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## Reattachment of Fractured Anterior Tooth-A Conservative Approach

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### ABSTRACT

The present case report is about a 32 year old man who reported to a dental treatment camp, with the chief complaint of pain in upper anterior teeth region along with the mobility of the tooth segment. History of trauma day before due to accidental impact from an iron rod was elicited from the patient. Based upon the findings of the study, it is concluded that reattachment of fractured tooth fragment is the best method of restoring the functions, esthetics and biological properties of the tooth structure rather than prosthetic and artificial looking restorations. When the availability of the fractured fragment is there, reattachment should always be considered as the treatment modality.

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**Keywords:** Fractured Anterior Tooth, Reattachment, Trauma, facial area, maxillary central incisors

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## Introduction

Trauma to the facial area generally involves the teeth and their supporting structures, the most frequent causes are fall, accidents, domestic violence, fights and sports.<sup>1</sup> Studies have shown that maxillary central incisors are the most frequently injured teeth in both primary and permanent dentition as these teeth are more vulnerable to the injury because of their position in the arch.<sup>2,3</sup>

Several factors influence the management of coronal tooth fracture, 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 or absence of fractured tooth segment and its condition for use (fit between fragments) and the remaining tooth structure, occlusion esthetics, finance and prognosis.<sup>1-4</sup>

Reattachment of the crown fragment to the fractured tooth is the best method to reinstate the natural shape, contour, surface texture, occlusal alignment and the color of the fragment, which offers excellent esthetics and functional results and less chair time.<sup>5-6</sup>

Resin based restorative materials are frequently used in restoration of fractured teeth<sup>5</sup>. Tennery (1988)<sup>7</sup> was the first to report the reattachment of the fractured fragment using acid etched technique. Starkey (1979)<sup>8</sup> and Simonsen (1982)<sup>9</sup> subsequently have reported with similar cases.<sup>10</sup> But due to poor mechanical strength and resistance of these materials; different approaches were developed to strengthen the resistance of composite resins, such as fiber post.<sup>11</sup>

Tooth colored fiber post were introduced in 1990's and have better esthetics and Modulus of Elasticity similar to dentin<sup>12</sup>. The purpose of this report is to describe the reattachment

of crown fragment of anterior teeth after trauma. Adhesive bonding of the fragment with the use of fiber post was the restorative technique implemented.

## Case Report

The present case report is about a 32 year old man who reported to a dental treatment camp, with the chief complaint of pain in upper anterior teeth region along with the mobility of the tooth segment. History of trauma 1 day before due to accidental impact from an iron rod was elicited from the patient. He was referred to the department of public health dentistry, college of dental sciences, Davangere, India. Patient's medical history and family history were noncontributory. There was no apparent trauma to soft tissue on intra and extra oral examination.

Clinical examination revealed labial horizontal fracture at coronal 2/3<sup>rd</sup> of the left maxillary central incisor, running obliquely to the palatal surface with the fracture line 1 mm supragingivally involving enamel dentin and pulp. However, the fractured segment was still attached but mobile, the mobility was being evident in labiopalatal direction. On radiographic examination the fracture line was 2-3 mm above the CEJ. There was no evidence of periodontal changes or trauma to the adjacent teeth. They were vital.

The patient expressed the desire of maintaining the tooth so considering the various treatment options available and the prognosis of the case, it was decided to carry out endodontic treatment followed by cementation of fiber post (to gain intra radicular retention) and esthetic restoration of the tooth by reattachment of the fractured fragment with direct resin based composite. The treatment plan was accepted by the patient.

Local anesthesia was administered and the mobile fractured segment was separated and



removed. It was then stored in 0.9% saline and 0.2% chlorhexidine solution to prevent discoloration and dehydration. The tooth was isolated and a single visit root canal treatment was performed using standard step back technique for biomechanical preparation, and the canal was obturated with guttapercha using AH Plus, (DENTSPLY) DeTrey sealant employing cold lateral condensation technique. After the endodontic therapy was complete, Post space was prepared using the drill (1.6 mm diameter). About 4 mm of guttapercha was left to maintain apical seal. Fiber post was selected corresponding to the size of the drill used (RelyX diameter of 1.6 mm 3M ESPE) subsequently the fit of the post was examined. Post space was prepared in both radicular portion of the tooth and the fractured crown segment.

