

## Reattachment of Anterior Tooth Fragment by a Conservative Approach- A Case Report

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**Abstract:** Trauma to anterior tooth is relatively common among children and adolescents. One of the options for managing coronal tooth fractures when the tooth fragment is available and there is no or minimal violation of the biological width is the reattachment of the dental fragment. Reattachment of fractured tooth fragments can provide good and long-lasting aesthetics because the tooth's original anatomic form, color, and surface texture are maintained. It also restores function and provides a positive psychological response. Patient cooperation and understanding of the limitations of the treatment is of utmost importance for good prognosis. This article reports on coronal tooth fracture case that was successfully treated using tooth fragment reattachment.

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### I. Introduction

Coronal fractures are the most frequent traumatic injuries that affect the permanent teeth. [1, 2] The majority of dental injuries involve 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. Dental injuries usually affect only a single tooth; however, certain trauma types such as automobile accidents and sports injuries involve multiple tooth injuries. [3] Management of such injury using fragment reattachment is well documented in the literature. [4] Tannery first introduced an acid etch technique for fracture reattachment that was later advocated by Starkey and Simonson. [5,6]

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/absence of fractured tooth fragment and its condition for use (fit between fragment and the remaining tooth structure), occlusion, esthetics, finances, and prognosis. [7,8] Patient cooperation and understanding of the limitations of the treatment is of utmost importance for good prognosis.

Reattachment of original tooth fragment has certain advantages such as natural tooth contours, texture, color, translucency with better esthetic. [4] Furthermore, it enhances the durability because of natural incisal wear resistance of a sound dental tissue. [1] The procedure is acceptable in permanent as well as primary tooth as it is a conservative, cost-effective and a less time-consuming restorative option. [9,10] Management of traumatized tooth by biologic tooth restoration has optical and mechanical properties equivalent to a natural tooth. Therefore, in comparison to composite tooth restoration, biologic tooth restoration is always a promising treatment option. [1]

Clinicians have employed an assortment of bevel designs, chamfers, dentinal and enamel grooves, and choices of resin composite materials and techniques for the reattachment of tooth fragments. Reis and colleagues [11] have shown that a simple reattachment with no further preparation of the fragment or tooth was able to restore only 37.1% of the intact tooth's fracture resistance, whereas a buccal chamfer recovered 60.6% of that fracture resistance; bonding with an over-contour and placement of an internal groove nearly restored the intact tooth fracture strength, recovering 97.2 and 90.5% of it, respectively.

This article reports on a coronal tooth fracture case that was successfully treated using splinting with Ribbond periodontal splint followed by tooth fragment reattachment.

### II. Case Report

A 16-year-old female patient reported to the Dept. of Conservative Dentistry and Endodontics, GURUNANAK INSTITUTE OF DENTAL SCIENCES AND RESEARCH, KOLKATA, with a chief complaint of complicated crown fracture to her maxillary right central incisor during sports activities.



Fig 1. pre-operative intraoral image

### **III. Clinical Examination**

- Showed Ellis Class III fracture of maxillary right central incisor (11) with a frank clinical exposure of pulp. The fractured segment of the tooth was seen palatally attached and separated labially.
- The patient gives no history of any bleeding or swelling associated with the tooth.



Fig 2. Clinical Examination

### **IV. Radiographic Findings:**

- Complicated oblique crown fracture wrt 11 that extended subgingivally on the disto-palatal area.
- No significant bone loss was observed.

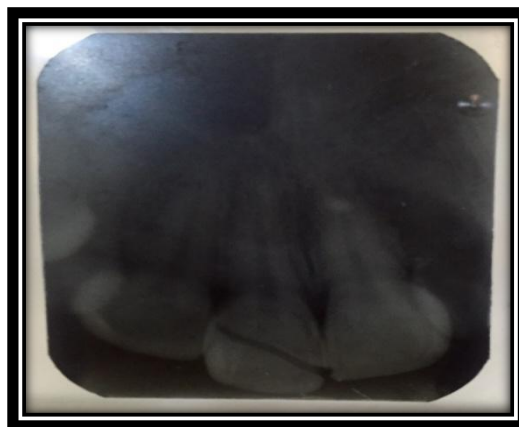
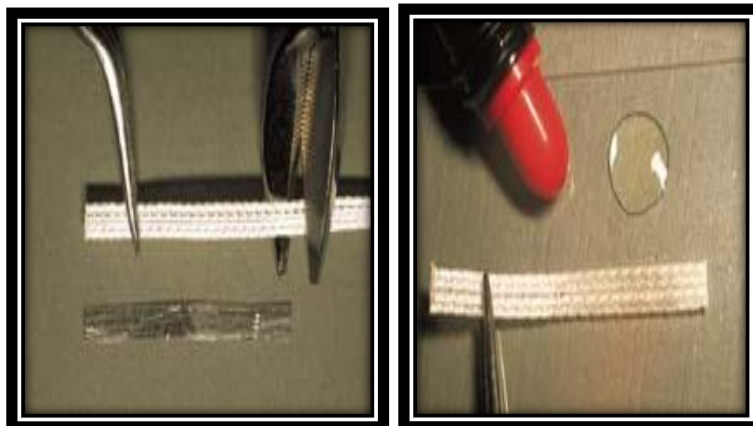


Fig 3. Preoperative radiograph

### **V. Treatment Plan**

The tooth was isolated. The two fragments were brought in approximate anatomical configuration and reattached by light cure composite resin. The united fragments were further stabilized by Ribbond fibresplinting. The facial surface of the tooth was cleaned using a prophylaxis cup with water and pumice. The interproximal surfaces were cleaned using thin diamonds and finishing strips. The teeth were

etched for 10 secs using 37% phosphoric acid gel, rinsed and dried. The Ribbonsplint was bonded from distal of 12 to distal of 22 with a medium viscosity hybrid composite resin and light cured for 20 seconds [14].



