

Prosthetic Rehabilitation of Endodontically Treated Tooth by Using CAD-CAM Milled Zirconia Post and Core System: A Clinical Report

G Abhishek¹, Abhisikta Chakrabarty², Vivek Kavlekar³, Yashpal Singh³,
Supreet Mahajan⁴

^{1,2}Tutor, ESIC Dental College, Kalaburagi, Karnataka

³Post Graduate, Dept. of Prosthodontics, GDC, Bengaluru

^{4,5}House Surgeons, ESIC Dental College, Kalaburagi, Karnataka

Corresponding Author: Dr. G Abhishek

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ABSTRACT

Background: Maxillary central incisor is the most commonly affected tooth during trauma followed by maxillary lateral incisor and mandibular incisors. Trauma to the anterior tooth requires urgent care because of the essentiality of preserving the natural tooth. When a complicated crown a fracture takes place, it necessitates endodontic treatment and restoration of a fractured crown segment with post in the canal. This case report describes a patient with a broken central incisor and treated with a Zirconia crown.

Keywords: CAD/CAM, Esthetics, Post & Core.

INTRODUCTION

Ellis fracture pertaining to the dental injuries usually affects the anterior teeth of permanent as well as deciduous dentition. 96% of the cases of crown fractures are mostly seen in maxillary incisors. Age and gender predominance can be observed in children and teenagers, with most commonly seen in boys than girls. Dental injuries result from cycling, fun games, sports, and accidental falls. Absence of teeth leads to esthetical and emotional stress to children, ultimately ruining the childhood memories of kids. In cases where the remaining crown structure is not sufficient to retain the full coverage crown, post and core is a treatment option to increase the retention and resistance form of tooth. The

principal objective of the treatment in such cases is the rehabilitation of both esthetics and function.¹

Various treatment modalities are available for management of fractured anterior teeth. In cases where the teeth are severely fractured, endodontic treatment and placement of intracanal posts become necessary, before crown placement. In recent years, an alternative to prefabricated metal posts and cast posts for the restoration of endodontically treated teeth, have emerged with various types of fiber reinforced posts.² 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. The technology evolution has enabled manufacturers today to provide fiber posts that besides offering superior aesthetics require less chair side time and have similar modulus of elasticity as that of dentin (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.³

CASE DESCRIPTION

A 23 years old male reported to Department of Prosthodontics, GDC Bengaluru with a complaint of fractured anterior teeth. (Fig

01) Patient desired his smile to be enhanced with replacement of fractured tooth segment with aesthetically pleasing appearance. Intra-oral examination revealed no abnormalities with acceptable oral hygiene. Based on the patient's esthetic requirements, considerations of remaining coronal tooth structure and occlusion, various treatment options were explained to patient, and the decision of restoring the tooth with CAD-CAM fabricated fibre post and core followed by full coverage Zirconia crown was made. Informed consent of the patient was obtained regarding the nature of the procedure, number of visits, total cost of treatment and possible consequences and risks had been explained to the patient. Informed consent was obtained from patient regarding photographs and documentation.⁴ Preliminary impressions were made using alginate for diagnostic cast. Patient education was made easier with this and treatment planning was made easier. Mock-up was made and final prosthesis can be visualized with the prepared mock up.

Endodontic management was done wrt maxillary right central incisor, following with which the GP was removed for the placement of the fibre post with apical seal of remaining GP which is approximately 1/3rd of the root canal. GP was removed with peeso reamer considering the length and diameter of the canal.⁵ (Fig 02) After the cementation of the fibre post with resin cement, core build up was done with composite material of preferred shade to enhance the translucency of the crown. (Fig 03) Final impression was made with incorporation of gingival cord placed in the gingival crevice. After the impression, temporization (Fig 04) was done using zinc oxide eugenol cement. After the Zirconia crown was fabricated with CAD/CAM, it was assessed for shade with bisque trial (Fig 05) and finally cemented with 10-MDP containing resin cement.⁸ (Fig 06) Patient was given all the post cementation instructions and was recalled at the intervals of 1 week, 1 month and 3 months for follow up.



Fig 01: Pre - Treatment



Fig 02: Instruments



Fig 03: Core build-



Fig 04: Temporization



Fig 05: Bisque Trial



Fig 06: Post - Treatment

DISCUSSION

Post and core are considered as the basic treatment for damaged dentition. The main aim of this procedure is to provide retention for the core restoration, which replaces lost

tooth structure. Post and core can be prefabricated post with composite core build up or one piece custom made post with the advancement of innovative technology, restoration of endodontically treated teeth

has advanced to such an extent that patient acceptance with the final outcome has improved. In the wake of changing treatment concepts, the material market for posts has undergone a complete makeover.⁶ The physical properties of fibre post are similar to that of the natural dentin such as hardness, elastic modulus which increases the resistance to the fracture of tooth and its durability. Because of these advantages, fibre post was used in this case to restore the fractured teeth with composite resins. Fibre posts are ready to use whereas it is time consuming such as increased chair side time, laboratory time. The fiber posts which are used nowadays are radiopaque and may also conduct the light for polymerization of resin-based luting cements. A light-transmitting post results in better polymerization of resin composites in the apical area of simulated root canals, as measured by hardness values. It is generally accepted that bonding fibre posts to root canal dentin can improve the distribution of forces applied along the root, thereby decreasing the risk of root fracture and contributing to the reinforcement of the remaining tooth structure.⁷

CONCLUSION

Excellent esthetic and functional results can be achieved with the use of a 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 along with Zirconia crown provides satisfying esthetic results and improved mechanical properties.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Bastone EB, Freer TJ, McNamara JR. Epidemiology of dental trauma: a review of the literature. *Australian dental journal*. 2000 Mar;45(1):2-9.
2. Garoushi S, Vallittu PK, Lassila LV. Continuous and Short Fiber Reinforced Composite in Root Post-Core System of Severely Damaged Incisors. *Open Dent J* . 2009;3(1):36-41.
3. Verma L, Passi S. Glass Fibre-Reinforced Composite Post and Core Used in Decayed Primary Anterior Teeth: A Case Report. *Case Rep Dent*. 2011;2011:864254.
4. Galgali DN, Dange DS, Mahale DK, Khalikar DS. A novel approach of restoring endodontically treated tooth by using cad-cam milled peek post and core system: a case report. *Int J Appl Dent Sci*. 2021;7:9-13.
5. Re D, Augusti G, Amato M, Riva G, Augusti D. Esthetic rehabilitation of anterior teeth with laminates composite veneers. *Case reports in dentistry*. 2014 Jun 11;2014.
6. VÅrlan C, Dimitriu B, VÅrlan V, Bodnar D, Suciuc I. Current opinions concerning the restoration of endodontically treated teeth: basic principles. *Journal of medicine and life*. 2009 Apr 4;2(2):165.
7. Dietschi D, Duc O, Krejci I, Sadan A. Biomechanical considerations for the restoration of endodontically treated teeth: a systematic review of the literature-Part 1. Composition and micro-and macrostructure alterations. *Quintessence international*. 2007;38(9):733-43.
8. Abhishek G, et al. Comparative evaluation of bond strength of resin cements with and without 10-methacryloyloxydecyl dihydrogen phosphate (mdp) to zirconia and effect of thermocycling on bond strength—An in vitro study. *Journal of Clinical and Experimental Dentistry*. 2022 Apr;14(4): e316.

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