

# Reattachment of Fractured Tooth Fragment in Maxillary Anterior Teeth: An Esthetic Approach

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## ABSTRACT

Fracture of anterior teeth is a very common form of dental injuries among children and young adolescents. Various treatment modalities have been practiced in past but reattachment of fractured fragment is considered to be most conservative, natural and esthetic approach. The restoration of natural teeth form, color and alignment in these patients create a positive social and emotional response in such patients. This article discusses a case of 16 year old female patient with fractured right central incisor (ellis class 3 fracture). Reattachment of fractured fragment was done after single sitting endodontic treatment with bonding system and dual cure composite resin cement. Evaluation at 1 year yields good reattachment, intact post, good esthetics and good periodontal health.

**Keywords:** Fracture, Reattachment, Dual cure resin cement

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## INTRODUCTION

Fractures of anterior teeth are very common form of dental injuries that mainly affects children and young adolescents. These injuries most commonly results from falls and contact sports (1,2). Upper anterior teeth especially, the maxillary central incisors are most commonly injured because of their position in the arch (3,4). A trauma with accompanying fracture of anterior teeth is a tragic experience for the patient who requires immediate attention, not only because of damage to the dentition but also because of psychologic effect of the trauma. Various treatment modalities have been practiced in past to restore the fractured anterior teeth including composites, laminates, esthetic crown, or the reattachment of fractured fragment. Among which reattachment of fractured tooth fragment is considered one of the most conservative, biologic and esthetic approach provided fractured tooth fragment is retained. Reattachment of fractured tooth provides

the best esthetic results as natural tooth shape, contour, surface texture, occlusal alignment and color are maintained (5-10). Additionally, this approach provide positive psychological and social response from the patient.

Tennery (1988) (11) was the first to report the reattachment of a fractured fragment using acid-etch technique. Subsequently, Starkey (1979) (9) and Simonsen (1982) (10) have reported success with similar cases. The introduction of composite in combination with the use of acid-etch technique to bond composite to enamel, made restoration possible for the fractured incisor, with minimal preparation (12). However, composite resin has the disadvantages of poor abrasion resistance in comparison to enamel (13), water absorption, and staining. Reattachment techniques for tooth fragments present several advantages over restorations obtained with composite resin systems: better and long-lasting esthetics, improved function, immediate results, a positive

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Figure 1: Pre-operative radiographs of patient



Figure 2: Fractured tooth fragment

psychosocial response, and faster and less complicated procedures (14-17). This article discusses the management of a case of crown fracture of anterior tooth which was successfully treated in a conservative manner by reattachment.



Figure 3: Radiograph showing root canal treated fractured tooth

**CASE REPORT**

A 16 year old female patient reported with the chief complaint of pain and fractured tooth in upper front tooth region after a fall from stairs 40 minutes earlier (Figure 1). Medical history was non-contributory. Clinical and radiographic examination revealed oblique fracture of maxillary right central incisor involving enamel, dentin and pulp. Fracture line was oblique running labial to palatal in an apical direction with associated pulp exposure (Ellis class 3 fracture). Fractured tooth fragment was recovered from the patient (Figure 2). Patient was in acute pain due to pulp exposure. No mobility of anterior teeth was recorded and surrounding intraoral soft tissues and alveolar bone were normal. The fractured fragments of crowns was checked for fit with the remaining tooth structure. Root integrity was assessed with preoperative periapical radiographs.

Upon analysis, various treatment op-

tions were presented to the patient, regarding their advantages, disadvantages, Cost and prognosis. Reattachment option was presented only after confirming that the fragments were in good condition and that they fit reasonably well on the fractured teeth. The patient and the patient's father opted to have the tooth fragment reattached.

The treatment plan was decided as follows: single sitting endodontic treatment of the fractured tooth, preparation of post space, and cementation of post followed by reattachment of fractured fragment. The parent's informed consent was obtained before commencement of the treatment.

The fractured fragments were kept in 5% sodium hypochlorite for 1 minute to dissolve the remaining pulp tissue, then placed in normal saline during the entire period before reattachment. The incisal fragment exhibited no caries, negligible loss of tooth structure, and adapted well to the remaining tooth structure when "tried-in." Single sitting endodontic treatment was performed (Figure 3). Post space was prepared in both the radicular portions of the tooth and the fractured crown fragment using stainless steel parapost system (Parapost XP; Coltène/Whaledent) (Figure 4). Appropriate-size post was cemented using dual-cure composite resin cement (Calibra; Dentsply Caulk, Milford, DE; ). A radiograph was taken to ascertain the fit of the posts in the canal.

