

Case Report

Management of fractured anterior tooth using fiber post: A case report

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ABSTRACT:

Objective: This clinical case report addresses the step-by-step of the application of a core-and-post system that uses a dual cure resin cement (Ivoclar Multi-Link N Resin Cement) material to fiber post cementation and core build-up in a maxillary right lateral incisor. **Clinical considerations:** The literature reports several materials and methods for the restoration of endodontically treated teeth with coronal destruction that require an intra-radicular fiber post for the core build-up. The present case report describes a core-and-post. A dual resin composite highly filled material and cement was used for luting the fiber post (Tenax Fiber Trans) and build-up the core structure in an easy application. **Conclusions:** The “core-and-post” technique that uses a single material system protocol minimizes the material interfaces, steps of procedures, and chair-time in comparison to conventional techniques.

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INTRODUCTION

The loss of tooth tissue is mostly result from trauma and bruises. In the treatment of the teeth with the loss of excess material, direct composite restorations, indirect restorations, and post-core systems are preferred.^{1, 2} Fracture of the anterior teeth by trauma is the most frequent type of injury in the permanent dentition, affecting up to 25% of this patient population.³ Causes may include sports injuries, automobile accidents, fights, although falls are the most frequent cause. Endodontic treatment is usually required for the tooth affected by caries with pulpal involvement or trauma.

Restorations of endodontically treated teeth (ETT) are often achieved by using post and core.⁴ For many years, the concept of using a post for the restoration of endodontically-treated teeth was based upon the philosophy that the post would “reinforce” the tooth and would provide additional retention for the core restoration. A post was generally placed in an attempt to strengthen the tooth however, a significant amount of dentin has to be sacrificed especially when a metal post is utilized, leaving the tooth more susceptible to fracture. So the real function of a post is not to strengthen the root but serves solely to improve retention of the core. Resistance to fracture of the

non-vital tooth is related with the thickness of remaining root.⁵

A restoration lacking resistance form is not likely to be a long-term success, regardless of the retentiveness of the post. Fiber posts have revolutionized the field of restoration of endodontically treated teeth. Although fiber system was introduced in 1990, a long-term study was begun in 1988 when Friedriksson et al. studied 236 teeth restored with posts.⁶ Modern post materials such as carbon fiber, quartz, and glass fiber have been introduced into the dental practice. Resin-based restorative materials with tooth-colored fiber post are of choice these days due to advantages such as a suitable elastic modulus, esthetics, better bonding between post and cement, lower chair time and minimal tissue removal. The use of a fiber post with fractured teeth, as it interlocks the two fragments, minimizes the stress on the reattached tooth fragment.⁷ Fiber’s transparency makes it possible to use esthetic restorations for cases such as restoring a traumatized anterior tooth.⁴

TYPES OF FIBRE-POST

- Snow post (Carbotech, France): Has a three-degree taper and a cylindrical shape. Available in different diameters – 1, 1.2, 1.4, and 1.6 mm.

- Parapost fiber white(Coltene/Whaledent): The color-coded ring around the head helps in identification. Available in four diameters – 1.14, 1.25, 1.4, and 1.5 mm.
- Glassix (Harald Nordin, Switzerland):Like its carbon fiber stable mate, the Glassix posts have a woven fiber arrangement with similar dimensions.
- Mirafit white(Hager Werken, Germany):This is a similar to Mirafit carbon except that it is made of glass fiber.
- Luscent anchor(Dentatus, Sweden):Diameter at the coronal 1.4, 1.6, and 1.8 mm with matching bur. These are tapered post made up of translucent longitudinal glass fiber.
- Fiber kor(Jeneric/Pentron, USA):are supplied with a pair of tweezers and matching burs in three sizes (1, 1.25, and 1.5 mm). Intermediate sizes are also available (1.125 and 1.375 mm).

INDICATIONS

- Indicated If remaining coronal tooth structure is less than 50%.
- Teeth liable to fracture following endodontic treatment; creation of access opening and cleaning and shaping of the tooth during endo

treatment further weaken a tooth hence, the need for a post for the indirect restoration.

- Anterior teeth must resist lateral and shearing types of forces, and the pulp chamber are too small to provide adequate retention and resistance without a post.

