

Reattachment of Anterior Fractured Tooth Fragment Using Fiber Post: A Case Report

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ABSTRACT

Background: Crown fracture of the maxillary anterior teeth is the most common dental injury. Reattachment of the fractured fragment of the tooth with dual cure resin and fibre post is the treatment of choice for such cases. It provides immediate functional rehabilitation, esthetics, phonetics, and positive physiological response. This case report presents a clinical technique of reattachment of coronal fractured fragment of maxillary central incisor after trauma using direct fiber-reinforced post systems.

Keywords: Coronal fracture, Dental trauma, Reattachment, Esthetics, Fiber-reinforced post.

INTRODUCTION

Tooth fractures are the common features during injuries in contact sports, automobile accidents, and secondary to fall. Most commonly occurs in children and adolescent due to their involvement in extracurricular activity. [1]

Most commonly affected tooth by trauma is maxillary central incisor according to literature it is up to 75%-80% of all dental traumatic injuries [2] as they are forwardly positioned in the maxillary arch and protruded due to their eruption pattern.

Fracture of anterior tooth in young individual is a tragic experience as it causes severe impact on the esthetic and psychological well-being of a patient.[3] Treatment modalities for these traumatic injuries is governed by various factors which includes biological width encroachment, pulpal exposure, fracture of bone, condition of fractured tooth fragment and its availability, size and site of fracture, maturity of root formation, periodontal status, treatment cost and patient cooperation.[4]

In present era multiple treatment options are available to restore the fractured crown which includes composite build up, veneers, full coverage crowns, post and core followed by crown, extraction followed by fixed prosthesis or implant. All these techniques have some drawbacks such as staining, time consumption, and further loss of remaining tooth structure. Moreover, recent advent in restorative materials and techniques have resulted in newer treatment modalities. Today one of the option for managing coronal tooth fracture when the tooth fragment is intact and available and there is no or minimal violation of the biological width is the reattachment of the dental fragment. Tennerly in the year 1988 was the first to reported the re-attachment of fractured tooth fragment by acid-etch technique. Reattachment of a fractured fragment to the traumatized tooth can provide best and long lasting esthetic because [4, 5] its color matching, preservation of natural translucency, maintenance of original anatomic form, physiological wear will be similar to other natural intact teeth and surface texture are mentioned. It can restored function, positive

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physiological response reasonably simple procedure provide immediate treatment for such type of coronal tooth fracture.[6,7]

CASE REPORT

A 45 years old female patient reported to the department of Conservative Dentistry and Endodontics, Chandra Dental Collage and Hospital, with the chief complain off fracture upper front teeth and gave history of trauma due to fall from stairs one day before. Clinical and radiograph examination revealed complicated crown fracture in relation to maxillary left central incisor(21). A fracture line was extending obliquely from cervical third of labial aspect to subgingival level on the palatal aspect [Figure-1(A)(B)]. The tooth was tender on percussion and fractured segment was mobile with loosely attached to soft tissue. Soft tissue examination revealed injuries on left side of upper lip and inflammation of marginal gingiva around the fractured tooth. A diagnosis of complected crown fracture of maxillary left central incisor was made. The patient's medical history was not relevant. Patient expressed her desire to retain the tooth and restore it in its natural form, therefore single visit root canal treatment followed by immediate reattachment of the fracture fragment using esthetic fiber post was planned. Patient was explained about the treatment plan and informed consent was taken from the patient.

Local anesthesia was administered and the fractured segment was atraumatically removed.[Figure-2(A)(B)] It was cleaned with 2% chlorhexidine solution and preserved in isotonic saline solution to prevent from dehydration and discoloration. Electrocautery was performed to gain access to subgingival fracture area on the palatal side.

Working length was determined with the help of electronic apex locator (Root ZX, J Morita,USA) which was verified by radiograph [Figure-3]. Cleaning and shaping of the canal was performed by step back technique with hand K-files (Dentsply Maillefer, Switzerland) to an apical size of 55, 3% sodium hypochlorite and 17% EDTA were used alternatively as an irrigants. Length of master gutta percha cone was confirmed by radiograph and root canal was obturated with sectional obturation technique using AH plus sealer [Figure-4] . Post



Fig 1: Preoperative view.



Fig 2(a): After detachment of fractured fragment.