The fragment and the tooth were cleaned with 0.2% chlorhexidine, rinsed and lightly air dried. After shade selection and complete isolation of the involved tooth, one step etch and bond system XP BOND® DENTSPLY DETREY GmbH, were used to coat the surfaces of both the fractured tooth segment and the remaining tooth enamel and dentin and cured for 10 seconds (manufactures recommendations).

The fractured segment was reattached ensuring the tooth was well positioned and in good contact. A flowable composite 3M™ ESPE™ filtek™ Z350 XT was used to adhere with the post of the fragment, then composite resin 3M™ ESPE™ filtek™ P60 was placed in increments and cured for 30 seconds using light cure unit 3M™ ESPE™ Dental: Elipar™ 2500 Curing Light. Occlusion was checked using articulating paper, no interference was noted. Excess material was removed and restoration margins were finished with a series of

polishing burs and the tooth was polished to high luster using aluminum disks.

The patient was instructed to avoid loading the anterior teeth. Immediate postoperative clinical assessment presented good esthetics and good occlusion while radiographic examination showed stable reattachment and good periodontal health. At follow up appointments after 1 week, 1 month and 3 months clinical examinations revealed normal aspects of the tooth and supporting structures.

### Discussion

Functions, esthetics and biological restoration of a lost tooth structure are an intimidating clinical challenge for a dentist<sup>10</sup>. Prosthetic replacement has uncertain longevity while problems faced with conventional composites are less than ideal contours, color matching, incisal translucency and of course difference in fluorescence to that of the tooth structure, which can be psychologically traumatic to young adults in social circle<sup>13</sup>.

Reattachment of the fractured segment should be the choice of the clinician especially when the patient brings it along. Fractured segment is the part of natural tooth hence the physical properties are similar. Reattachment of the fragment may offer the following advantages:

- Better esthetics, because shade match and translucency will be perfect.
- Incisal edge will wear at a rate similar to that of the adjacent teeth.
- Replacement of fractured portion may be less time consuming than needed for completion of a provisional restoration.
- A positive emotional and social response from the patient for preservation of natural tooth structure<sup>10</sup>.



Clinical examination the present case revealed pulpal involvement, so endodontic treatment was inevitable. Fiber post was placed to achieve retention form and to protect the bond from rotation and twisting forces. There are several options for treatment of fractured teeth depending upon the location of fracture; including tooth extrusion, crown lengthening, followed by fragment reattachment or reconstruction and even extraction in severe cases<sup>5</sup>, however in present case the fracture line was above the gingival contour, therefore, no extrusion or crown lengthening techniques were applied, the periodontal and bony support were excellent which was indicative of a better prognosis.

Reinforcing pulpless teeth with extensive tooth structure loss was identified as the best restorative methodology; however when a tooth structure has more than 50% of its coronal structure missing the use of post and core foundation is recommended prior to restoration<sup>14</sup>. The purpose of a post is to retain a core that is needed because of extensive loss of coronal tooth structure. A post is not intended to provide any increase in strength of the tooth rather it's an anchor for the core to gain added retention. Fiberposts are able to provide additional retention as they bond to a place. The synergistic nature of dental materials have a potential to create strongest possible replacement of missing tooth structure.<sup>15</sup>

The most common complication in this system is debonding. Root fracture is another cause of failure in post and cores; the use of parallel sided post in a tapered canal requires considerable enlargement of post space, which weaken the tooth significantly<sup>5</sup>.

Fiber reinforced composites have favorable biomechanical properties; they feature high tensile strength at the same time exhibits elastic characteristics as that of the dentin.

