Reattachment of Fractured Tooth Fragments - an Immediate Esthetic Alternative- Case Reports

*Dr Bharati B Patil¹, Dr Shoba K², Dr Sheena Babu³, Dr Mamata B Patil⁴
¹,4Junior Resident, ²Professor, ³Associate Professor
¹, ², ³ Department of Conservative Dentistry & Endodontics GDC, Kottayam, kerala
⁴Maratha Mandal’s NGH Institute of Dental Sciences & Research Centre, Belgaum, Karnataka

*Corresponding Author:
Dr Bharati B Patil
Junior Resident
Department of Conservative Dentistry & Endodontics GDC, Kottayam, Kerala

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ABSTRACT
Reattachment of fractured fragment is an option that provides immediate esthetic, functional and biologic restoration. It could be the first choice for crown fractures of anterior teeth as it can be the most conservative and less time consuming treatment. Reattachment of teeth fragment is attempted in following cases.

Keywords: Reattachment; Trauma; Fractured fragment; anterior aesthetics

INTRODUCTION
Crown fractures are the most common consequences of traumatic injuries that mainly occur in the anterior permanent dentition. The quarter of the population suffers a minimum of one dental traumatic injury related to coronal fractures of the anterior teeth before the age of 18 years, the most common of which are attributed to falls, high-impact sports, and motor vehicle accidents.

The choice of the esthetic restorative treatment of fractured anterior teeth remains the biggest challenge for the dentist. Treatment options include composite resin restoration, fragment reattachment, and ceramic restorations. When the tooth fragment is present and in good working condition, the best option for the treatment of a coronal fracture fragment is reattachment.[¹,²]

The reattachment of a fractured tooth fragment offers a viable option for the dental clinician. Function and esthetics may be restored with the use of this conservative and low-cost approach. It is proposed as a simple and conservative option as fragment reattachment restores the morphological, functional, and esthetic aspects of the dentition, while maintaining the shape, contour, texture, color, 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. [³,⁴,⁵,⁶-⁷]

This paper represents case reports where reattachment is done in anterior teeth.

Case report -1
A 14 yr old boy with history of fall had reported to dept of conservative dentistry, GDC kottayam. Clinical and radiographic examination revealed Ellis class III fracture with 21. Patient had carried the fractured segment wrapped in a dry hand kerchief with an elapsed time of 20 minutes. The fragment was stored in isotonic saline solution for rehydration. Treatment planned was RCT followed by fiber post
reinforcement and reattachment of fractured segment in relation to 21 in single appointment.

LA was administered and tooth isolated with rubber dam. Mock placement of fractured fragment onto the tooth was done to check for approximation of the fragment. Single visit root canal therapy was done followed by fiber post placement.

The fragment was prepared for reattachment by giving an external chamfer bevel on both the fragment and the tooth. Acid etching was done on both the fragment. Both the fragment and the tooth dentin were kept moist and excess water was removed using blotting paper. A bonding agent was applied to both the substrates and light cured for 15 seconds. A flowable composite was used for filling the inter-fragmentary space and the fit was reverified. The excess was removed and the composite layer was cured from both the buccal and palatal surface.

Case report -2

A 23 yr old female reported with history of RTA 2 days back. Clinical examination showed Ellis Class III fracture of 21 with clinical exposure of pulp. The fractured segment of the tooth was seen palatally attached and separated labially. Radiograph revealed no root fracture. Treatment planned was RCT followed by approximation of the fractured fragments in place.

After LA administration, access opening and pulp extirpation was done stabilizing the fractured crown labially by finger pressure. Then fractured area was sealed with flowable composite material. A GP was placed in the canal before sealing, to prevent flowing of the composite material into the canal. Later GP was removed followed by canal irrigation and temporary sealing of the cavity. Tooth was stabilized with composite splinting using orthodontic wire. In the next appointment the access regained and root canal therapy was completed and a final restoration was given.

