

Reattachment of a fractured crown fragment: A case report

Chandki Rita*

Kala M.**

ABSTRACT

Traumatic crown fractures which are caused from dental injuries are a serious dental public health problem. Coronal fractures of permanent incisors represent 18-22% of all traumas to dental hard tissues, 28-44% being simple (enamel +dentin) and 11-15% complex (enamel +dentin +pulp). Of these 96% involve maxillary central incisors. The reattachment of the crown fragment to the fractured tooth is the best method to reinstate natural shape, contour, surface texture, occlusal alignment and color of the fragment. This article addresses the treatment regimen of a horizontal crown fracture of maxillary central incisor at cervical level that offers simplicity, esthetics and conservation in cases of dental trauma.

Key Words: Tooth fracture, reattachment, fragment

INTRODUCTION

Tooth fracture can be defined as "traumatic injury to a tooth that manifests itself as a chip, crack or break." Manifestations may also include partial dislocation or complete dislocation of the tooth. A wide range of treatment options have been advocated for traumatic permanent teeth like:

1. Orthodontic extrusion¹
2. Osteotomy/osteoplasty²
3. Intentional replantation³
4. Re-attachment of fragments⁴
5. Extraction

Tennery was the first to report the reattachment of a fractured fragment using acid etch technique. Subsequently, starkey and simonsen have reported similar cases. Advantages of reattachment of fragment include:

1. Better aesthetics, as shade match and translucency will be perfect.

2. Incisal edge will wear at a rate similar to that of the adjacent teeth.

3. Replacement of fractured portion may be less time consuming than needed for completion of a provisional restoration.

4. A positive emotional and social response from the patient for preservation of natural tooth structure⁵

Case report

An 18 year old male patient reported to the department of conservative dentistry and endodontics, government dental college and research institute, bangalore with the chief complaint of broken upper front tooth following trauma due to fall in a road traffic accident two days ago. The patient's medical history was non contributory. No apparent trauma to the soft tissues in the intra-oral and extra-oral examination was noted. Intra oral examination revealed a complicated crown root fracture of maxillary right central incisor that extended subgingivally in the palatal aspect, with fracture line extending in a faciolingual direction at the cervical level. Pulp was exposed and the coronal tooth fragment

Author's Affiliation: *P.G. Student, **Chief Professor & HOD, Government Dental College and Research Institute, Bangalore, Karnataka.

Reprint's request: Dr. Rita Chandki, 12-A Vaishali Nagar, Annapurna Road, Indore-452001, Mob: 09620468544,09826918577, Email: chandki.rita@gmail.com.

was still attached palatally by fragile soft tissue. Tooth was tender on percussion with a mobile coronal fragment. There was bleeding on probing the fragment.

Radiographic examination revealed a well defined u shaped radiolucent line in the cervical region of the tooth extending mesiodistally suggestive of horizontal crown fracture of maxillary right central incisor, with no discernible vertical root fracture. The apex was fully formed and there was no associated root fracture or periapical pathology. No other fracture or injury in the adjacent teeth was noted. A diagnosis of ellis class iii fracture was made and a treatment plan was formulated to immediately attach the natural tooth fragment since the patient was concerned about esthetics. A detailed explanation of the same was given to the patient and was accepted by the patient.

*Tooth fragment removal

*Root canal therapy in relation to maxillary right central incisor

*Reinforcement of tooth with glass fiber post

*Reattachment of tooth fragment using dual cure resin

Buccal and palatal infiltrations of 2% lignocaine with adrenaline were administered and the segment was removed with minimal force from its soft tissue attachment and recovered. The pulp chamber in the recovered fragment was cleaned by removing all pulp tissue and bleached using sodium per borate and hydrogen peroxide for 24 hours. The tooth fragment was stored in normal saline during whole period prior to the restoration to prevent dehydration and discoloration.

A single visit endodontic treatment was carried out, wherein the working length was determined with an electronic apex locator and confirmed with radiography. Biomechanical preparation was carried out using crown down technique with constant irrigation using edta, sodium hypochlorite and normal saline. The root canal was dried with paper points and obturated using ah plus sealer and laterally condensed gutta percha. The post space preparation was carried out using number 2 and 3 peeso reamer attached

to a slow speed contra angle handpiece. A pre fabricated sided post was selected and cemented using dual cure resin.

A retention box using number 4 round bur was prepared in the coronal fragment to accommodate the head of the post. The fractured crown fragment and the tooth were etched with etchant for 10 seconds. Primer was applied on the surface of tooth structure with a disposable brush and left in place for 30 seconds. Dual cure resin cement was mixed and applied around the post and the retention box of the fragment and the fragment was attached to the tooth. Excess cement along the margins was removed using number 12 bard parker blade and light cured with led curing light for 20 seconds. The residual excess at the restorative margin was finished with a series of finishing burs, and then polished to a high luster using aluminum oxide discs. Three months follow up showed the reattached tooth to be symptom free.

