

## Management of Anterior Tooth Root Fracture in An Adolescent : A Case Report.

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### Abstract

Treatment of permanent tooth root fracture in an adolescent poses significant difficulties for the dental clinician. This case report gives the details about the treatment of root fractures in anterior teeth. A brief review of use of suitable material in the treatment of root fractures is provided.

### Introduction

Root fractures, defined as fractures involving dentin, cementum and pulp, are relatively uncommon among dental trauma patients, comprising 0.5-7.0% of all injuries affecting the permanent dentition[1]. Intraalveolar root fractures present as either horizontal(also called transverse) or diagonal (also called oblique) or vertical. These fractures may occur at different levels of the root and, depending on the location, are classified as: coronal third, middle third and apical third.

The mechanism of root fracture is usually a frontal impact which creates compression zones labially and lingually. The resulting shearing stress zones then dictates the plane of the fracture. Root fractures involving the permanent dentition, predominantly affects the central incisor region usually in the age group of 11-20years. Males are more commonly affected than females[1,2].

The root fractures produce new sections of the root which are termed as fragments. These fragments are designated as coronal fragment and apical fragment, and the space between these fragments referred to as the diastasis[2].

Treatment of choice for fractures of root can be divided into: Endodontic treatment and surgical treatment. Endodontic treatment can be further divided into: Treatment of Coronal fragment alone and coronal and apical fragments[1,2]. This case report presents the

management of a child who presented with a radiographically demonstrated anterior tooth root fracture.

### Case Report

A 14 year old male patient reported with pain and grade I mobility in relation to maxillary left central incisor tooth. Patient had history of frontal impact due to fall from a bicycle about one month back. Clinical examination revealed that the tooth with root fracture was slightly extruded and was displaced in the lingual direction. Radiographic examination of left maxillary central incisor revealed that endodontic treatment was being undertaken for a period of one year for a previous trauma in the same region. A radiolucent line at the apical third of the root of maxillary left central incisor could be seen on the radiograph (Fig.1). The same tooth was tender to vertical percussion with a blunt instrument. It was decided to resect the fractured root fragment surgically and to



**Figure 1 :** Preoperative radiograph showing fractured apical third of maxillary left central incisor.

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strengthen the remaining root with suitable material.

### Clinical procedure

After achieving left infraorbital block with 2% lignocaine hydrochloride, a semilunar incision was made on the attached gingiva in relation to left maxillary central and lateral incisors. Full thickness of mucoperiosteal flap was retracted and bone removal was carried out using surgical round burr in a straight headpiece with sterile irrigant (2.5% sodium hypochlorite alternating with 3% hydrogen peroxide and normal saline). The osseous window was sufficiently enlarged until sufficient space was created to provide adequate access for curettage (Fig.2).



**Figure 2 :** Surgical exposure of the fractured root.

The fractured apical root fragment in relation to maxillary central incisor extended palatally along the long axis of the tooth up to the middle third of the tooth root (Fig.3). The fractured fragment was extracted. Guttapercha was found to be extruding from the periapex of central incisor. The extruded guttapercha was trimmed with surgical scissors and its remaining portion burnished at the apex with a hot ball burnisher.



**Figure 3 :** Resected Fractured apical fragment.

The fractured palatal aspect of the root was built with Type 2 Glass Ionomer Cement(GIC) (GC Fuji Industries, Tokyo) in relation with central incisor (Fig.4). The flap was gently placed back to its normal position. It was

sutured with interrupted silk suture 3-0(fig.5). Patient was prescribed Amoxicillin 500mg and Ibuprofen 400mg together with 0.2 % chlorhexidine mouth rinse for a period of 5 days. Patient was reviewed after 7 days for suture removal. The healing at the surgical site was uneventful and patient was comfortable with the



**Figure 4:** Radiograph showing maxillary left central incisor with resected apical 3rd of fractured root and condensed GIC in the apical third.



