

**Management of fractured anterior tooth using novel fiber post by minimally invasive method**

<sup>1</sup>Dr Dileep Kumar CN, Post Graduate Student, Department of Endodontics, DAPM RV Dental College, Bengaluru, Karnataka

<sup>2</sup>Dr Sheela N V, Reader, Department of Endodontics, DAPM RV Dental College, Bengaluru, Karnataka

<sup>3</sup>Dr B S Keshava Prasad, HOD, Department of Endodontics, DAPM RV Dental College, Bengaluru, Karnataka

<sup>4</sup>Dr H Murali Rao, Professor, Department of Endodontics, DAPM RV Dental College, Bengaluru, Karnataka

<sup>5</sup>Dr Supreetha S Naik, Lecturer, Department of Endodontics, DAPM RV Dental College, Bengaluru, Karnataka

**Corresponding Author:** Dr Dileep Kumar CN, Post Graduate Student, Department of Endodontics, DAPM RV Dental College, Bengaluru, Karnataka

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**Abstract**

Traumatic injuries to the teeth and to its surrounding structures will all lead to true dental emergencies. The presence of reduced circumferential dentin, young root canals loss of moisture and coronal destruction from dental caries weakens the tooth structure, which makes it more prone to fracture /break under normal masticatory forces. The final restoration can be well retained only with post and core system. . Bio light plus bundle is joined by a sleeve which allow an easy and effective insertion into the root canal prior to this the canal walls are it is cleaned, cleared and filled with a composite bonding. Each bundle is produced in a high-tech pultrusion line: high performance fibres are impregnated with a UDMA additive and agent free resin, making certain about with the best adhesion with the composite

bonding. History of trauma [Figure 1] 1 year ago due to road traffic accident. Tooth 11 was prepared to receive all ceramic crowns following standard tooth preparation principles. After adequate gingival retraction, impressions were made with silicone material. Advances in aesthetic materials have allowed enhanced and predictable Aesthetic Dentistry in restoring defective teeth, treating disease and restoring comfort and function. . Therefore the Biolight Plus shows promising aesthetic and functional restoration of the fractured teeth.

**Keywords:** Fractured tooth, trauma, aesthetic post, bio light plus post

**Introduction**

Tooth fracture can occur at any age due to trauma. Impact of trauma on tooth varies from mild enamel chipping to complex crown root fractures. Aesthetic and functional

implications of tooth fracture depend upon its severity and age of the patient. The Convalescence of teeth with a past trauma/injury /extensive dental caries brings upon a challenge to the dentist. The presence of reduced circumferential dentin, young root canals loss of moisture and coronal destruction from dental caries weakens the tooth structure, which makes it more prone to fracture /break under normal masticatory forces. Such a tooth would require an additional system of augmentation to aid in retention of the core, thereby re-establishing the tooth to its original function and aesthetics.1

Traumatic injuries to the teeth and to its surrounding structures will all lead to true dental emergencies. Although dental trauma may not be seen as significant in comparison to other bodily injuries yet anterior tooth injury leads to the significant discomfort which affects the patient's psychological, aesthetic, functional needs and phonetics too. Rational therapy based on accurate diagnosis must be incorporated as the teeth have lowest to the least potential to return back to normal healthy conditioning after the trauma.2

The restoration of endodontically treated teeth persists to be in a challenge to the doctors, particularly when there is average to extensive tooth loss. In such cases, the final restoration can be well retained only with post and core system. The convalescence of weakened roots with thin residual dentinal walls is with a couple of problems often results in a poor long-term prognosis. Wide/ flared root canals could be due to caries extension into the pulp chamber, internal resorption or excessive preparation of the root canal which contribute to the incomplete physiologic root development.3

Aesthetic posts are needed as traditional metallic posts with all-ceramic crowns fail to give satisfactory aesthetic results due to alteration of restoration colour, hindrance to the light transmission and reflection of metallic hue on

the marginal gingiva. Bio light plus bundle is joined by a sleeve which allows an easy and effective insertion into the root canal prior to this the canal walls are it is cleaned, cleared and filled with a composite bonding. Each bundle is produced in a high-tech pultrusion line: high performance fibres are impregnated with a UDMA additive and agent free resin, making certain about with the best adhesion with the composite bonding. Those bundles allow personalised restoration by adapting in an optimum way to the root canal structure, these are all taken into consideration with the preparation limited to a partial and moderate clearing, in accordance with the principles of minimum-invasive dentistry. The post endodontic restoration using post-core systems gives the clinician a huge arrangement of materials, techniques and designs.4

