Rehab of A Fractured Incisor Using Original Tooth Fragment : A Case Report

Abstract

Complicated crown-root fracture of maxillary central incisors is a common case of severe trauma or sports-related injury. A 14-year-old boy had fractured his maxillary central incisor while swimming. The fracture line involved 2/3rd of the crown, compromising the pulp and extended subgingivally on the palatal aspect. The paper describes the treatment of oblique crown root fracture of maxillary right central incisor with reattachment procedure using fiber post. After one year, the reattached fragment still has satisfying esthetics and excellent function.

Keywords- Crown-Root fracture, Reattachment, Fiber post

Introduction

Seeing children grow from small toddlers into adolescents is an incredible experience for parents. Throughout this youthful and energetic period children are constantly subjected to new experiences and adventures that help them to develop their survival instincts. Simultaneous with the growing up process, they also are more prone to accidents especially accidental injuries to the oro-facial region, in particular dental trauma.

Commonly reported causes for dental related injuries are fall especially from a bicycle & contact sports and motor vehicle accidents. Boys are more prone to dental traumas than girls. Uncomplicated and complicated crown fracture is the most common traumatic dental injury to permanent teeth and the teeth most commonly affected are maxillary incisors, with a reported share of 96% of all the crown fractures (80% central incisors and 16% lateral incisors). This is attributable to their anterior position and protrusion caused by eruptive pattern. Trauma with accompanying fracture of a permanent incisor is a tragic experience for the young patient and creates psychological impact on both the parents and children. If the injury involves the loss of extensive tooth structure, it alters the child’s appearance and makes him the target for teasing and ridicule by other children.

One of the options for managing coronal tooth fractures, especially when there is no or minimal
violation of the biological width, is the reattachment of the dental fragment when it is available. Tooth fragment reattachment offers a conservative, esthetic, and cost effective restorative option that has been shown to be an acceptable alternative to the restoration of the fractured tooth with resin-based composite or full-coverage crown. Reattachment of a fragment to the fractured tooth can provide good and long-lasting esthetics (because the tooth’s original anatomic form, color, and surface texture are maintained), can restore function, can result in a positive psychological response, and is a reasonably simple procedure. In addition, tooth fragment reattachment allows restoration of the tooth with minimal sacrifice of the remaining tooth structure. Furthermore, this technique is less time consuming and provides a more predictable long-term wear than when direct composite is used.

This case report outlines the management of complicated oblique crown-root fracture that minimally encroached into the biologic region in a growing child with fragment reattachment procedure.

**Case Report**

A 14-year boy reported with the chief complaint of broken upper front teeth and gave the history of fall while swimming 1 day back. The child complained of slight mobility of the broken segment (Fig. 1). Complete history of trauma was recorded with no significant finding. On clinical examination, right central incisor had undergone Ellis class III fracture and right lateral had undergone Ellis class II fracture. The fracture line of maxillary right central incisor involved 2/3rd of the crown, compromising the pulp and extended subgingivally on the palatal aspect. Fractured fragment was mobile though the fragment was held in position palatally. Intraoral periapical radiograph of maxillary right central incisor revealed radiolucent horizontal line at cervical one-third with respect to maxillary right lateral incisor.

A diagnosis of complicated crown fracture with respect to maxillary right central incisor and uncomplicated crown fracture in right lateral incisor was made. Removal of fractured fragment and reattachment using self etching adhesive and esthetic fiber post was planned the tooth having Ellis class III fracture and composite build up of maxillary right lateral incisor.

![Fig.1: Pre-operative view showing complicated crown-root fracture of maxillary right central incisor.](image1)

The removed tooth fragment of maxillary right central incisor was disinfected with sodium hypochlorite and rinsed with water (Fig.2, Fig.3).

![Fig.2: Fracture fragment removed from underlying tooth structure](image2)

![Fig.3: Fractured tooth fragment.](image3)

Then it was kept in normal saline, till the endodontic treatment completed. After the endodontic treatment was completed, the fiber-post was placed (Fig.4).

![Fig.4: Root canal treatment done in maxillary right central incisor.](image4)

Isolation was done with cotton rolls and gingival retraction cord. Gutta percha filling was removed with gates-glidden drill from two-third of the canal retaining approximately 5-6mm of gutta percha apically (Fig.5). A light transmitting fiber post (REFROPOST) was tried in the canal and cut at the desired length.
Radiograph was taken for the confirmation of the post space preparation (Fig.6).

