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Case Report

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Surgical management of intra-alveolar root fracture in maxillary premolar - a case report

Abstract

Intra alveolar radicular fractures in permanent teeth are very rare. Horizontal root fractures are commonly observed in the maxillary anterior region of young male patients while in premolars they are very rare. These may vary in severity from enamel fractures to avulsions. Fracture occurs often in the middle-third of the root followed by apical and coronal third. In present case, incomplete horizontal root fracture located at the junction of apical and middle third of a right maxillary first premolar which was treated endodontically with surgical removal of fractured apical segment. After 6 months follow-up, the tooth was asymptomatic with normal periodontal health.

Keywords: luxation, interradicular splinting, granulation tissue

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Introduction

Compared to other dental injuries, Intra-alveolar root fractures are relatively rare. The frequency of root fractures is only 0.5-7% in permanent teeth and 24% in deciduous teeth.[1] Root fractures are generally defined as fractures involving dentin, cement, pulp, and periodontal ligaments.[2] Diagnosis of root fracture is determined by clinical and radiographic examination .The common clinical situation is a luxation injury of the coronal fragment with mobility. Radiographic examination confirms the diagnosis and reveals a horizontal or radiolucent line separating the displaced coronal fragment from the apical one.[3,4] Clinical management of a root fracture depends on its location and pulp vitality. When the coronal fragment is displaced, conservative treatment is repositioning of the teeth, immobilization, and relief of the occlusion. It has been reported that in up to 80% of cases, successful treatment results were obtained.[5] Immediate immobilization within 1 hour following the trauma gives the best results.[6] If the coronal fragment is nonvital or pathological symptoms develop during the follow-up period, endodontic treatment should be performed through the apical end of the coronal fragment.[7] Further dental treatment may involve interradicular splinting and related restorative treatment.[8] Surgical removal of apical segment of fractured root is indicated when the following clinical conditions exist:

1. Root fracture in the apical portion of the root.
2. Pulpal necrosis in the apical segment as indicated by a peri radicular lesion or clinical signs or symptoms.
3. Coronal tooth segment is restorable and functional.

This Case report records a case of symptomatic non vital permanent tooth with intra-alveolar root fracture and which was managed with surgical removal of fractured apical segment and then endodontic treatment of remaining coronal segment of tooth.

Case report

A 16 year old boy with pain and swelling in right side of maxillary region reported in Dept of Conservative Dentistry & Endodontics. Patient's medical history was non contributory. Past dental history includes loss off upper anterior teeth following road side accident 2 month ago and some intervention in upper right maxillary first premolar by private clinician.

Intraoral clinical examination: revealed that tooth #11, 12, 21, 22 and 23 were missing. In tooth #14 and, Access opening has already made by some private practitioner. Tooth #14 was tender on percussion & palpation, not mobile, not carious & none discolored. On Periodontal probing showed no pocket & demonstrated no response to Pulp vitality test. Parulis was present on both side (buccal and palatal) in relation to 14 (Figure 1) (Figure 2).

Intraoral Periapical radiograph: showed intra-alveolar incomplete root fracture at junction of apical and middle third in relation to tooth #14. Peri radicular radiolucency was also associated with same tooth.

Treatment plan: consist of orthograde endodontic treatment and surgical removal of fractured apical segment of tooth #14. Detailed explanation about the treatment plan was given to patient and written informed consent was taken.

Procedure: As the tooth 14 has been already opened so access opening was improved further and both buccal and palatal canals were explored with DG16. Buccal canal was easily negotiated with 15no. k-file up to full root length while file in palatal canal got obstructed and not go beyond fracture line. So Working length determined up to the fractured end of coronal segment of tooth and confirmed with radiograph. Biomechanical preparation of both canals was done up to predetermined working length. Then local anaesthesia (2% LIGNOX with Adr) was administered. A mucoperiosteal flap elevated with help of 15 no. surgical blade and periosteum elevator extending from distal aspect of right max canine to mesial aspect of max. Second premolar and retracted to expose fracture site. Resorption of buccal cortical plate in relation to tooth was present. Granulation tissue was removed with help of curette. But this bony window is too small to remove fractured apical segment so further osteotomy was done with the help of round bur (Figure 3) (Figure 4). Root fragments were separated with help of surgical bur straight elevator and root forcep (Figure 5). Bony cavity was again profusely irrigated with normal saline and inspected for any remaining granulation tissue & was removed. Obturation of both canals was done and GP at apical end of

coronal portion was burnished with ball burnished. Root end filling was done with biodentin. An intraoral periapical radiograph was taken (Figure 6). Bony cavity was then cleaned & flap sutured to its original position. Post operative instructions were given to patient to prevent any complication. Patient was recalled after 5 days for suture removal. After 3 month follow-up, tooth was asymptomatic with normal periodontal health (Figure 8) (Figure 9). IOPA revealed healing with new bony lacunae at resorption site (Figure 10). Patient was referred to prosthodontic dept for replacement of missing teeth.