CONTRAINDICATIONS

- Poorly motivated patients
- Poor oral hygiene
- Presence of persistent periapical pathosis
- Poorly root- filled tooth

CASE REPORT

A 43years old Female patient reported to department of Conservative dentistry and endodontics, with a chief complaint of fractured upper front teeth with a unaesthetic appearance of face since 2 yrs after sustaining trauma due to accidental fall.The right lateral incisor was fractured and was not tender on percussion. Radiographic examination revealed radiolucency involving enamel, dentine, and pulp. Vitality test was done and the tooth gave a negative response.Hence, it was concluded that the tooth was non vital.



FIG: 1 Preoperative Photograph

Ellis class IV fracture was diagnosed during intraoral examination.Treatment was decided to restore the complex crown fracture with fiber post and core followed by crown.

Access cavity was prepared withround bur followed by Endo-z bur.Working length was confirmed with radiograph.Biomechanical Preparation was done till F3 protaper gold rotary file.paper point was used to dry the root canal and then obturated with laterally condensation with gutta-percha.



FIG: 2 Mastercone Selection

Post space was prepared using appropriate peeso drills to receive the fiber reinforced post. The fiber post was checked for the fit. Canal was dried and cleaned.



FIG: 3 Post Selection

37% phosphoric acid was used to etch the canal and remaining tooth structure for 15 seconds. The canal was rinsed and dried. Bonding agent was applied and was then cured.



FIG: 4 Etching Of Canal

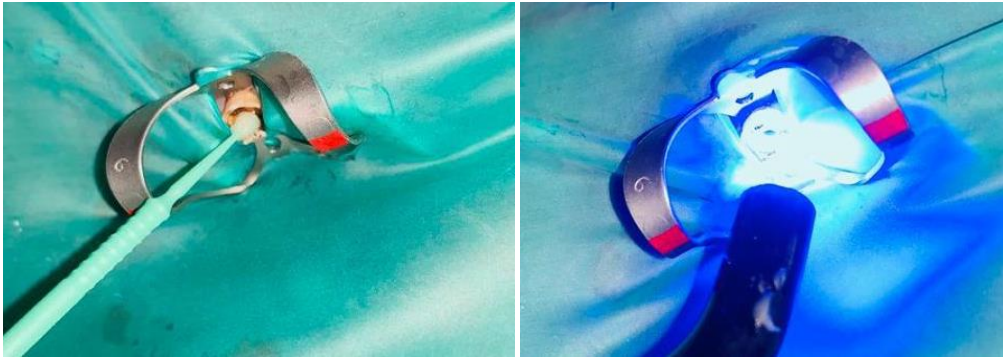


FIG: 5 Bonding And Curing Of Canal

Post was etched for 5 sec, then rinse and dried. Then monobond was applied to promote bonding of post of restorative material. Dual cured resin cement was injected into the canal, post was seated and then light cured. Extra post was trimmed out and core build up was done using composite.



FIG: 6 Etching And Monobond Application



FIG: 7 – Fiberpost Cementation



FIG: 8 Post Operative

DISCUSSION

During the restoration of a traumatic endodontically treated tooth various factors need to be considered. These factors include retention of the restoration, the amount of remaining sound tooth structure, masticatory forces, prevention of microleakage and the esthetic appearance of tooth. Depending on the degree of instrumentation while doing root canal treatment, the tooth loses a significant amount of structural support. Nowadays, post core is widely recommended in the restoration of teeth with excessive crowns damage.⁸

The result of various studies have confirmed the longevity of fiber post. Flexural properties of fiber posts render them responsible for prevention of root fracture. Similarly, there have been reports of increased fracture resistance with preformed fiber posts as compared to control group. However, systematic review comparing the metal posts and fiber posts had outlined greater survival rate (90%) in contrast to fiber-reinforced posts (83.9%) with overall equal incidence of fracture of root. In a 3-year follow-up, superior result in terms of clinical success was observed in teeth restored with fiber post. In another study fiber-reinforced composite showed highest mean fracture resistance in comparison to nano-hybrid and silorane.⁷

CONCLUSION

The use of a glass fiber reinforced composite root canal post and composite material can be a simple and efficient procedure for the treatment of anterior traumatized teeth, with excellent esthetic and functional results.

With use of fiber-reinforced composite post, the treatment of traumatically involved and endodontically weakened teeth can be easier and also

more beneficial than other system. However, incorporation of various advantageous properties of post (ferrule effect, diameter, length, luting cement etc.) is of paramount importance for long-term success of such restorations.

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