



## REATTACHMENT OF FRACTURED SEGMENT IN A MAXILLARY CENTRAL INCISOR USING FIBER POST – A CASE REPORT

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### ABSTRACT

Tooth fragment reattachment restores morphological, functional and esthetic aspects of the dentition, while maintaining the shape, contour, texture, colour and alignment of the natural teeth. Furthermore, fragment reattachment can be considered a fast and low cost treatment solution, creating a positive emotional and psychological response in the patient. Different preparation techniques as well as adhesive materials have been described throughout the literature, designed to increase the chemical and mechanical retention of fragments. This case report describes reattachment of fragment in a pulpally involved tooth where biologic width was not compromised. If the fractured fragment is available and is in a good condition reattachment is the better treatment option. When compared to more aggressive prosthetic techniques like crowns and veneers, the reattachment technique is both conservative and aesthetic.

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## INTRODUCTION

Traumatic dental injuries occur frequently in children and young adults, comprising 5% of all injuries. 25% of all school children experience dental trauma and about 33% of adults

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experience trauma to the permanent dentition, with the majority of the injuries occurring before age 19. (1)The majority of dental injuries involves the anterior teeth, especially the maxillary incisors(because of its position in the arch), whereas the mandibular central incisors and the maxillary lateral incisors are less frequently involved. Several factors influence the management of coronal tooth fractures, including extent of fracture (biological width violation, endodontic involvement, alveolar bone fracture), pattern of

fracture and restorability of fractured tooth (associated root fracture), secondary trauma injuries (soft tissue status), presence or absence of fractured tooth fragment and its condition for use (fit between fragment and the remaining tooth structure), occlusion, esthetics, finances and prognosis. 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 tooth fragment.(2) Fragment reattachment restores morphological, functional and esthetic aspects of the dentition, while maintaining the shape, contour, texture, colour and alignment of the natural teeth. Furthermore, fragment reattachment can be considered a fast and low cost treatment solution, creating a positive emotional and psychological response in the patient. Different preparation techniques as well as adhesive materials have been described throughout the literature, designed to increase the chemical and mechanical retention of fragments (3) This case report describes successful management of crown fracture by reattachment of fractured tooth fragment with fiber post.

**Case report:** A 14-year-old patient presented at the clinic after sustaining a complicated crown fracture to maxillary left central incisor during sports activity (figure 1). The fractured tooth fragment was recovered by the patient at the site of injury and maintained in a storage media (figure 2). Patient's medical history was non-contributory. Clinical and radiographic examination revealed a complicated oblique crown fracture (Ellis class III) of tooth #9. No mobility of the remaining tooth was recorded and surrounding intraoral soft tissues were normal.



Figure 1. Preoperative view

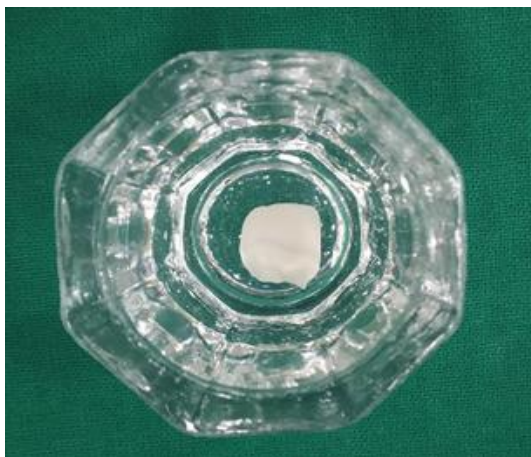


Figure 2. Tooth fragment

The fractured fragment was washed thoroughly under running water and stored in sterile normal saline to prevent dehydration

and discolouration. It was planned to reattach the fractured fragment to the remaining tooth and patient's consent was obtained. Rubberdam was applied. (Fig 3) Fit of the fractured tooth segment was assessed (Fig 4).

