management and periodic evaluation. Understanding the healing patterns of root fracture is essential for successful treatment. Diastasis between fragments exerts a great influence on healing at the fracture line and on pulpal necrosis. Adequately treated teeth with horizontal root fractures have a good prognosis.

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Fig 1



Fig 2



Fig 3



Fig 4

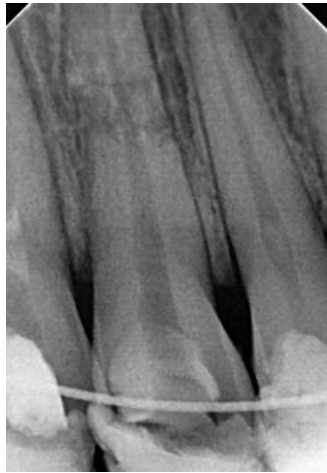


Fig 5

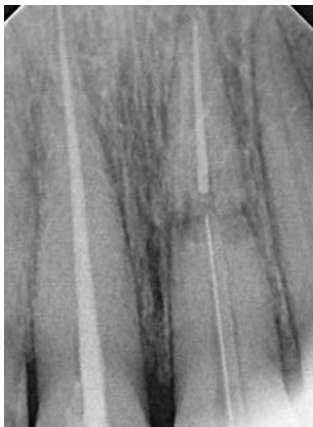
(A)

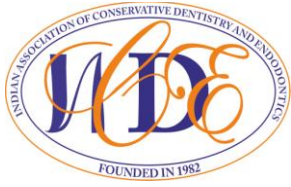


(B)



(C)





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Pre Op



Post Op