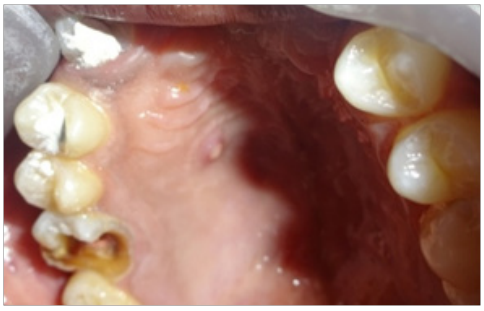

Figure 1 Pre-op palatal view.

Figure 2 pre-op buccal views.

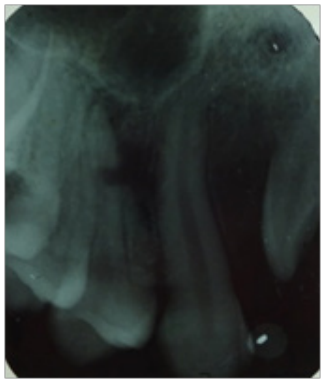

Figure 3 Pre-op IOPA radiograph.

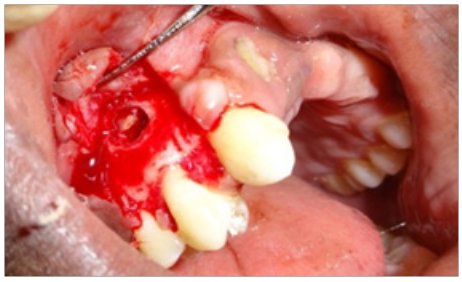

Figure 4 After doing osteotomy.

Figure 5 Fractured apical segment.

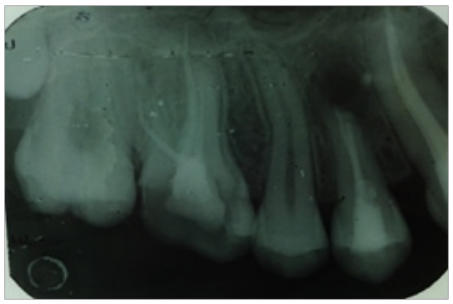

Figure 6 IOPA after removal of fractured segment.

Figure 7 After flap closure.

Figure 8 postoperative photographs (buccal view).

Figure 9 postoperative photographs (palatal view).

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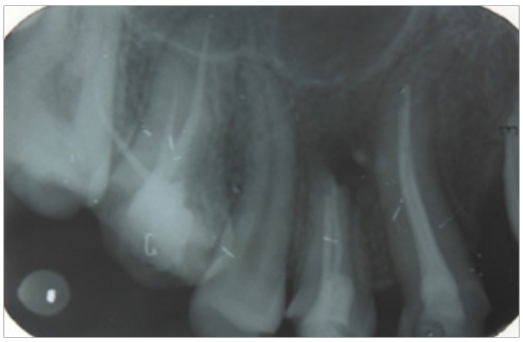

Figure 10 postoperative radiographs after 3 month.

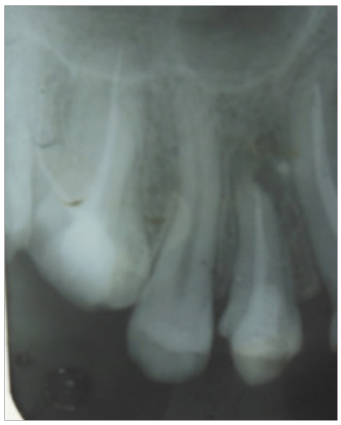

Figure 11 postoperative radiographs after 6 month.

