

## Reattachment of coronal fragment using fiber reinforced post

Qureshi A<sup>1</sup>, Kumar P<sup>2</sup>, Rao PS<sup>3</sup>, Soujanya E<sup>4</sup>, Ramtheerth A<sup>5</sup>

<sup>1</sup>Dr Asma Qureshi  
MDS, Reader  
asmakuresh@gmail.com

<sup>2</sup>Dr Pratap kumar  
MDS, Professor  
pratapmukka@gmail.com

<sup>3</sup>Dr P Sambashiva Rao  
MDS, Professor  
drpssrao@gmail.com

<sup>4</sup>Dr Soujanya E  
MDS, Senior Lecturer  
soujanyae.17@gmail.com

<sup>5</sup>Dr Anand Ramtheerth  
MDS, Senior Lecturer  
ramtheerth84@gmail.com

<sup>1,2,3,4,5</sup>Department of Conservative  
Dentistry & Endodontics  
Meghna Institute of Dental Sciences  
Nizamabad, Telangana, India

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Correspondence to:

Dr Asma Qureshi  
+917893191667  
asmakuresh@gmail.com

### ABSTRACT

Anterior crown fractures are a common form of injury that mainly affects children and adolescents due to their position in the oral cavity especially in the maxillary arch. Reattachment of original tooth fragment to the fractured tooth forms a relatively quick, biologic and esthetic restoration. A 28 years old male reported to the Department of conservative dentistry & endodontics with a complex crown fracture of 21 and 22 one day after the trauma had occurred. Following endodontic treatment, a glass fibre post was used to increase retention and distribute stresses along the tooth. The dental restoration was completed using the original fragment and a dual cure resin composite. Clinical and radiographic examination at 3, 6 & 11 months recall showed the glass fiber post and restoration was in place, indicating the success of the treatment in maintaining the fractured tooth.

**Key words:** Dental trauma, complicated crown fracture, composite, fragment reattachment, glass fibre post

### Introduction

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. [1] 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 similar to that of

dentin, and reinforcement of restored segments by the formation of monobloc. [2, 3] For planning a tooth fracture reattachment procedure, a systematic clinical approach by a thorough evaluation of the periodontal, endodontic and occlusal status of the fractured tooth should be done. [4]

The present case report describes the reattachment of an original tooth fragment using a glass fiber post.

### Case Report

A 28 years old male patient was reported to the department of conservative dentistry and endodontics with the history of fall and injury to the upper front teeth one day back. Extra-oral examination revealed no significant abnormalities, and

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intra-oral examination revealed neither lacerations nor evidence of alveolar bone fracture, but there was a fracture line extended from labiopalatally in apical direction irt 21, 22 and the fragment was still attached by a soft tissue at the palatal aspect. [Figure 1]



**Fig.1 Preoperative clinical photograph -21,22**

On radiographic examination revealed, a radiolucent line extends from incisal to cervical third of crown obliquely with intact lamina dura irt 21, 22. [Figure 2]



**Fig. 2 Preoperative radiograph -21,22**

Based on clinical and radiographic findings, it was diagnosed as Ellis class III fracture irt 21, 22. Patient was informed of long term prognosis of the teeth and the treatment was initiated. Infra orbital nerve block was given (2% lidocaine with 1:100,000). Coronal fragment was removed and stored in saline to prevent dehydration. Immediate endodontic treatment was carried out using Sectional obturation technique by using gutta perch and AH plus sealer.( Dentsply Maillefer, Dentsply, York, Pa).After periodontal

examination, crown lengthening was done with the electrocautery [Figure 3] and detached fragments were checked for the fit at the fractured site and A hole was drilled in the centre of the original crown fragment.