**Fig 4. Cutting Ribbond Fig 5. Wetting Ribbond**



**Fig 6. Ribbond periodontal splint**



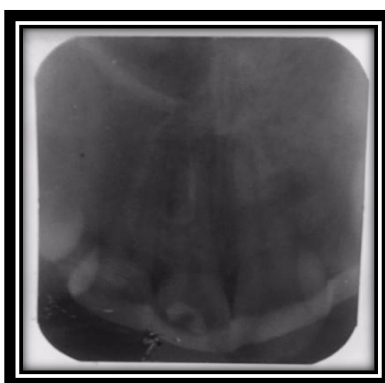
**Fig 7. Tooth splinted to adjacent normal teeth with Ribbond periodontal splint**

Access cavity was prepared and canal was negotiated with no. # 15 K file and working length (19mm) was established radiographically. Biomechanical preparation was performed using crown-down technique with rotary Protaper Universal files and the canal was enlarged up to # F5 under copious irrigation with Sodium hypochlorite (2.5%) and normal saline used alternatively. The canal was dried with sterile paper points and obturation of the root canal was completed with gutta-percha and AH26 as sealer using sectional obturation technique. Post obturation radiograph was taken to confirm quality canal seal and the access cavity was sealed with IRM.



**Fig8. Access cavity preparation**

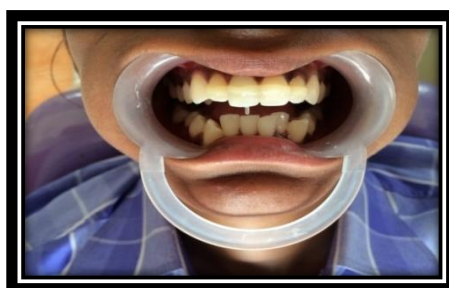
**Fig 9. Radiographic Working length determination**



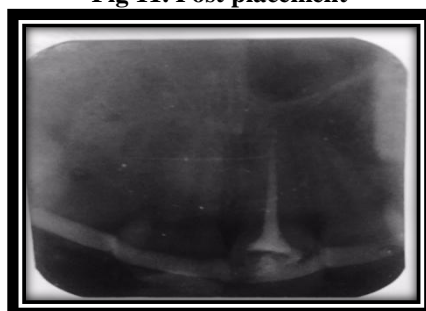
**Fig 10. Obturation of the root canal was under taken With Sectional Obscuration technique**

Post space was prepared with vivoclar size 1 drill (1.5mm) and corresponding FRC post of size 1 was selected. The post and canal space was etched with 37% phosphoric acid. The silane coupling agent was applied on the post followed by bonding agent application on both the post and canal space and light cured. Finally the post was luted with dual cure resin cement and cured for 20 secs. The access cavity was filled with light cure composite resin.

The tooth was disoccluded by 1mm to avoid trauma from occlusion and the patient was recalled after 6 weeks.



**Fig 11. Post placement**



**Fig.12 Postoperative radiograph. Fibre-post in place.**

At 6 weeks the patient presented with lack of clinical signs and symptoms .No pain, no tenderness on percussion and no mobility was observed. The splint was removed.

The Post-operative view shows adequate esthetic results with restored functionality by the use of a very conservative and cost-effective approach.



**Fig 13. Postoperative Photograph. Splint Removed**

## **VI. Outcome And Follow-Up**

Tooth was asymptomatic with no postoperative complications after a follow-up of 1 year.

## **VII. Discussion**

The present case report described that the rearrangement of tooth fragment is an alternative to composite resin build-up for restoring esthetics and function of fractured teeth. Coronal fracture by trauma is the most frequent type of dental injury in the permanent dentition. Reattachment of a tooth fragment is the first choice for restoring fractured teeth whether or not the technique is combined with resin composites. Tooth fragment reattachment offers a conservative, aesthetic and cost-effective restorative option that have been shown to be an acceptable alternative to the restoration of the fractured tooth with resinbased composite or full-coverage crown. Reattachment of a fragment to the fractured tooth can provide good and long-lasting aesthetics because the tooth's original anatomic form, color and surface texture are maintained. It 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, economical and provides a more predictable long-term wear. The psychological trauma caused to the individual owing to loss of aesthetics can be managed by this procedure successfully. When a tooth has not sustained a luxation injury, this technique should be considered.

Different reattachment techniques involved are Enamel Beveling; V-shaped Internal Enamel Groove; Internal Dentin Groove; External Chamfer; Over contour; Simple reattachment etc. Hayashi et al [13] indicated that, the best restorative methods are needed to be identified for teeth with extensive loss of structure, and reinforcing pulpless teeth. However, when a tooth has more than 50% of its coronal structure missing, the use of a post-and-core foundation is recommended prior to restoration. Tooth colored fibre posts have several advantages. They are more aesthetic and bond to tooth tissue. The use of fibre post increases retention and distributes the stress along the root, with the help of the glass fibre post the fractured crown can be permanently bonded to the root. Thus, it reduces the possibility of tooth fracture during function or traumatic injury. [12]

The techniques described in this case report are reasonably simple, while restoring function and esthetics with a very conservative approach.

However, the professional has to keep in mind that a dry clean working field and the proper use of bonding protocol and materials is the key for achieving success in adhesive dentistry. The long term prognosis is still obscure, but it is an immediate technique of esthetic rehabilitation in the management of traumatized tooth.

## **VIII. Conclusion**

It can be concluded from the case report that fracture reattachment is a viable, 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.

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