Discussion

The first step in the treatment of horizontal root fracture cases is accurate diagnosis.[9] Detailed radiographic evaluation is needed for correct fracture detection in root fractures. The classification of horizontal root fractures is based on the location of the fracture line (apical third, middle third, or cervical third) radiographically and on the degree of dislocation of the coronal fragment.[10] Horizontal root fractures that localizes in the middle or apical third of the root present better prognosis when compared with fractures in the cervical third of the root. In the cervical third, healing depends on proximity of the fracture to the gingival sulcus and possibility of contamination.[11,12] In this case, the fracture line passed through the junction of middle and apical third of the root. In the case of apical-third fractures of the root, there is usually no mobility and the tooth may be asymptomatic. Also, it has been observed that the apical segment of a transversely fractured tooth remains vital in most of the cases. Thus no treatment is required and a watch and observe policy is advocated. If the pulp undergoes necrosis in the apical fragment, surgical removal of the apical fragment is indicated. The success of treatment and type of healing is related to age, stage of root development, diastasis of fragments especially degree of dislocation of coronal fragment and pulp condition. Following initial treatment of the root fracture, the type of healing can be divided into five groups:

1. fracture healing
2. pulp necrosis
3. root canal calcification or obliteration
4. resorption
5. fracture nonhealing.[8]

The ideal outcome for horizontal root fractures is fracture healing with interposition of calcified tissue. For this type of healing, the pulp of the traumatized tooth must be intact and the coronal fragment should not be dislocated. Although pulp necrosis is relatively rare (20-44%) after apical third or middle third root fracture.[13] additionally, a wide immature apical foramen in a traumatized tooth favors pulp survival.[14] In the presented case, the periapex showed pathology. Complete canal negotiation was not possible in palatal canal due to displacement of fractured fragment. Also, there was no healing between the fractured segments. This could be due to the necrosis of the apical segment. Hence it was decided to surgically remove the apical fragment and perform orthograde endodontic treatment for the coronal segment. IOPA radiograph, after 3 months of surgical procedure, revealed healing with new bony lacunae at the resorption site. Hence this case shows the favorable results and resolution of symptoms associated with a tooth showing incomplete horizontal fracture of root at junction of middle and apical third.

Conclusion

It is concluded that symptomatic tooth with fractured roots in apical third can be restored back to normal function even when pulpal necrosis or peri radicular pathosis has developed. In this case, it was important to save this tooth as it was proposed to fabricate a cast partial denture for this patient and this premolar would serve as an abutment for occlusal rest. A regular follow-up of teeth is required to evaluate the success of treatment and to do the necessary alterations in the suggested treatment protocol, if indicated.

Acknowledgements

None.

Conflict of interest

The author declares that there is no conflict of interest.

References

1. Caliskan MK, Pehlivan Y. Prognosis of rootfractured permanent incisors. *Endod Dent Traumatol*. 1996;12(3):129−36.
2. Bakland LK, Andreasen JO. Dental traumatology: essential diagnosis and treatment planning. *Endod Topics*. 2004;7:1434.
3. Molina JR, Vann WF Jr, McIntyre JD, et al. Root fractures in children and adolescents: diagnostic considerations. *Dent Traumatol*. 2008;24(5):503−9.
4. Flores MT, Andersson L, Andreasen JO, et al. Guidelines for the management of traumatic dental injuries. I. Fractures and luxations of permanent teeth. *Dental Traumatol*. 2007;28(1):6671.
5. Andreasen JO, Hjorting Hansen E. Intraalveolar root fractures: Radiographic and histologic study of 50 cases. *J Oral Surg*. 1967;25(5):414−26.
6. Hargreaves JA. The traumatized tooth. *Oral Surg Oral Med Oral Pathol*. 1972;34(3):502−515.
7. Trope M, Maltz DO, Tronstad L. Resistance to fracture of restored endodontically treated teeth. *Endod Dent Traumatol*. 1985;1(3):108−11.
8. Cheung SP, Walker RT. Root fractores: A case of dental nonintervention. *Endod Dent Traumatol*. 1988;4:1868.

9. Andreasen JO, Andreasen FM. Root fractures. In: Andreasen JO, Andreasen FM, editors. *Textbook and color atlas of traumatic injuries to the teeth*. 3rd ed. Copenhagen: Munksgaard; 1994;793−14.
10. Andreasen JO, Andreasen FM, Andersson L. Root fractures. In: *Textbook and color atlas of traumatic injuries to the teeth*. 4th edn, Blackwell Munksgaard; 2007;912.
11. Kindelan SA, Day PF, Kindelan JD, et al. Dental trauma: An overview of its influenceon the management of orthodontic treatment. Part 1. *J Orthod*. 2008;35(2):68−78.
12. Deshpande A, Deshpande N. Flexible wire composite splinting for root fracture of immature permanent incisors: A case report. *Pediatr Dent*. 2011;33(1):636.
13. Mata E, Gross MA, Koren LZ. Divergent types of repair associated with root fractures in maxillary incisors. *Endod Dent Traumatol*. 1985;1(4):1503.
14. Jacobsen I. Root fracture in permanent anterior teeth with incomplete root formation. *Scand J Dent Res*. 1976;84(4):210−7.

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