#### **Case History**

A 30-year-old male patient reported to Department of Conservative dentistry & Endodontics, DAPMRV Dental College, Bengaluru with the chief complaint of a fracture of his maxillary right central incisor due to road traffic accident. History of trauma: patient gives history of fractured tooth [Figure 1] 1 year ago due to road traffic accident and no treatment was done. Patient presented with severe, continuous, localised pain in upper front tooth region. The Medical history was non-contributory. Intraoral examination revealed maxillary right central incisor with a complex fracture and an intraoral sinus tract opening. Radiographic examination revealed complete root end development of the tooth and radiograph showed chronic periapical abscess and remaining crown structure was 1 to 1.5mm. Considering the clinical situation, treatment plan was to institute endodontic treatment of maxillary right central incisor and post endodontic treatment with a novel fibre post [Figure 2] by minimally invasive method using bio light

was planned in order to achieve the altered angulation of final crown in the arch in harmony with neighbouring teeth for improved aesthetics. He was explained about the treatment plan, and an informed consent was obtained. Local anaesthesia (2% lignocaine, 1.5mL) was administered and the, access opening was performed under rubber dam isolation and the intracanal contents were debrided. The canal was cleaned and shaped after working length was determined. Copious irrigation was carried out with sodium hypochlorite (2.5%) and normal saline alternatively and canal was dried using paper points. Intracanal medicament (Calcium Hydroxide) was placed and patient was recalled after one week after which obturated by cold lateral condensation, was done followed by temporization with an interim material. Patient was recalled after a week to allow soft tissue healing. Once the inflammation had reduced considerably, crown lengthening was performed around the tooth to increase the clinical crown height. In the following appointment, post space preparation was done using heated hand plugger and hand H file with 5mm of apical gutta percha seal intact. A size 4 Bio light fibre post was selected and its fit was evaluated radiographically. After etching of the coronal fragment with a 37% phosphoric acid gel for 20 seconds, the area was rinsed for 20 seconds then dried gently with air. The Bio light fibre post was cemented using dual-curing luting composite system [Figure 3]. Finally, core was built using composite resin to meet the aesthetic requirements for the anterior segment using the incremental technique and occlusal adjustment was done. Tooth 11 was prepared to receive all ceramic crowns following standard tooth preparation principles. After adequate gingival retraction, impressions were made with silicone material (Aquasil, Dentsply) using single phase technique. After evaluation

of crowns in occlusion, it was luted using dual cure resin cement [Figure 4 and 5].

### **Discussion**

Management of patient with anterior tooth fracture is great challenge to the clinicians both from functional and aesthetic perceptive. Treatment objectives may vary depending on the age, socio-economic status of the patient and intraoral status at the time of treatment planning. There are various treatment modalities for restoration of fractured teeth like composite resin restoration, fixed prosthesis, reattachment of the fracture fragment (if available) followed by post and core supported restorations.<sup>1-5</sup> Restoration of endodontically treated teeth has always been an area of concern and the recent past has witnessed an implosion of interest in the field with regard to functional and aesthetic problems. In the wake of changing treatment concepts, the material market for posts has undergone a complete makeover. Ranging from the era of wooden posts to metal posts and more recently, carbon fibre, glass fibre, and ceramic posts, the material and design options are infinite.<sup>6-10</sup> Traditionally cast posts have been used for a long time to restore complicated crown fracture. Depending on developments in adhesive dentistry resin-based fibre reinforced posts have been used in the restoration of maxillary anterior teeth. Fibre resin posts show similar hardness, modulus of elasticity to dentin and exhibits greater durability than the metal posts. Increases resistance to tooth fracture. Because of these advantages, the Biolight Plus post and composite resin was used in this case to restore the fractured tooth.<sup>7, 8</sup> Thus, advances in aesthetic materials have allowed enhanced and predictable Aesthetic Dentistry in restoring defective teeth, treating disease and restoring comfort and function.

## Conclusion

Excellent Aesthetic and functional results can be achieved with the use of a fibre-reinforced root canal post and composite material for the treatment of anterior traumatized teeth. Fibre post has better homogeneous stress distribution of load, than rigid metal or zirconium oxide ceramic posts. Fibre reinforced posts also possess optical advantage over metal or metal oxide post systems. Therefore the Biolight Plus shows promising aesthetic and functional restoration of the fractured teeth.

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## Legend Figures



Figure 1: Preoperative photograph



Figure 2: Selection of biolight plus fiber bundle



Figure 3: Cementation of biolight plus fiber post



Figure 4: Core build up using composite resin (ivoclar vivadent composite resin)



Figure 5: Post Operative Photograph