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A SIX YEAR FOLLOW UP OF HORIZONTAL ROOT FRACTURE: A CASE REPORT

Dental Science

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ABSTRACT

Dental trauma may be considered the main reason for the permanent tooth loss.Root fracture can occur due to dental trauma from motor accidents,sports activity or violence. Horizontal root fracture results in 0.5 to 7% of all traumatic injuries and the upper anterior region are most commonly affected. The prognosis of tooth with horizontal root fracture is influenced by various factors such as patients age, stage of root development, the amount of separation of the fragments. Four types of healing of root fracture have been described in the literature depending on the amount of separation of the fragments, the severity of the injury and the healing capacity of the pulp. This case report describes the calcific healing of the middle horizontal root fracture in both maxillary central incisors following endodontic treatment .

KEYWORDS:

Horizontal root fracture, Calcific healing,maxillary central incisor

Introduction

Horizontal root fracture occur in 0.5 to 7% of all traumatic injuries with the upper anterior region most commonly affected[1-3]. Such fractures can occur in central incisors (68%),lateral incisors (27%) and also in lower incisors (5%)[4].These fracture results from the effect of high force upon the root resulting in the division of root into coronal and apical fragments with subsequent effect on the cementum, dentin, pulp and periodontal tissues.These fractures are more commonly seen in permanent teeth with closed apex than in teeth with incompletely formed roots.

Clinical features of such fractures are tenderness to percussion and palpation, tooth mobility, displacement and bleeding from the gingival sulcus[5]. Diagnosis of such fractures are made by radiological examinations with two films taken at different vertical angles or are observed on an occlusal film[1] otherwise it will often be missed .

The horizontal root fractures may occur in apical,middle or coronal third areas and are managed according to the location of the fracture, mobility and the pulp vitality. The initial treatment requires repositi oning of the coronal fragment , splinting and relief from occlusion to allow healing of the pulp and periodontal tissues[6,7,8]. The tooth with root fracture gets healed without endodontic interve ntion[4]However, in some cases the tooth develops pulp necrosis or pathological symptoms within a period from 1month to 1year[9] and requires endodontic management limited to the coronal fragment[10].

The type of healing described for root fractures depends on the extent of injury,pulpal and periodontal healing ability and the treatment performed at the time of injury.The healing of fracture segments can be by deposition of hard tissue ,connective tissue or both or lack of union with swelling and granulation tissue[2].The ideal healing is always calcific union.This case report describes the endodontic management of middle third horizontal root fracture with osseous healing.

Case Report

A 27 year old female patient reported to the Department of Conservative dentistry & Endodontics with painful upper teeth. History revealed that the patient had a trauma 10 days back with direct blow to the upper teeth. No significant medical history was present.

On clinical examination, the tooth 11 and 21 were mobile and tender with intact crown. The teeth were extremely sensitive to cold air. On radiographic examination, 11 and 21 were fractured horizontally in the middle third of the root with no periapical radiolucency. The fracture line was apical to the crest of the alveolar bone without much displacement of the fractured segment.

The initial treatment consisted of stabilization of the coronal segments by semi rigid splinting as the teeth were mobile.The Figure 8 splint with thin orthodontic wire was applied (Fig 1.) and the teeth were relieved from the occlusion.The analgesics were prescribed and the patient was called after a week for assessment of pulp sensibility.

However patient returned within two days with severe sensitivity in the both central incisior.A diagnosis of irreversible pulpitis was made and root canal treatment of coronal segment was initiated.The root canal access were made in 11, 21 under local anesthesia.The pulpectomy and the coronal enlargement till 1 mm short of fracture line was done using ISO size 70 k file with intermittent irrigation with 2.5% sodium hypochlorite and distilled water.

The apical segment were left undisturbed presuming that apical segment consisted of vital and healthy pulp. The canals were filled with calcium hydroxide paste (Metapaste,META BIOMED CO. Ltd) and the access were sealed with temporary restoration(Coltosol F Coltene /Whaledent) and the patient was called after two weeks.

After two weeks, the patient was asymptomatic and the mobility was also reduced. The calcium hydroxide paste was removed from the canals and were filled with gutta percha with cold lateral condensation and the splint was removed.The access cavities were restored with composite restoration (Te-Econom Plus,ivoclar vivadent) .The patient was advised for clinical and radiographic follow up.

On subsequent follow up the teeth were asymptomatic.The teeth had develop yellowish discoloration but were firm (Fig2,3). On radiogra phic examination,there was no periapical radiolucency in 11,21. The fracture line repaired by calcific deposition between the coronal and apical segment with rounded margins. The radiograph at two,four and six years is shown in Fig [4,5,6]

Discussion

Root fractures can occur following dental trauma which may be due various reasons such as falling during motor accidents or by direct blows received on the face during sport activities or violence.The most predominantly affected teeth are maxillary central incisor followed by maxillary lateral and the mandibular incisors[11].

The fractured root can be diagnosed based on the clinical as well as the radiographic examination. The radiographic diagnosis of a root fracture is critical. The root fracture will normally be visible only if the central beam is directed within a maximum range of 15-200 of the fracture plane[12]. However if the fracture root is not visible on initial radiograph it may become apparent days or weeks later due to the separation of the broken root fragments by edema and masticatory forces.

It has been shown that the pulpal necrosis subsequent to root fractures occurs from 20% to 44% of the time[13,14]. The pulpal necrosis of the coronal fragment is related to initial displacement of the coronal segment[6,14]. The necrotic pulp if not treated will stimulate inflammation and granulation tissue formation in the fracture line. The cases with pathological symptoms or pulpal necrosis are traditionally managed with control of root canal infection and root canal obturation of the coronal part[15]. Thus the endodontic treatment was performed in the coronal fragment in the case described as the patient exhibited symptoms of irreversible pulpitis.

The calcium hydroxide was used as an intracanal medicament because

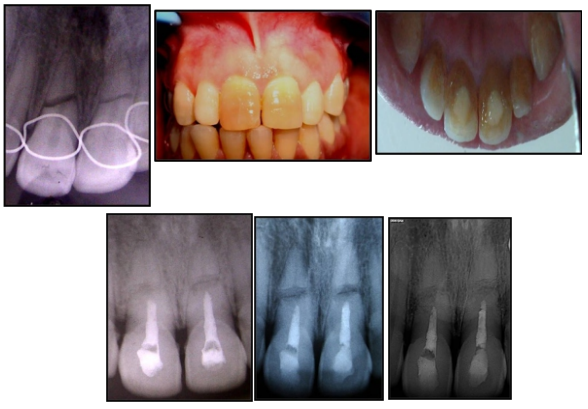
of its antibacterial action and its ability to promote the formation of hard tissue barrier at the apical end of the coronal fragment thereby facilitating the obturation with gutta percha[16].

The apical segment was not involved during endodontic intervention as it has been observed that during horizontal root fracture, there is varying degree of displacement of coronal segment with relatively less displacement of the apical segment as a result of which the apical pulpal circulation is not disrupted and the pulp necrosis in the apical segment was found to be extremely rare[17].

Depending on the amount of separation of the fragments, the severity of the injury and the healing capacity of the pulp, four types of healing have been described[2]. Both maxillary central incisors had shown healing with calcific tissue between the root fragments. There was deposition of hard tissue in and around fracture sites with rounded edges.

Conclusion

There are various factors which affects the outcome of these types of traumatic injuries.The most crucial step at the time of the treatment is the preservation of the pulp vitality along with minimising the damage to the periodontal tissue to prevent resorption.However when there are signs of pulp necrosis,it requires immediate endodontic intervention to prevent infection thereby providing environment for ideal healing.



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