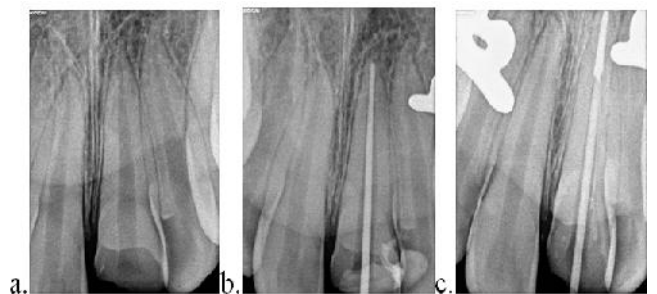


Figure 3. Rubber dam application



Figure 4. Checking the fit of the fragment

The fragment was temporarily positioned before access cavity preparation of tooth #9 for enhancing ease of post placement. After endodontic therapy, post space preparation was done using #2 peeso reamer. A 5mm of gutta-percha was left in the apical region. Fiber post was positioned. Angelus Referpost fibre glass intraradicular post size 2 was used.



a. preoperative radiograph, b. master cone, c. post placement

The fragment was carefully seated, flowable composite was used to fix the fragment in position. During curing firm finger pressure was applied to the coronal fragment to closely oppose it to the tooth. Afterwards, final finishing and polishing was done. (Fig 5)



**Figure 5. Post operative view**

## DISCUSSION

Recent developments in restorative materials, placement techniques, preparation designs, and adhesive protocols have allowed clinicians to predictably restore fractured teeth.

With the advent of restorative dentistry, the process of fragment reattachment has become simplified and more reliable, it has also allowed dentists to use the patients own fragment to restore the fractured tooth. Several case reports using a variety of technique and materials to reattach fractured teeth have been published (4) The direction of the fracture line is an important aspect in rrestorability, and it has a direct bearing on the prognosis of teeth.(5)In this case, the fractured fragment was in sound condition and exhibited good fit over the radicular portion, so reattachment using fiber post was considered to be the best treatment option. A bevel with flowable composite further improved the fracture strength. Conventionally, cast metal post and core were used for fracture reattachment. The newer variety of nonmetallic posts is made of either ceramic or fiber-reinforced materials such as carbon, quartz, or glass in an epoxy matrix. Tooth-colored fiber posts have several advantages. They are more esthetic, bonded to tooth tissue, modulus of elasticity similar to that of dentin, and have less chances of fracture.

Using glass fiber post with composite core and with recent advances in adhesive techniques and materials, one can create a monoblock, a multilayered structure with no inherent weak interlayer interfaces. The unique advantage of this system is that it reinforces the teeth structure through this concept. Therefore, the integrity of the final endodontic restorative continuum monoblock approaches that of the original healthy tooth itself (6). An additional use of fiber posts is that it helps to distribute the stress to remaining radicular dentin. Luting the fiber posts with resin cement not only reinforces the tooth but also helps in achieving higher bond strengths of the fractured segments. It also minimizes the inclusion of air voids are easy to use and predictable.(7) In apical areas light-cured luting resin cement may result in incomplete polymerization; hence, dual curing systems prove to be the most suitable material as they would allow polymerization even in those areas which would otherwise have left uncured due to the inability of light to reach in deeper areas (8). Resin-based sealers are used to obturate the teeth planned for restoration with glass fiber posts as eugenol-based sealers may inhibit the set of resin cements. If the fracture line is supragingival, the procedure for reattachment will be straightforward.

However, when the fracture site is subgingival or intraosseous, orthodontic extrusion with a post retained crown may be necessary. Alternatively, surgical techniques such as electrosurgery, elevation of tissue flap, clinical crown lengthening surgery with removal of alveolar bone, and removal of gingival overgrowth for access to the fractured site are all viable methods for bonding fractured component. It has been suggested that whenever the fracture site invades the biologic width, surgery should be performed with minimum osteotomy and osteoplasty (9).

This case report describes reattachment of fragment in a pulpally involved tooth where biologic width was not compromised. If the fractured fragment is available and is in a good condition reattachment is the better treatment option. When compared to more aggressive prosthetic techniques like crowns and veneers, the reattachment technique is both conservative and aesthetic. Using this treatment procedure it is possible to achieve long-term retention and good mechanical resistance of the tooth-fragment complex (10) Long term follow up is necessary.

## CONCLUSION

Thus it can be concluded that reattachment using fiber post is a cost effective treatment approach. Reattachment of the fractured fragment to the remaining tooth can provide better and long lasting esthetics, improved function, a positive psychological response and is a faster and less complicated procedure.

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