This minimizes the risk of root fracture. The even load distribution is supported through friction locked bond between post and the tooth substance due to adhesive actions in the root canal<sup>16</sup>

Favorable optical properties of the tooth colored fiber post (glass or quartz) are consistent with that of the natural teeth; their ability to conduct light facilitates goals of esthetics. They can be processed in one time procedural visit that eliminates the laboratory steps. If needed, they can be easily removed from root canal without extensive instrumentation. In addition minimum preparation is required because it uses undercuts and surface irregularities to increase surface area for bonding; thus reduces possibility of tooth fracture during function or traumatic injuries<sup>17</sup>.

### Conclusion

Reattachment of fractured tooth fragment is the best method of restoring the functions, esthetics and biological properties of the tooth structure rather than prosthetic and artificial looking restorations. When the availability of the fractured fragment is there reattachment should always be considered as the treatment modality.

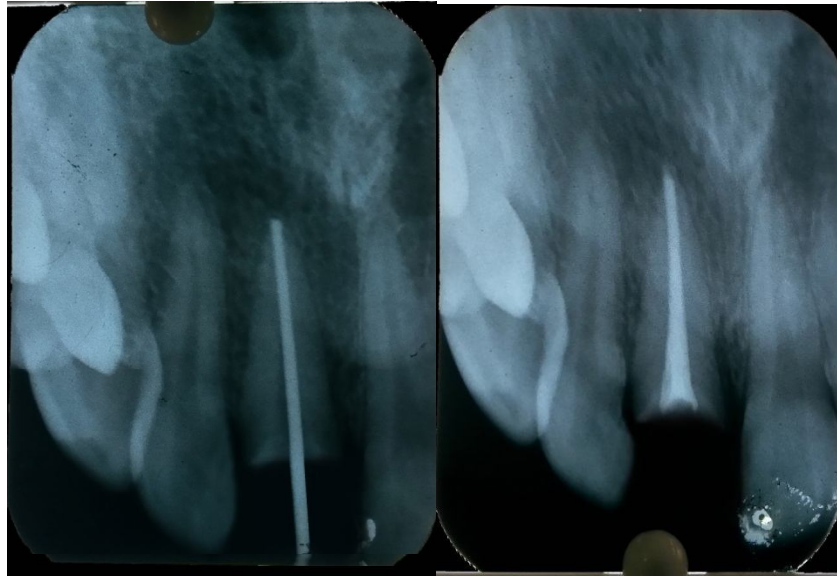
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### RADIOGRAPHS



Master Cone Placement

Obturated

### CLINICAL PICTURES



Fracture Line



Separation of fractured fragment from the tooth



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Fractured fragment stored in 0.9% saline and 0.2% chlorhexidene solution



Placement of post

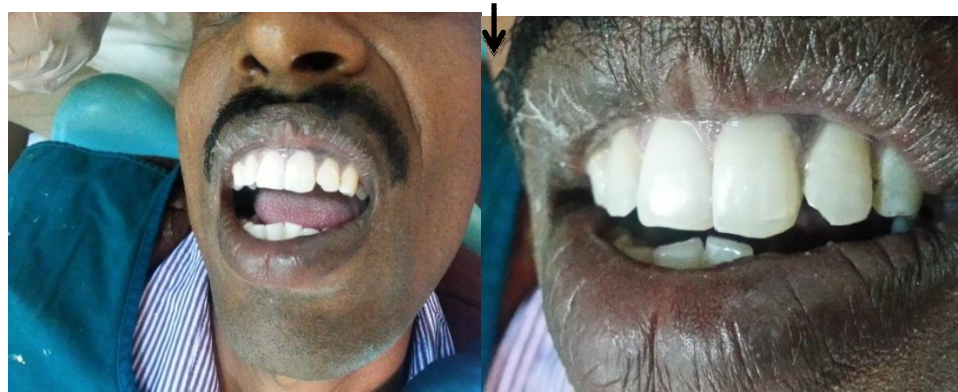


Post adjusted to required measurements





**Attachment of the fractured fragment with composite**



**Final outcome**