**Figure 5 :** Surgical sutures in place.

treatment.

### Discussion

Root fractures involving permanent dentition predominantly affect the maxillary central incisor region, usually in the age group of 11-20 yrs. A frontal physical impact creates compression zones, both labially and lingually. This results in shearing stress zones which dictate the plane of fracture. Root fractures of apical third or midroot, usually follow a steep course, either facio-orally or palatorally in the direction of incisal edge[1].

The choice of treatment depends on radiographic features, such as periradicular changes, the width of root canal space and the amount of separation of the two fragments[1]. In the present case, radiographic evaluation of an endodontically treated maxillary left central incisor demonstrated the presence of apical third root fracture and a separation of the apical fragment from the coronal fragment leaving a space of approximately 1mm between

the two fragments (Fig.1). A common speculation is that an endodontically treated tooth is more brittle compared to the one with vital pulp, and that the dentin undergoes changes in collagen crosslinking after root canal treatment and therefore loss of moisture in endodontically treated teeth, compared with vital pulps, is not a major etiological factor but a predisposing one for fracture[3]. The presence of grade 1 mobility, associated pain in left central incisor and the extent of root fracture, necessitated a surgical approach. Following surgical exposure, the root fracture was found to be following a palatal course towards the incisal direction. This was in contrast to the radiological findings and therefore the use of X-ray images cannot be totally relied upon for an exact diagnosis.

The advantages of a surgical approach are :

- 1) Rapidity of treatment,
- 2) Removal of the focus of infection (fractured fragment),
- 3) Immediate suppression of periapical lesion,
- 4) Application of an efficient, reliable Glass Ionomer Cement apical barrier, ensuring better and easier three- dimensional canal filling [4,5].

Several material have been proposed for use in endodontic surgery and fractured root build up such as, super Ethoxy Benzoic Acid (super EBA), silver amalgam, composite resin and type 2 glass ionomers[3,4]. The retrofilling and root build up material chosen in our study was type 2 GICs. The characteristics that led us to choose this material for endodontic surgery were:

1. Chemical adherence to the dentine resulting in good sealing ability.
2. Coefficient leakage resistance
3. Biocompatibility and fluoride release
4. Little tendency to dissolve in tissue fluids after setting
5. Ease with which it can be polished, resulting in a better link with the periapical tissues
6. Radio-opacity

7. Good mechanical properties
8. Low cost.

Glass ionomer cement used as retro filling and apical root build up material strengthens the root canal walls and decreases the diameter of the canal, thereby making the apical closure easier[6,7].

### Conclusion

Endodontic surgery is the treatment of choice for root fractures with periapical lesions. The use of Glass Ionomer Cement as retrofilling material and as a means of strengthening the root walls makes three- dimensional endodontic closure easier and more reliable for a necrotic infected tooth.

### References

1. Andreasen JO, Andreasen FM. Classification, etiology, and epidemiology. Textbook and color atlas of traumatic injuries to the teeth. 3rd edn. Copenhagen: Munksgard ; 1994. p.279-284.
2. Berman LH, Blanco L, Cohen S. A Clinical Guide to Dental Traumatology. 1st edn. 2007. p.51-52
3. Ingle JI, Bakland LK, Baumgartner JC. Ingle's Endodontics. 6th edn. BC Decker Inc: Hamilton; 2008. p-684.
4. Kim S, Pecora G, Rubinstein RA. Colour atlas of microsurgery in Endodontics. London: WB Saunders;2001
5. Gutmann JL. Principles of endodontic surgery for general practitioner. Dental Clinics of North America 1984;28:895-908.
6. Duperz JP, Bouvier D, Bittar E. Infected immature teeth treated with surgical endodontic treatment and root-reinforcing technique with glass ionomer cement. Dent Traumatol 2004; 20: 233-40.
7. Mount GJ. An atlas of Glass Ionomer Cements. 3rd edn. 2002