DISCUSSION

The following re-attachment strategies have been advocated for re-attaching a detached tooth fragment to the remaining tooth:

1. Placement of a circumferential bevel before re-attaching the fragment^{6,7,8}
2. Placement of an external chamfer at the fracture line after bonding⁹
3. Use of a v-shaped enamel notch¹⁰
4. Placement of an internal groove^{11,8}
5. Leaving a superficial overcontour of restorative material over the fracture line¹²⁻¹⁶

composite resins with the acid etch technique have proved a real boon in reattachment procedures. The earlier treatment of fractured segment was to build them with composites but quite often there was the complaint of non-satisfactory color matching, sensitivity, and poor translucency. Another common complaint with composite restoration was fast incisal edge wear of the composite surface. Reattachment of fragments takes care of the above stated drawbacks to a great extent. Another important advantage

with tooth fragment reattachment is the psychological comfort of the patient. The fracture of a tooth may be a most traumatic incident for a patient, but it has been found that there is a positive emotional and social response from the patient to the preservation of natural tooth structure. The dentist plays an important role in the management of injured cases and so he has to take into consideration every possibility of saving a tooth that has received trauma. The remarkable advancement of adhesive systems and resin composites has made reattachment of tooth fragments a procedure that is no longer a provisional restoration, but rather a restorative treatment offering a favorable prognosis. However, this technique can be used only when the intact tooth fragment is available.

In the present case, reattachment of the fractured fragment was possible because the fractured fragment was intact and due to advancements in dentin bonding technology. The use of natural tooth substance clearly eliminated problems of differential wear of

restorative material, unmatched shades and difficulty of contour and texture reproduction associated with other restorative techniques. Tooth fragment reattachment procedure offers ultraconservative, safe, fast and esthetically pleasing results when the fractured fragment is available.

CONCLUSION

Reattachment of the dental fragment as a restorative procedure has now become possible with the improvement of adhesive techniques and restorative materials.

Fiber reinforced resins allow not only creation esthetic restoration but also the preservation and reinforcement of tooth structure. At the 6 month follow-up, the resultant appearance was acceptable to the patient. However, before recommending a similar treatment on a regular basis, a longer follow-up period is required.

Coronal tooth fracture at the cervical third of the tooth



Coronal tooth fracture at the cervical third of the tooth



Fractured coronal segment (facial view)**Tooth after removal of fractured segment**

Post operative



Post operative



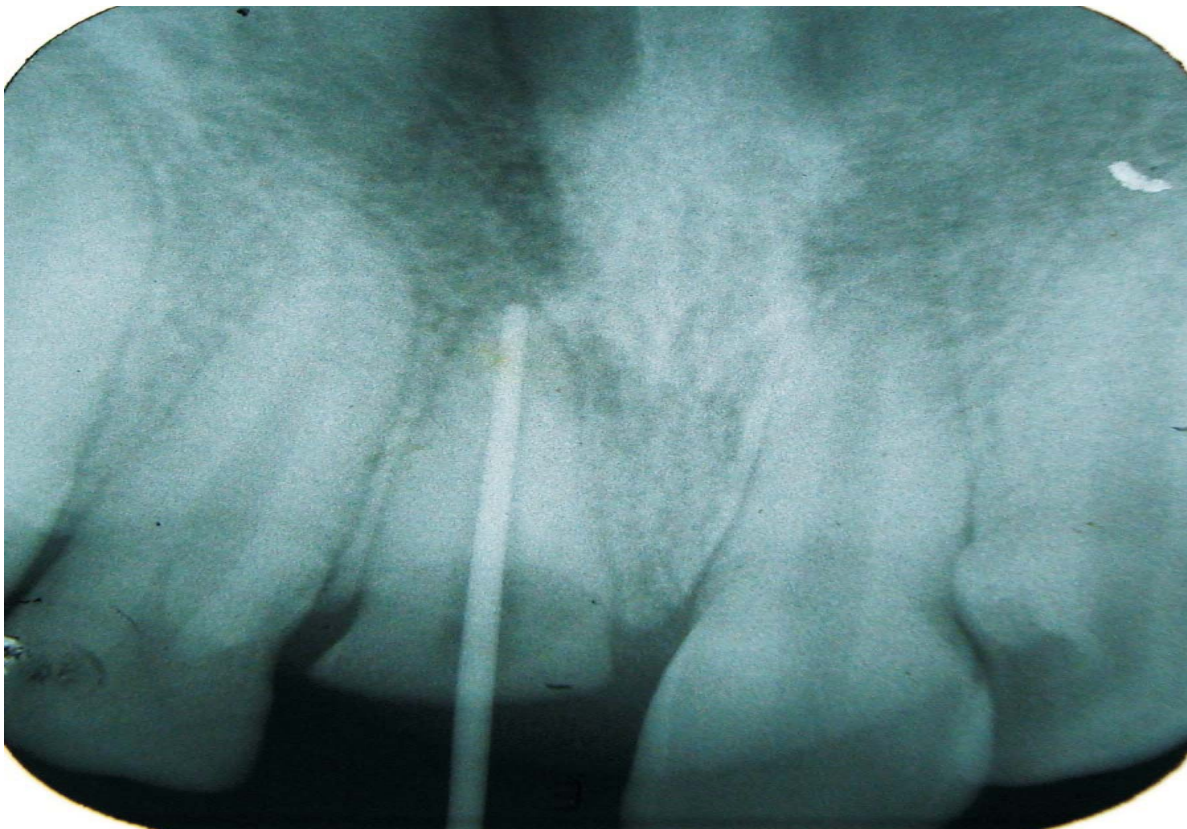
Pre operative radiograph



Working length determination



Master cone selection



Obturation



Post space preparation



Reinforcement of tooth with glass fibre post



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