



## MANAGEMENT OF COMPLICATED TOOTH FRACTURE USING FIBER POST AND FRAGMENT REATTACHMENT: A CASE REPORT

### Dental Science

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### ABSTRACT

Crown fracture of anterior teeth is common sequelae of dental trauma. In case of complex tooth fractures, if the fractured fragment is available, close approximation of the fragment to the remaining tooth structure is possible. Root canal treatment followed by reattachment of the fractured fragment reinforced with fiber post is a good treatment option in such cases. This procedure is conservative and has many advantages over other forms of restorations such as exact restoration of the crown form, surface morphology, color, and minimal violation of biologic width. This case report highlights a complex coronal tooth fracture which was successfully managed using reattachment with fiber post reinforcement.

### KEYWORDS

Fiber post; fracture; reattachment; root canal treatment

### INTRODUCTION

Restoration of teeth with complicated crown or crown-root fracture is always challenging for dental practitioners because a comprehensive and accurate diagnosis along with proper treatment plan is required for its successful management. [1] A fractured anterior tooth can cause damage to dentition and can also have a psychological impact on patient if not treated as early as possible and thus requires immediate clinical attention. [2]

Conventional treatment modalities for management of complicated crown fractures include definitive crown after crown lengthening procedure, orthodontic or surgical extrusion or extraction followed by prosthetic rehabilitation. [3] If the fractured crown fragment is retrieved and preserved at the time of injury, its reattachment to the remaining tooth structure is possible. Reattachment provides several advantages over other forms of restorations like exact restoration of the crown form, surface morphology, color, and minimal violation of biologic width. [4, 5]

However, successful reattachment is determined by many factors such as the site of fracture, size of fractured fragment, periodontal status, pulpal involvement, maturity of the root formation, invasion of biological width, occlusion, materials and technique used for reattachment. [6] This paper reports a case of complicated coronal tooth fracture successfully managed by tooth fragment reattachment with fiber post reinforcement.

### CASE REPORT

A 28 year old male injured in a road traffic accident was referred to the Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur. Clinical examination suggested of a complicated oblique crown fracture with tooth 12 extending subgingivally in the palatal aspect. The fractured segment was held in place by the gingival attachment (**Figure 1a**). Intraoral periapical radiograph revealed an intact periodontal ligament space, complete root formation, and no evidence of root fracture (**Figure 1b**). The medical history was noncontributory.

A treatment plan of nonsurgical root canal treatment followed by reattachment with fiber post reinforcement was decided and explained properly to the patient. Local anesthesia (Lignox 2%, Indoco Remedies Ltd., India) was administered and the fractured fragment was removed atraumatically (**Figure 1c**). The removed fragment (**Figure 1d**) was then cleaned properly with 2% chlorhexidine solution and stored in an isotonic saline solution. Working length determination was done with an electronic apex locator (Root ZX mini, J. Morita Corp., Japan) and confirmed radiographically. Biomechanical preparation was done along with irrigation with 3% Sodium hypochlorite solution (Prime Dental Products Pvt. Ltd., Pune, India) and normal saline. The root canal was dried with absorbent paper points and obturation was done with Gutta-percha (Diadent Group International, Korea) and AH Plus root canal sealer.

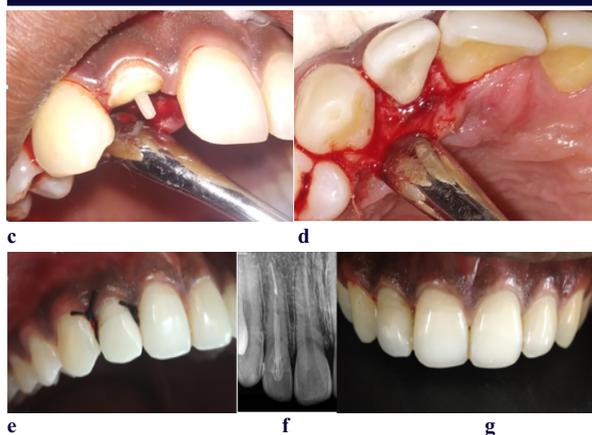
After completion of root canal treatment, gingival flap was raised as the fracture line was below the gingival level on the palatal aspect (**Figure 2a**). Post space was prepared using Gates Glidden drills and Peeso reamers. The fit of fiber post (Medicept, Selfpost, glass fiber post) was checked in the canal and adjusted to the desired length (**Figure 2b**). Pulp chamber of the fractured crown fragment was also prepared to retain the coronal portion of the post. The prepared post space was then etched using 37% phosphoric acid (DPI Tooth conditioner gel, Dental Products of India, Mumbai, India), rinsed, blot dried with paper points followed by application of bonding agent. The post was then luted in the canal using dual-cured resin luting cement (LuxaCore dual, DMG) (**Figure 2c**). The inner prepared surface of the coronal fragment was similarly etched and bonded to the tooth using dual-cured resin cement (**Figure 2d**). At the end of procedure, flap was repositioned and sutured (**Figure 2e**). A radiograph was taken at the end of the procedure (**Figure 2f**). Patient was recalled after 7 days for removal of sutures (**Figure 2g**). Clinical and radiographic examinations were carried out after 6 months and 1 year and the tooth responded favorably (**Figure 3a, 3b**).



**Figure 1(a)** preoperative photograph, **(b)** preoperative radiograph, **(c)** After removal of fractured fragment, **(d)** removed coronal fragment



**a** **b**



**Figure 2(a) elevation of gingival flap, (b) post fit verification, (c) fiber post in place, (d) fragment reattached, (e) after suturing, (f) postoperative radiograph, (g) photograph after suture removal**



**Figure 3(a) 1 year follow up photograph, (b) 1 year follow up radiograph**

## DISCUSSION

Conventional methods used for the restoration of fractured teeth include partial and full coverage crowns, laminates, and composite resins all of which are time consuming, costly, and not conservative [7]. In 1964, Chosack and Eidelman first described that the restoration of fractured teeth using fractured fragment offers a fine way to restore the natural shape, contour, surface texture, occlusal alignment, and color of the fragment [8]. In present case, the fracture line was below gingival level. Hence, gingival flap was raised to obtain accessibility to the fractured site for proper bonding of fractured fragment. As the biological width was only minimally invaded and it was possible to place the restorative margin at or above the level of the cemento-enamel junction, bone recontouring through crown lengthening was not indicated in present case. According to available literature, whenever biological width is invaded, surgery should be performed with minimum osteotomy and osteoplasty. [9]

The success of the reattachment depends on many factors and hydration of the fractured segment while outside the oral cavity is very important. Proper storage of the fractured fragment maintains vitality and original esthetic appearance of the tooth and also ensures adequate bond strength [7]. In present case, the fractured coronal fragment was stored in sterile isotonic saline to ensure proper hydration.

Reinforcement of the reattached fragments using posts has been widely reported in the literature and many techniques and materials have been suggested for it. Resin based restorative materials with tooth-colored fiber post can be considered good option because of many advantages such as a suitable elastic modulus, esthetics, good bonding between post and cement and less dentin removal [10, 11]. It has been reported that the use of a fiber post, minimizes stress on the reattached tooth fragment as it interlocks the two fragments [10–12]. In addition to the preparation of the post space, a vent is required in the coronal fractured fragment as a leeway for the excess cement to flow out without buildup of any hydrostatic pressure [13].

## CONCLUSION

The present case report highlights importance of multidisciplinary approach and proper clinical technique for the successful management of complicated crown fractures. After 1 year of follow-up, the attached coronal fragment is in position with good esthetics and clinical and radiographic signs of periodontal health and tooth integrity, thus indicating treatment success.

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