**Fig. 3 After crown lengthening 21,22**

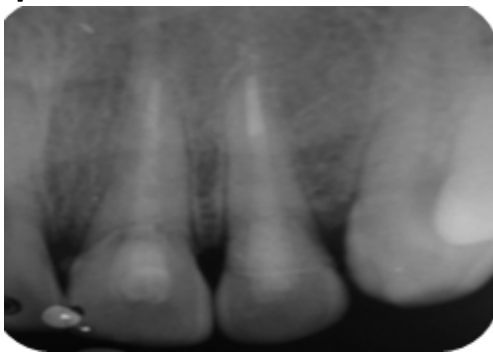
Both the intact coronal portion of the tooth and the original crown fragment were etched with 37% phosphoric acid gel for 20sec, rinsed with water for 20 sec and dried with a gentle stream of air, dentin bonding agent (Adper Single Bond Plus, 3M) was applied and cured for 40sec. Flowable composite resin (Filtek Supreme XT, 3M) was then applied to the surfaces, and the fractured fragment was positioned to its original place. Excess resin was removed and light cured for 40 seconds. [Figure 4]



**Fig. 4 After fragment reposition 21, 22**

Post space preparation was done with no.2 drill to receive corresponding light transmitting fibre post. (D.T. Light Post Illusion #2, Bisco, Schaumburg, IL, USA) The prefabricated post was checked for

the adaptation in the canal. The root canal was irrigated with 3% Sodium hypochlorite, 17% EDTA and finally rinsed with water. The root canal was dried with paper points. The fiber post was disinfected with 75% ethanol, dried with air free of water and oil, and cemented into the root canal for retention with self-adhesive universal resin cement (RelyX Unicem, 3M), according to the manufacturer's instructions. Then the root canal was sealed with light cured hybrid composite resin. (Filtek Z250, 3M) [Figure 5]



**Fig. 5 Radiograph after cementation of the fiber post-21,22**

At each clinical follow-up examination, at 3 month, 6 month and 11 month [Figure 6, 7] the following were evaluated: fragment position, fragment stability, gingival swelling, and presence of abscess, sinus tract formation, sensitivity to percussion.

After each recall period, the reattached tooth had a satisfying function, favorable physiological and esthetic outcomes and healthy surrounding periodontal structures.

### **Discussion**

Dental trauma is a relatively prevalent condition effects one in six adolescents and one in four adults suffers a traumatic dental injury in their life time. Epidemiologic studies show that most dental injuries involve just one tooth and

that the majority of the affected teeth are maxillary central incisors. [5]



**Fig.6 Post operative clinical photograph and radiograph - After 3 months**



**Fig. 7 Post operative clinical photograph and radiograph - After 6 months**

There are several treatment options for the treatment of tooth fractures involving the biologic width, i.e. tooth extrusion, crown lengthening followed by fragment reattachment or reconstruction, intentional reimplantation and even tooth extraction in severe cases. [6,7]

Several conditions must be taken into consideration to determine the ideal option, such as the location and extent of the fracture, the pulpal condition, the degree of tooth eruption, the degree of

root formation and the patient's esthetic demand.<sup>[8]</sup>

It is beneficial to quickly restore the function and the aesthetics of a fractured tooth. The reattachment of a fractured crown fragment may be the most conservative and desirable treatment of choice for anterior teeth.

Successful reattachment is highly dependent upon the rapid retrieval of the fragment, which should be preserved in physiologic solution or saline in order to avoid any change in colour due to dehydration. In this case, the fractured fragment was stored in normal saline until reattachment was done, and no discoloration was observed during the post treatment follow up examinations.<sup>[9]</sup>

In this case, glass fibre post was used to reinforce the pulp less teeth. Its monobloc effect with no inherent weak interlayer interface helps in distribution of stresses to the remaining radicular dentin, there is less chance of microleakage and good bond strength to tooth.

The retention of fiber posts in root depends on the degree of conversion of the resin cement, which may be inhibited in the most apical regions of post space, because these areas are far from the light. Therefore, the exclusive use of dual cure or self curing composites to lute fiber post is recommended. In this case, self adhesive dual cured universal resin cement (Rely X Unicem) was used to cement the post, which was white and transparent. Its use facilitated the light penetration and increased the composite resin conversion.<sup>[10, 11]</sup>

This treatment requires less chair time and minimum patient compliance. No complications were experienced during 11 months follow-up. Longer follow up periods and more patients are required to substantiate the efficacy of the technique.

## **Conclusion**

The combined use of a glass fibre reinforced composite root canal post and an original crown fragment is a simple and efficient procedure for the treatment of traumatized anterior teeth that appears to offer excellent aesthetic and functional results.

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