

CASE REPORT

RARE HEALING PATTERN OF TOOTH AFTER FRACTURE: A CASE REPORT

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ABSTRACT

Dental trauma is one of the prime reasons for tooth loss in permanent dentition. Horizontal intra alveolar root fractures are rare with an incidence of less than 7% as compared to other dental impact trauma outcomes. Most of the root fractures heal without treatment, complications like pulpal necrosis and resorption may require endodontic intervention. This case report discusses the management of multiple horizontal intra-alveolar fractures in maxillary central incisor. Radiographically multiple healing patterns including the rare type 3 were observed. Combined surgical and non-surgical approaches were used for the management of the fractures.

Keywords: Dental trauma, MTA, Root fracture.

INTRODUCTION

Dental trauma is one of the prime reasons for tooth loss in permanent dentition. Horizontal intra-alveolar root fractures (HIRF) are rare with an incidence of only 0.5% - 7% in relation to other dental impact traumas.^{1,2} HRFs occur predominantly in maxillary central incisors followed by maxillary laterals and mandibular anteriors.³⁻⁵ The most common location for fracture is in the middle third of the root followed by apical and coronal third.⁶

Most of the root fractures usually heal without complications.^{5,7} Fractures limited to the apical or middle third with lesser diastasis, younger patient, and lack of movement usually have a favourable prognosis and outcomes.^{8,9} Complications like pulpal necrosis, root resorption, and root canal calcification may occur in about 20% of the cases.⁵ Complicated root fractures present a treatment challenge for the dentist.

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Healing of root fracture is classified into four types,¹⁰ i.e. 1) healing with calcified tissue, 2) healing with interruption of connective tissue, 3) healing with interruption of calcified and connective tissue and 4) interposition of granulation tissue. First three patterns are generally considered as favourable outcomes.

The following case report discusses about the comprehensive treatment of intricate multiple root fractures in right maxillary central incisor.

Case Report

A 22 year old female patient visited to the Department of Endodontics with the chief complaint of pain and mobility in upper right central incisor. Complete case history revealed injury to the offending tooth 1-2 years ago. On examination (Fig. 1) upper right central incisor (tooth #8) was slightly discoloured, tender on percussion and grade I mobility. On pulp vitality testing (electrical and thermal) the tooth was found to be non-vital.



Fig. 1: Preoperative photograph

Radiographic examination (Fig.2) revealed root fractures within the alveolus with division of root into multiple fragments (coronal, middle and apical). There was widening of fracture line between coronal and middle fragment with radiolucency encapsulating the middle fragment. Between the middle and apical fragments there was an indistinct radio-opaque area. A diagnosis of multiple horizontal intra-alveolar root

fractures was made with respect to tooth (#8), based on clinical and radiographic examination.

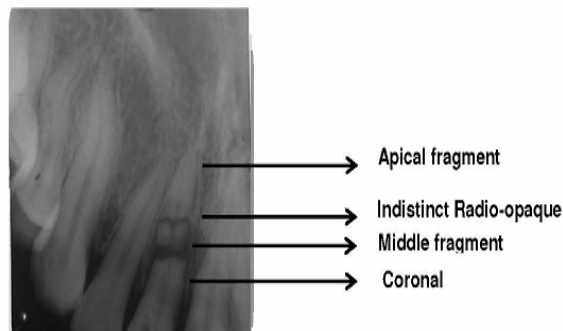


Fig. 2: Diagnostic radiograph

Treatment plan was formulated which involved the root canal treatment of the non-vital (as indicated in vitality testing) coronal part using Mineral Trioxide Aggregate (MTA) to form the apical plug. Surgical removal of the middle and apical part was planned for better periapical healing and to prevent any secondary infection.

Under local anaesthesia, after rubber dam isolation and access opening, working length of the coronal part was taken and biomechanical preparation was done using K-files under profuse irrigation with 2.5% sodium hypochlorite (NaOCl). Intracanal calcium hydroxide medicament dressing was given for two weeks. After two weeks, under local anaesthesia, a full thickness mucoperiosteal flap was raised (Fig. 3).



Fig. 3: Raised full thickness flap

Middle and apical fragments were removed using periosteal elevator. A distinct 2 mm wide bony ridge was seen between the middle and apical fragments, which was left intact (Fig. 4).

