

Management of Mutilated Anterior Tooth Using Anatomic Post and Core: A Novel Approach

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Abstract

The functional & esthetic rehabilitation of severely mutilated tooth pose challenges to the clinician. With the increasing awareness among patients, they prefer to save their natural teeth rather than extraction followed by prosthetic rehabilitation. Modern dental practice offers a wide variety of treatment alternatives and modalities. Fiber posts are used to restore endodontic ally treated teeth that have insufficient coronal structure to retain a core for the definitive restoration. This procedure is conservative and cost effective than extraction followed by prosthesis. This case report highlights a management of severely mutilated anterior tooth which was successfully managed using anatomical fiber post. The clinical procedure is simple & superior fit to the root canal walls

can be achieved. It also reduces the amount of cement needed when the prepared root canal is wide.

Keywords: Anatomic post, Anterior tooth, Mutilated tooth, Post and core.

Introduction

Mutilated tooth is that tooth which is grossly weakened and badly broken down tooth where the volume of left over tooth shape is less than the amount of tooth loss.¹ Mutilation of teeth can occur due to long standing caries or recurrent caries, over-zealous preparation and traumatic fracture of the tooth.² Treatment options for these teeth include post and core, extraction followed by fixed partial denture, removable partial denture or Implant. With the advancement of modern techniques & dental materials, dentists are having several options to recover the aesthetic-functional characteristics of such mutilated

teeth.³ Prefabricated posts are often used due to their ease of placement and a short clinical application time.⁴ In case of wide root canal, gap exists between the post and residual dentin. This gap has to be filled with a large amount of cement which is prone to shrinkage. Cast-metal posts require much preparatory work and can cause root fracture. Composite anatomical post-systems have elastic properties similar to those of the natural tooth should be the best solution for mutilated teeth with wide root canals.⁵ This paper reports a case of a severely mutilated tooth successfully managed by anatomical post by using composite resin and fiber-glass post on upper right central incisor i.e.11.

Case Report

A 24 years old male patient reported to OPD of Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Nagpur. His chief complaint was fractured tooth in upper front region of jaw. Also patient wished to close the interdental spaces present between maxillary anterior teeth. Patient gave history of trauma to the tooth in childhood. He also gave history of previous dental treatment 5 years back and discontinued the treatment. Clinical examination suggested of Ellis class IV fracture with tooth 11. (Figure 1a, 1b) Radiographic examination revealed an immature tooth with wide open apex. The medical history was noncontributory. Oral prophylaxis was done to remove extrinsic stains. Considering the clinical situation, it was decided to achieve apical barrier using MTA followed by anatomical post. In order to recover the function and aesthetics of the tooth, future rehabilitation of the tooth with full ceramic crown was planned. To close the interdental spaces treatment options of orthodontic treatment or indirect ceramic veneers on teeth 21, 22, 12 were suggested to the patient. The Patient chose for indirect ceramic veneer treatment option. The infected

dentin was removed using hand excavator & small round stainless steel bur. working length determination was done with apex locator (Root ZX Mini) and confirmed on radiograph. (Figure 2a) The canal was debrided and irrigated using 3% sodium hypochlorite (Prime Dental Products Pvt. Ltd., Pune, India) and normal saline throughout the cleaning and shaping procedures. Intracanal dressing of calcium hydroxide paste (Prime Dental Products Pvt. Ltd., Pune, India) was given for 7 days. Access cavity was sealed with an intermediate restorative material. One week later, the temporary filling was removed, and the canal was thoroughly irrigated using saline to remove any remnants of calcium hydroxide. After drying the canal, MTA (MTA Angelus) was mixed with distilled water and carried into the canal using amalgam carrier and packed to form an apical plug of approximately 5 mm.(Figure 2b) Over this, a moist cotton pellet was placed, and access cavity was sealed. At the next appointment, the cotton pellet was removed; the canal was thoroughly dried with absorbent points. The root canal of tooth 11 was wide and no prefabricated post could satisfactorily adapt to it. (Figure2c) Hence anatomic post was preferred. Peeso reamer was used to remove any undercut if present on canal walls. The canal was then lubricated with glycerin. Fiber post was selected #2 (GC fiber post, America) and layering on fiber post was done in increments with packable composite resin, in order to replicate the anatomic form of root canal with photo activation for 20 seconds for each increment. Then the post was gently withdrawn & curing was carried out externally for complete polymerization. The anatomic post was tried again to ensure snug fit without any interference. (Figure 2d) Luting procedure was performed similar to that of conventional post. The root canal was etched using 37% phosphoric acid (DPI Tooth conditioner gel, Dental Products of India, Mumbai, India) for 15 seconds, washed