The fractured fragments were etched with 37% phosphoric acid for 15 seconds and thoroughly rinsed with air-water spray. Excess water was removed with a brief jet of air, so that the surface was left visibly wet. A drop each of primer A and primer B of Calibra dual-cure resin cement were mixed together and applied to the wet dentin and enamel of the fragment. The fractured teeth was treated in similar fashion. The fragment was repositioned correctly on the fractured tooth (Figure 4 and Figure 5). The fragment site was light

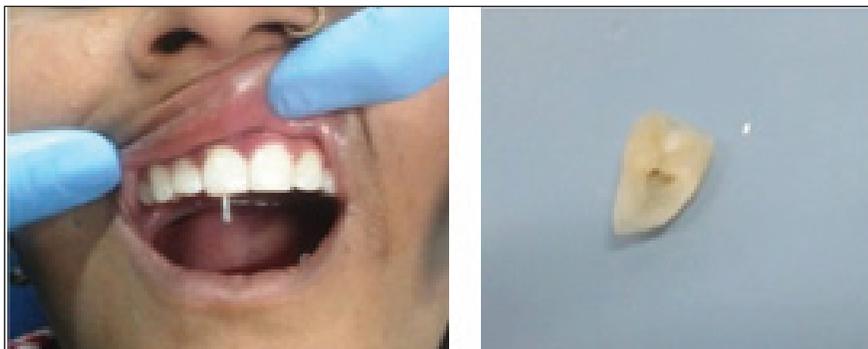


Figure 4: Post space preparation in both the radicular portion of tooth and fractured crown fragment

polymerized on the facial and palatal surface for 40 seconds each . Finishing and polishing of the restoration were carried out. Occlusion was checked and post operative instructions were given to the patient . Radiographs and clinical examination carried out after 1 month, 3 months, 6 months and 1 year confirmed the satisfactory esthetic and functional outcome of the treatment with no associated endodontic or periodontal problem.

**DISCUSSION**

Anterior teeth are commonly traumatized in orofacial injuries associated with automobile accidents (1), sports injuries, violence or fall. Among traumatic injuries, uncomplicated crown fracture accounts to more than 50% cases whereas complicated crown fractures accounts to 2 to 13% of all dental injuries (7). Trauma with associated fracture of anterior tooth poses immense distress to the young patient. Reattachment of fractured fragment and preservation of natural tooth form provokes a positive emotional and social response from the patient

(14). Various treatment options can be considered for the management of fractured teeth. Early techniques include stainless steel crowns, basket crowns, orthodontic bands, pin-retained resin, porcelain bonded crown, and composite resin with acid etch adhesive techniques and jacket crown. but techniques that restores aesthetics and improve long term success rates are of potential value and should be considered. Conventional composite resin restoration may result in less than ideal contours, color match and incisal translucency. In addition ,composite has poor abrasion resistance (13) in comparison to enamel. Prosthodontic restorations in younger patients may have confounding variables such as large pulp, progressive eruption and

gingival margin instability. Thus, when an intact fragment is available that fits reasonably well to the fractured tooth, fragment reattachment may provide most conservative and most esthetic treatment option available (16).

The choice of treatment for complicated crown and/or root fractures which involves the pulp depends upon several factors viz the developmental stage of a tooth,time lapsed between occurrence of an accident and treatment rendered as well as concomitant periodontal injury. Success of reattachment will depend on how dehydrated the tooth fragment is, because the longer it remains dehydrated, lesser will be the fracture strength of the tooth; however fracture strength can be reinstated by hydrating the fragment (15).

Reattachment of tooth fragment when violation of biological width has occurred present a different clinical situation. There are several options for the treatment of teeth fractures involving the biologic width, including tooth extrusion, crown lengthening followed by fragment reattachment, or reconstruction (8).

In the present case report ,the patient reported with intact tooth fragment. To increase the fracture strength of fragment, it was kept in normal saline till the reattachment was done. The clinical intraoral examination revealed pulpal involvement confirming that endodontic treatment was required. Post was placed to improve the retention form and to protect the the bond from rotational and twisting forces. The techniques described in the present case report are reasonably simple with a very conservative approach. However, all restorative techniques present some limitations and reattachment is not an exception. longevity of this procedure is not predictable. Also the dehydrated fragments may not retain their original hue and consistency. The favourable clinical outcome in present case may have been a result of good adaptation of



Figure 5: Fractured tooth fragment repositioned on fractured tooth



Figure 6: Post operative photograph of the patient

the fragment, associated with sealing effect of restorative material used and the proper fit and contour of the margin.

## CONCLUSION

The presented case has demonstrated that conservative approach to restoration of fractures anterior tooth is a simple, inexpensive, long lasting and efficient alternative that can restore the esthetic and function of the fractured teeth in a single visit with a positive psychological response. However, long term prognosis may be queried and other restorative procedures like crown fabrication may be an alternative in case of failure.

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