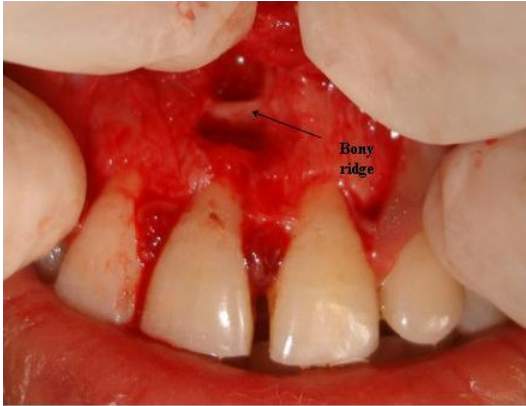


Fig. 4: Apical and middle fragments removed

Coronal fragment was obturated till the fracture line and MTA was used to perform retrograde filling to ensure the adequate apical seal (Fig.5).



Fig. 5: Post-operative radiograph

Flap was closed by using 3-0 braided silk suture material (Fig. 6). After 1 week, sutures were removed. Patient was asymptomatic after 6 months

but failed to keep up the regular follow-up despite several attempts (Fig. 7).



Fig. 6: Suture in place



Fig. 7: Six months post operative

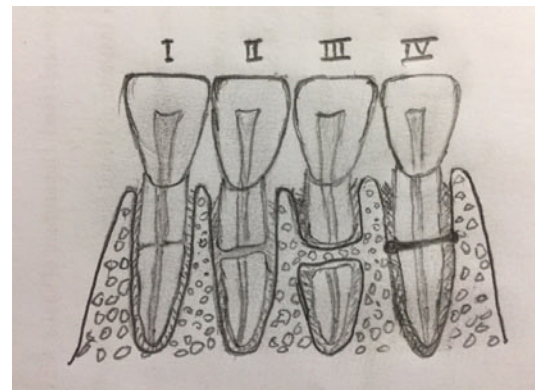


Fig. 8: Patterns of healing

DISCUSSION

Maxillary central incisors are most prone to dental injuries accounting for about 80% of the total.³⁻⁵ Root fractures are less common among the traumatic injuries of the tooth. The prevalence of root fracture in permanent dentition is about 0.5% to 7% as compared to 2 to 4% in deciduous teeth.¹¹ The predominant type of root fractures are in middle and apical third of the root.⁶ In the present case report patient had multiple intra-alveolar root fractures in a maxillary central incisor in middle and apical third.

Most of the root fractures (77%) heal without treatment but complications like pulp necrosis occurs in about 20% of the cases.^{5,7} Prognosis of a root fracture is based on state of pulp, relation of occlusion, dislocation of the root pieces, movement of coronal part and general health of patient.¹¹⁻¹³ The diagnosis involves evaluation of tenderness on percussion, movement of the fragments, pain to palpation of the soft tissues and pulp vitality status.¹⁴ Common clinical signs may include bleeding into the sulcus, movement of the coronal fragment, and history of trauma to the teeth.

Regarding radiographic examination, current (International Association of Dental Traumatology) IADT guidelines¹⁴ suggest a periapical radiograph with bisecting angle technique, occlusal view, and periapical radiograph with different horizontal angulations from the mesial or distal aspect of the tooth in question.

Four types of healing patterns are observed in root fractures (Fig. 8).¹⁰ i.e. healing with calcified tissue (type I), healing with interruption of connective tissue (type II), healing with interruption of calcified and connective tissue (type III) and interposition of granulation tissue without healing (type IV).

The first three types of healing patterns are considered successful while type IV is indicative of pulpal necrosis and necessitates the endodontic treatment of coronal part.¹⁵ Type III and Type IV healing patterns were observed in the present case. Healing with interruption by bone and connective

tissue (type III) is most unusual occurring approximately 5% of times.¹⁶

In the present case report pulp necrosis was reported in the coronal segment which is consistent with the majority of cases in the literature. So, root canal treatment of the coronal part was done. To ensure apical seal MTA was used as apical barrier. MTA has excellent physical and biological properties and has been successfully used in such situations.¹⁷⁻¹⁹

There was peri-radicular pathosis apical to the coronal fragment and between the middle and apical fragments. So, the non-vital middle fragment was removed.²⁰ Though there was healing by bony ridge formation between the middle and apical fragments, there was no merit in saving the apical fragment, which could later get infected and was also surgically removed.

CONCLUSION

Preservation of teeth is the main goal of dentistry. Dental trauma is main cause of anterior tooth loss, which can be esthetically, functionally and psychologically traumatic for the patient. Successful management of root fracture should aim at preservation of the tooth and providing optimum environment conducive for healing. Using both surgical and non-surgical procedures and use of the materials like MTA as in the present case can result in the successful management of root fractures.

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