with water. Excess moisture was removed using paper points. Bonding agent was applied using micro brush, excess was removed using paper points & light cured for 20 seconds. Dual-cure resin luting cement (LuxaCore dual, DMG) was used for luting as per manufacturer's instructions. The catalyst & base component of material were mixed & were carried using lentulo drill into the canal & post was seated. The excess material was removed before light curing for 40 seconds through the post. (Figure 2e) After luting of post, coronal reconstruction was done with the composite resin in incremental portions and followed by photo activation of each increment for 20 sec.(Figure 3a) An appropriate shade was selected. The prosthetic preparation of the core was done for future execution of full ceramic crown with diamond burs. Tooth preparation for ceramic veneer for teeth 21, 22, 12 was carried out.(Figure 3b) Impression of prepared teeth was made with addition silicon (DMG silagum, Hamburg, Germany). Lower arch impression was made with alginate. (Figure 3c) Type IV die stone was used to pour impression. The fabrication of veneers was undertaken meticulously. Patient was recalled for the next appointment after 5 days. Ceramic crown & veneers were evaluated intraorally to assess marginal fit and aesthetics before definitive cementation procedure. Dual cure resin luting cement (LuxaCore dual, DMG) was used for cementation of crown & veneers. (Figure 3d) Satisfactory results were found at the subsequent follow up.

Discussion

The biomechanical properties of an endodontically treated tooth differ from that of a healthy tooth. Stress concentrations and localized damages can lead to restoration failure or to irreversible root fracture.⁵ MTA has gained popularity in one visit apexification. It forms a barrier and prevents micro leakage. It is biocompatible and forms dentinal bridge, cementum and periodontal

ligament regeneration.⁶ The cases in which residual root canal shape is not perfectly round are suitable cases for anatomic post. In an attempt to place a conventional fiber post in such canal, one has to apply a thick layer of cement to fill the space between fiber post and dentinal walls.⁷ The present case was suitable for including anatomic post as it had a flared canal. With respect to traditional cemented prefabricated composite posts, anatomical posts have the advantage of eliminating the interface between filling cement and core resin. But polymerization shrinkage can occur in case of wide root cavity. It ranges from 1.5 to 4% of the total volume. may induce adhesive/cohesive imperfections and self-equilibrated stress fields.⁵ Clinical trials have shown that severely destroyed teeth restored with glass fiber and cast metal post performed similarly and had similar survival rate.⁸ Esthetic anatomic posts have lower modulus of elasticity. So the forces transferred from the post to the root are reduced. A cast metal post would have a wedging effect resulting in root fracture. The aesthetic anatomic post also bonds to the tooth structure forming a monobloc unlike a cast metal post. It can also be made in one visit without any laboratory procedures.

Conclusion

The fabrication of anatomic post is advantageous in mutilated tooth with flared root canal. It provides optimum strength and eliminates the laboratory procedures. Apexification with MTA has a favorable treatment prognosis. Further evidence based clinical research is recommended to establish the long term success of this technique.

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Legends Figures



Figure (1a): Preoperative clinical photograph (Occlusal view) Fi



Figure (1b): Preoperative clinical photograph (Palatal view).



Figure (2a): Working length radiograph



Figure (2b): Placement of MTA



Figure (2e): Cementation of anatomic post radiograph



Figure (2c): Fiber post check fit



Figure (3a): Core build up with 11



Figure (2d): Anatomic post



Figure (3b): Crown preparation with tooth 11 & veneer preparation with tooth 12,21,22



Figure (3c): Impression



Figure (3d) Postoperative clinical photograph