

Management of Complex Crown Fracture using Fiber Post: A Case Report

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ABSTRACT

Coronal fractures of permanent anterior teeth by trauma are the most frequent type of injury. Many factors are considered in the effort to provide optimal mechanical properties, aesthetic, and longevity. Discomfort, serious psychological, esthetic, functional, and phonetic problems are associated with anterior crown fracture, this may also affect social communications and it poses a challenge for the dentist, to save these teeth. In this paper, the anterior tooth trauma managed with fiber post cores has been highlighted.

KEYWORDS: Crown fracture, Fracture treatment, Fiber post, Dental materials

INTRODUCTION

The most frequent type of injury in the permanent dentition is seen as fracture of anterior teeth which mostly occur among children and adolescent reported up to 25% of the total patient population. If the fracture also exposes the dental pulp, it is known as the injury fracture or Class 3 fracture (Ellis and Davey classification). The incidence of complicated crown root fractures ranges from 2% to 13% of all dental injuries and the most commonly involved teeth are the maxillary central incisors.¹ Anterior crown fractures lead to discomfort and serious psychological, esthetic, functional, and phonetic problems that can affect social relationships.² In cases where the teeth are severely fractured, endodontic treatment and placement of intracanal posts become necessary, before crown restoration. In recent years, an alternative to prefabricated metal posts, cast post for the restoration of endodontically treated teeth have emerged with various types of fiber reinforced posts.³ The reinforced fiber used to construct an intracanal post offers superiorities over other systems, such as relative ease of manipulation, translucency, and resin composite crown reinforcement.⁴ The technology evolution has enabled manufacturers today to provide fiber posts that-besides offering superior aesthetic and mechanical properties (which are the first qualities to be appreciated in comparison with metal or cast post)are also radio opaque and available in a great variety of shapes.⁵

This article reports such a case treated with Glass Fiber Reinforced Post and Core for the restoration of traumatically fractured maxillary left permanent central incisor.

CASE REPORT

A male patient of 20 years reported to the Department of

Conservative Dentistry and endodontics, in Daswani Dental College and Research Centre, Kota with the complaint of fractured upper front teeth with a unaesthetic appearance of face since 4-5 yr. after sustaining trauma due to accidental fall. On examination, there was no pain and swelling. Eillis class III fracture was diagnosed during intraoral examination (Figure 1). Radiolucency involving enamel, dentine, and pulp was seen in radiographic examination. Vitality test was negative. Tooth was non-vital. After examination and diagnosis treatment was decided to restore the complex crown fracture with fiber post and core followed by Porcelain fused to metal crown.



Figure 1: Preoperative Photo

Local Anesthesia was given. Access was gained with round and Endo-z bur. An electronic apex locator was used to determine the working length and was confirmed with radiography. The coronal segment of the root canal was enlarged using Glidden drills followed by enlargement of the root canal to ISO size 60 working length. During the biomechanical preparation Sodium hypochlorite (2.5%) was used. Paper points were used to dry the root canal and then obturated with AH- plus sealer and laterally condensed with gutta-percha (Figure 2a,2b).

The post spaces were prepared and was extended beyond

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Figure 2a: Working Length Radiograph. 2b: Master Apical Radiograph

the fracture line with corresponding drills to receive the fiber reinforced post. The fiber post was checked for the fit (Figure 3). Dual cure cement was used for post cementation. The catalyst and base components of material were mixed and applied following manufacturer's instruction. The resin cement was carried into the root canal space with lentulo spiral, the post was seated and excess material removed before light curing. Core build up was done with composite (Figure 4). Tooth preparation was done i.r.t. 21. Upper and lower elastomeric Impression was taken. PFM crown cementation was done (Figure 5).



Figure 3: Fiber Post



Figure 4: Core build up



Figure 5: PFM crown cementation

DISCUSSION

An attractive and pleasing smile with healthy teeth is a desirable part of overall appearance and self-esteem. In

the restoration of anterior teeth, depending on the patients expectation, many factors should be considered.⁶

Traditionally cast posts have been used for a long time to restore complicated crown fracture. Depending on developments in adhesive dentistry resin-based fiber-reinforced posts have been used in the restoration of maxillary anterior teeth.⁷ Fiber resin posts shows similar hardness to dentin and exhibits greater durability than the metal posts. Having elastic modulus similar to dentin strengthens the remaining tooth structure and increases resistance to tooth fracture. Because of these advantages, fiber post was used in this case to restore the fractured teeth with composite resins.⁸⁻⁹ The potential problem regarding the original carbon fiber posts for post-restoration was the darkness of the material hampering the esthetics. More recent versions are white other types of fiber posts also are available, including quartz fiber, glass fiber, and silicon fiber posts. They are claimed to offer the same advantages as the carbon fiber posts, but with better esthetic's. Because they are newer, most fiber posts are relatively radiolucent and have different radiographic appearance than traditional posts¹⁰ Fiber posts are ready to use whereas more time, extra clinic and laboratory time are required for the metal post.¹¹

The fiber-reinforced post offers clinical advantages with the ability of easy removal and being less traumatic. Like a cast or prefabricated post, fiber posts are not retrieved in one piece but are removed from the canal by drilling down directly through them. Much higher potential for causing allergic reactions and adverse biologic effects have been reported with metal post system.¹²

Olaide S Gbadebo et al. conducted a study to compare the clinical performance of metallic and glass fiber posts in the restoration of ETT and conclude, Over a 6 month period, the rehabilitation of ETT using prefabricated glass fiber posts and metallic posts showed comparable clinical results. The clinical performance of the glass fiber post was slightly better than that of metallic post within the 6 months study period although this was not found to be statistically significant. However a long term review of the restorations will be required for further assessment.¹³

Roshan Uthappa, Deepika Mod et al. conducted a study to compare fiber post and metal post in the endodontically treated teeth restoration and concluded less chance of failure was seen with fiber post retained restored teeth than that of the metal post.¹⁴

CONCLUSION

Excellent esthetic and functional results can be achieved with the use of a glass fiber-reinforced root canal post and composite material for the treatment of anterior traumatized teeth. Fiber post has better homogeneous tension distribution when loaded, than rigid metal or zirconium oxide ceramic posts. Fiber reinforced posts also possess advantageous optical properties over metal or metal oxide post systems. Therefore, a combined use of fiber posts provides satisfying esthetic results and improved mechanical properties.

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