A groove was made on the fractured fragment so that it fitted comfortably on the fractured root without any interference from overlying post (Fig.7). The fragment was aligned with the apical portion of the tooth fragment and radiograph was taken for the confirmation of the post length.

Self etching adhesive (Multilink System Pack, Ivoclar Vivadent, Liechtenstein) provided as primer A and B mixed in 1:1 ratio was applied to the root dentin in the post space with the application tips for 15 seconds. Thin coat of adhesive was applied to the fiber post. Flowable composite was applied into the canal and to the post. Fiber reinforced post was placed into the canal with light pressure and light cured for 30 seconds. Then the fractured fragment was treated with bonding agent and was placed to the coronal portion of the fiber post by using flowable composite (Fig.8).

Any excess cement oozing out of canal was removed, as it could alter the fit of the fragment.

It was then light cured for 40 seconds. Maxillary right lateral incisor was also build up using composite (Fig.9,10,11).

Finishing and polishing was done using the composite finishing kit (Sof-Lex, 3M ESPE). Patient was advised analgesics. Tooth was kept under observation. Patient was recalled after six months and one year for evaluation (Fig.12).
The treated tooth had excellent esthetics and function. There was no mobility of any of the fragments and the periodontal status was also satisfactory.

Discussion

A patient with fractured anterior teeth usually reports with pain and is emotionally upset about his or her appearance. Quick restoration of the esthetic appearance and relief of discomfort for these patients by preserving the natural tooth structure may lead to a positive emotional and social response from the patient\(^5\). There are various treatment modalities like composite restoration, orthodontic extrusion, surgical extrusion, crown lengthening and reattachment of fractured fragment, followed by Post and Core supported restorations\(^6,7,8\).

Whenever possible, reattachment of the fractured fragment is one of the best techniques for the restoration of a fractured anterior tooth. It is esthetically more predictable for translucency, opalescence, fluorescence, have favourable wear mechanism, maintains the original tooth contours, preserve identical occlusal contacts, color stability of enamel is better, cost effective, prevents the patient from an emotional trauma of loss of a body part and a convenient treatment as comparison to other treatments\(^2,5\). This paper signifies that the fragment can be used even if the fracture is complicated but if the margins are accessible.

There are few treatment options available in treating complicated crown root fractures: (Brown and Welbury 2000; Fariniuk et al., 2003). Removal of the fractured coronal fragment and restoration of tooth if the fracture line has not encroached into the biologic width, removal of the coronal fragment and supplemented with gingivectomy and osteotomy to expose the fracture in order to establish biologic width prior to restoration, removal of the coronal fragment and initiation of endodontic treatment and restoration of tooth with post crown, removal of the coronal fragment and later by orthodontic or surgical extrusion of the apical fragment prior to restoration with post crown and in severe crown-root fracture, the tooth may have to extracted and replaced with removal or fixed prosthesis\(^1\).

In the present case, the fractured coronal fragment was removed and the fracture line was oblique running labio palatally extending below the gingival contour palatally but above the bone crest. The fractured fragment was intact and held in position without displacement though the fragment was mobile. The root apex of the 21 was completely matured as the patient was 14 years old so endodontic treatment was initiated soon after the removal of the broken fragment. During subsequent visits the canal was obturated with gutta percha and later the fiber reinforced post was placed. The Metal free post endodontic treatment promises to be the method of choice in cases of destroyed tooth as it enables the achievement of longevity and aesthetics of the restoration\(^8,9\).

As with all traumatic injuries, follow up is of critical importance. The patient was on follow up for 3,6,12 months. Esthetics, tooth mobility and periodontal status were confirmed at these follow-up visits.

The presence and preservation of the original tooth fragment can be enhanced by patient education that emphasize the management of fractured and avulsed teeth, its importance and restorative measures available\(^10\).

Conclusion:

A suitable reinforcing restoration for endodontically treated teeth is of utmost importance for the success of the treatment and to avoid tooth fracture with repeated trauma. Reattachment of fractured tooth fragments offers a viable restorative option for the clinician because it restores tooth function and esthetics with the use of a very conservative and cost-effective approach. Also provide immediate natural esthetics and functional rehabilitation.

References