After 6 weeks, patient reported with absence of symptoms. No pain, no tenderness on percussion and but mild mobility was observed.
Case report -3
A 28 yr old female reported with history of fall a day back. Clinical examination showed Ellis Class III fracture of maxillary right central incisor with clinical exposure of pulp. The fractured segment of the tooth was seen palatally intact and separated labially. Radiograph revealed no root fracture. Hence treatment planned was RCT followed by fiber post reinforcement and approximation of fractured segment.

After LA administration, access opening and pulp extirpation was done stabilizing the fractured crown labially by finger pressure. Single visit root canal therapy was done followed by fiber post placement. Fractured area was sealed with flowable composite material. Tooth was stabilized with composite splinting using orthodontic wire.

After 6 weeks, patient reported with absence of symptoms. No pain, no tenderness on percussion and no mobility were seen. The splint was removed and the tooth was given full coverage crown (PFM).
DISCUSSION

Reattachment of tooth fragment allows restoration of the tooth with minimal sacrifice of the remaining tooth structure. Conventional methods employed in the restoration of fractured teeth include partial and full coverage crowns, laminate veneers, and composite resins all of which are time-consuming, high priced, and not conservative. [8]

Factors influencing the feasibility of repairs include the site of fracture, size of fracture remnants, periodontal status, pulpal involvement, biological width invasion, occlusion, and time and resources of the operator and the patient. [9 10 11]

Various treatment options available are reattachment of fractured fragment, composite restoration, orthodontic traction and crown lengthening followed by post and core supported restorations. [9,12]

When the fractured fragment is intact and available, fragment reattachment may offer a most functional and esthetic treatment option. The success of the reattachment depends on several factors: hydration of the fractured segment while outside oral cavity is one of them. This is necessary to maintain the vitality and original esthetic appearance of the tooth and also ensures adequate bond strength. [8] In the first case the fractured fragment was kept in isotonic saline solution to prevent dehydration.

Reinforcement of the reattached fragments using posts has been widely reported in the literature. Although many techniques with various materials have been suggested, resin-based restorative materials with tooth-colored fiber post may be considered the best option because of several advantages such as a suitable elastic modulus, aesthetics, good bonding between post and cement, lower chair time, and minimal tissue removal. [13,14]

It is also reported that the use of a fiber post with fractured teeth, as it interlocks the two fragments, minimizes the stress on the reattached tooth fragment. [13,15]

Several methods have been applied to enhance the adhesion between fractured and remaining fragment. These include circumferential bevelling, placement of chamfer, placement of V-shaped notch, placement of internal groove, and superficial over-contouring. [16] In the first case, external chamfer bevel was given for enhancing the adhesion between fractured and remaining fragment.

Badami and associates [17] have shown neither the bevel nor the material used could obtain the original fracture resistance of the tooth. Specimens prepared
with chamfer and bonded had a fracture resistance of 40-60%, with internal dentin groove and over contour it reached around 90%. A simple reattachment procedure as in the first case is indicated, since bevel with flowable composite improves fracture strength recovery. The resistance of the fracture segment can be directly proportional to the surface area of adhesion.

In the first case, there is complete separation of the tooth fragment and also considering the patient’s age, the reattachment of the fracture segment facilitates the early establishment of form and function. Further treatment of restoring the tooth with full coverage crown will be an ideal option.

In the second case, fracture was incomplete and tooth was intact palatally. So lingual access approach by stabilizing the tooth labially will prevent the complete separation of the fragment and also facilitates the straight line access to the canal. A composite splinting was given for stabilizing the tooth in the arch. After the root canal therapy, the tooth was reinforced with fiber post followed by full coverage restoration (PFM) in the third case.

**CONCLUSION**

It can be concluded from the case reports that fracture reattachment is a conservative and esthetic alternative for treatment of the complicated crown fracture. The long term prognosis is still obscure, but it is an immediate technique of esthetic rehabilitation in the management of traumatized tooth.

**REFERENCES**