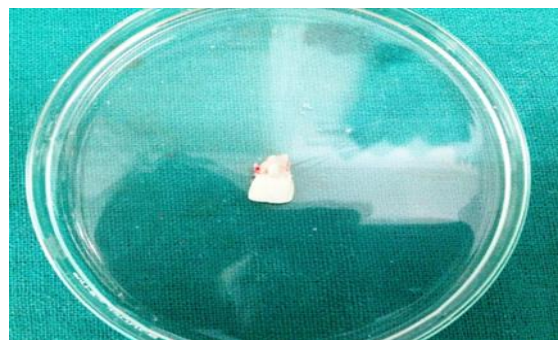


Fig 2 (b): Detached fragment.



Fig 3: After placement of Fiber Post.



Fig 4: Intra oral periapical radiograph after placement of fiber post.



Fig 5: Post-operative view after finishing.



Fig 6: Follow up after one week

space was prepared using Peaso reamers (size no.- 3). Fiber post (Tenax fiber Trans, Coltene, USA) was placed and adjusted according to prepared post space length [Figure-5(A)(B)]. An indentation was made in the fracture crown fragment with the round bur to act as a retentive area and to receive the post. The alignment of the coronal fragment was assessed with the post in position. Post space was dried with paper points. The root canal was etched using 37% phosphoric acid for 15 seconds and thoroughly rinsed off. Bonding agents (ADEPR

SINGLE BOND 2 3M ESPE) was then applied to the root canal wall and light cure for 15 seconds. Bonding agents also applied to the light transmitted post. Dual cure resin(Relay-x 3M) was placed in the canal and the fiber post was sited up to proper length. The inner surface of the coronal fracture fragment was similarly etched and bonded the tooth with suitable shade of dual cure composite resin. The excess material was trimmed and final finishing and polishing was done using Sof-lex polishing discs (3M ESPE, USA). Occlusion was checked and post operative radiograph was taken [Figure-6 (A)(B)].

DISCUSSION

According to the literature reattachment of a fractured tooth fragment is a feasible method for the treatment of coronal fracture of anterior teeth when the fractured fragment is intact and available.[8,9] The current manuscript reports a case of successful reattachment of coronal fractured fragment of maxillary left central incisor with 1 year follow up[Figure-7].

With the improvements in the dentin bonding technology it is now possible to achieve excellent result with reattachment of fractured coronal fragment of the tooth. The reattached tooth is restored to its original form, contour and margins ,increased wear resistance, more compatible with gingiva and modulus of elasticity similar to that of dentin. [10,11]

Hydration of the coronal separated fragment while outside the oral cavity is one of major issue in success of reattachment procedure. As it ensures original esthetic appearance along with adequate bond strength.[9] In the present reported case, after the coronal segment was separated, it was preserved in sterile isotonic saline to prevent dehydration.

Fracture of the tooth extending subgingivally may lead to restorative problems due to difficulty of access.[10] In the present case exposure of subgingival fracture line was achieved by electrocautery to facilitate the perfect approximation of the fragments and finishing of the margins. Rubber dam was not possible in this case, but adequate isolation was achieved using cotton rolls and cheek retractor.[11]

In the present case, a prefabricated fiber post was used. It was luted with resin cement and retain the coronal portion via friction bond, assist in preventing dislodgment and provide mono block effect. These posts also help to distribute the stress to remaining redicular dentin . Various tooth color restorative material can be used for reattachment of fractured segment such as dual cure composite, flowable composites or resin modified glass ionomers. In the present case dual cure composite resin was used as they have the advantage of better bond strength, aesthetics, and improved curing depth. [12,]

Before final procedure of reattachment adequate fitting of the fracture segment to the crown should be confirmed, as the longevity and esthetics depends on the proper fit of the coronal fragment. Whenever a appropriate adaptation of the tooth fragment is not achievable or fracture line is evident, then the addition of resin becomes imperative. It is necessary to check the occlusion before and after reattachment to prevent destructive occlusion loading. [13,14]

The clinician must consider a dry clean working field with proper use of bonding protocols and bonding materials for achieve success in adhesive dentistry. Patient co-operation and under standing of the limitation of the treatment is of utmost important for good prognosis.

CONCLUSION

The fracture of anterior tooth may create aesthetic and psychological incident for a young patient. Reattachment of fracture tooth fragment is a minimal invasive approach to immediately restore the esthetic, form and function of fractured tooth as well as there is a positive emotional and social response from the patient. With advancement in adhesive dentistry and restorative materials, it is now possible to achieve excellent prognosis of this treatment modality. However, before recommending a reattachment treatment procedure on a regular basis, a long term follow-up period is required.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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