



REATTACHMENT OF CORONAL FRAGMENT USING FIBER-REINFORCED POST: A CASE REPORT

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ABSTRACT Coronal fractures of permanent dentition are the most frequent type of dental injury. If the original tooth fragment is retained following fracture, the natural tooth structures can be reattached using adhesive protocols. The development and use of fiber-reinforced composite root canal posts make possible of the reattachment of the crown esthetically. This case report presents a clinical technique to reattachment maxillary central incisor tooth after trauma using direct fiber-reinforced post systems.

KEYWORDS : Reattachment, Trauma, Fiber-reinforced post

Introduction

Traumatic crown fractures, which are caused from dental injuries, are a serious dental public health problem. 1 A majority of the crown fractures involve the maxillary incisors. Today's dental patients are demanding a youthful, attractive smile.2 Coronal fractures of permanent incisors represent 18-22% of all trauma to dental hard tissues, 28-44% being simple (enamel + dentin) and 11-15% complex (enamel + dentin + pulp). Of these 96% involve maxillary central incisors.3 These fractures subsequently lead to esthetic, functional and phonetic problems. Restoration approach depends on the type of fracture, type of occlusion and the prognosis.4 Esthetics is an important requirement in determining the treatment strategy of a crown root fracture. Different treatment modalities for this kind of problem range from the maintenance and use of the original tooth fragment, definitive crown after an orthodontic and surgical extrusion or a crown lengthening, extraction followed by implant or fixed partial denture, composite restorations and post core supported restorations.2 The reattaching a tooth fragment was first described by Chosack and Eidelman in 1964. The reattachment of the crown fragment to a fractured tooth is the best method to reinstate the natural shape, contour, surface texture, occlusal alignment and color of the fragment, which offers excellent esthetic and functional results. Glass fiber posts were introduced in 1900, which offers several advantages such as esthetic, have modulus of elasticity. The present case report describes the reattachment of an original tooth fragment using a glass fiber post. similar to that of dentin, and reinforcement of restored segments by the formation of Monoblock.^{5,6}

Case Report-

22-year-old Female patient reported to the Department of Conservative Dentistry and Endodontics of V.Y.W.S DCH, Amravati, with a complaint of fractured maxillary anterior tooth. The tooth had fractured 12 hours ago on account of a fall. Patient complained of pain with 21. Clinical and radiographic examination revealed Ellis class III fracture in 21, it was tender to percussion. Pre-operative clinical image Pre-operative palatal view (fig 1 AB, C)

- Extra-oral examination revealed no significant abnormalities, and intra-oral examination revealed neither lacerations nor evidence of alveolar bone fracture.
- After taking written consent single visit root canal treatment

(RCT) was planned with #21 followed by reattachment of fractured fragment with fiber post reinforcement.

- Local anesthesia was administered (lidocaine2%with1:□ 80,000 epinephrine)
- The fractured fragment was cleaned with 2% chlorhexidine solution (germicidal) and stored in 25% dextrose (as hypertonic solution increases bond strength of reattached fragment).13 (Fig 2)
- Root canal procedure was initiated, working length was determined using intraoral radiograph (Fig 4)
- After thorough cleaning & shaping root canal is obturated using sectional obturation technique. (Fig.56)
- After completing RCT Assessment of post is done radiographically after adjusting the post length. (Fig.7)
- The prepared post space was etched for 15 seconds using 37% phosphoric acid (DENTSPLY, Spectrum). It was then rinsed thoroughly with water and excess water was removed with a cotton pellet. Next the bonding agent (DENTSPLY, Spectrum) was applied on the etched surface as well as the post. The adhesive was air thinned and light cured for 10 seconds.
- The post was then luted with resin cement (LUXACORE Z dual cure resin)
- A slot was prepared into the fractured segment to receive the part of post. (Fig-3)
- Etchant (DENTSPLY, Spectrum) was applied to the fragment and the remaining tooth structure using micro applicator tip.
- It was then rinsed thoroughly with water and excess water was removed with a cotton pellet. Next the bonding agent (DENTSPLY, Spectrum) was
- Applied. The adhesive was air thinned and light-cured for 10 seconds. and the fragment was cemented using dual-cure composite resin cement (LUXACORE Z dual cure resin)

- A good periapical radiograph was taken to ensure the proper cementation of post as well as fragment (Fig-8). The occlusion was checked and postoperative instructions were given to the patient.
- Composite restoration was done to improve esthetics & to mask fracture line (fig-9) The patient was recalled after 1 week for follow up.



FIG-2
FIG-3 Slot preparation into fracture fragment

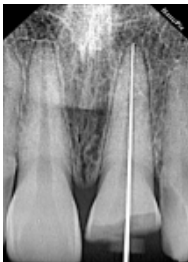


Fig 4 working length

Fig 5 master cone



Fig 6 sectional obturation technique

Fig 7 post placement



Fig 8 cementation of post as well as fragment



Fig 9 (A,B)- A) Composite restoration was done to improve esthetics & to mask fracture line. B) Palatal clinical photograph after fracture fragment reattached.

DISCUSSION

In a young individual, trauma to the anterior teeth is a tragic experience requiring immediate attention, as it can damage the patient's dentition as well as affect the patient's psychology. An immediate restorative technique for a fractured anterior tooth is to reattach the fractured tooth segment. The procedure restores the morphological, esthetic, and functional aspects of the dentition.

Composite resin restoration is the esthetic treatment of choice for fractured anterior teeth. Though these restorative materials do not structurally resemble enamel or dentin, their advanced formulations possess optical properties, such as, translucency, opalescence, fluorescence, and surface gloss. However, synthetic materials cannot match nature in quality or stability.⁶

Due to the protection of the natural tooth structure, it also gives a psychologically positive response. In the case of children and adolescents, both patient and parents are satisfied because original fragment is used in the restoration.⁷

Reis et al. studied the fracture resistance of teeth when reattached. They found fracture resistance of simple reattachment was very low of about 37.1%, whereas buccal chamfer, superficial over contouring, and internal groove placement showed the recovery of 60.6, 97.2, and 90.5% of fracture resistance, respectively. "Over contour" and "internal dentinal groove" have been found to yield better results in other studies also.¹ Hence, in the first case, internal groove placement was done to improve the fracture resistance of traumatized tooth.⁸ fiber-reinforced post was used for reattaching the fractured fragment with the tooth after completion of endodontic treatment was planned as FRC posts have several advantages over metal posts. Their principal advantages are that they are tooth colored, passive, bend along with dentin upon being flexed as their elastic modulus is similar to that of dentin.⁹ Reattachment using the FRC post which is bonded into the root canal enhances the retention of the crown's fractured fragment. The increase in fracture resistance is due to the combination of elastic and adhesive characteristics. Thus, both the tooth and post move and flex as a single unit, which ensures the favorable stress distribution.¹⁰

CONCLUION

with the materials available today along with appropriate clinical technique, reattachment of tooth fragment is a viable and conservative treatment option for fractured incisors. Several factors should be considered when choosing a technique or material for fragment reattachment. Bearing in mind that it is a simple, fast, affordable, and esthetically predictable technique, tooth fragment reattachment should always be the treatment method of choice when the fragment is present and is in good condition, even if a perfect adaptation is not observable. Future reports may need to focus on reporting longer follow-up to bolster the evidence in favors of this treatment option.

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