

# A Customized Post and Core on Structurally Compromised Endodontically Treated Tooth

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## ABSTRACT

The successful treatment of mutilated tooth require an interdisciplinary approach of good endodontic therapy and prosthetic reconstruction of tooth. The main goal of the post is to retain a core that secured the definitive prosthesis. When the tooth's remaining structure is extremely minimal, a post and core aids to prevent fracture. A custom cast post and core are recommended when a significant amount of tooth structure has been lost. This case report highlights the fabrication of customized metal post and core to save maxillary second molar with less crown structure followed by metal crown.

**Keywords:** Custom post and core; endodontic therapy; mutilated tooth; prosthesis.

## INTRODUCTION

The resilience and fracture resistance of teeth that have undergone endodontic treatment typically decreases. Dental cavities, cavity preparation, root canal preparation, and endodontic access are the main causes of tooth structure loss.<sup>1</sup>The selection of an acceptable post-endodontic restorative material can be difficult for endodontically treated teeth because of a big pre-existing restoration or substantial access cavity preparation.<sup>2</sup> Clinicians frequently find hard to make decision whether to use a partial or full coverage crown, a direct or indirect restoration and custom-cast or prefabricated posts. The remaining coronal tooth structure after root canal treatment, tooth's functional needs, aesthetics, patient's age, and the pre-existing periodontal condition; must be taken into consideration when selecting the best post-endodontic restorative material.<sup>3</sup> There are several different post/dowel systems available; cast metal posts, modern fiber posts. For extensive loss of coronal tooth structure, post/dowel is indicated which is generally made up of cast gold or preformed metal pin. In the tooth with multiple canals, post of ideal length must be placed in straight canal and a key must be placed in other canal. The key helps to seat the dowel and stops it from rotating, but it offers little to no retention. Parallelism is impossible in divergent canals, and any attempt to increase retention may result in a perforation.<sup>4</sup>



Figure 1: Preoperative photograph



Figure 2: Preoperative IOPA view

## CASE REPORT

A 37 years old male patient was referred to Department of prosthodontics for placement of crown in right upper back teeth region. On clinical examination, the right maxillary second molar was structurally compromised with extensive tooth loss. (Figure 1)

Intra oral periapical radiograph revealed endodontically treated with adequate periodontal support. The endodontic treatment was satisfactory and no sign of any periapical pathology (Figure 2). A full veneer crown retained by custom made post and core was planned for the tooth after thorough examination.

## CLINICAL PROCEDURES

A Gates Glidden drill was used to remove gutta-percha (GP) from the pulp chamber. A peeso reamer (Perfect

pees reamers, Dental Perfect) attached on micro motor hand piece was used to remove GP from the palatal canal, the straightest of the three canals, to an established length of 8 mm from the orifice. Similar to this, 3 mm of GP from the disto-buccal canal was removed to prepare the anti-rotational key. With Peeso reamer, a post space was created in the palatal and disto-buccal canal of the tooth. (Figures 3 and 4)

Tooth was roughly prepared for the crown with equigingival chamfer finish line. All the unsupported/thin enamel and dentine were removed using a diamond bur. Two tapered sticks of approximately the same diameter as those of the canals were made from self-cure resin (DPI RR coldcure, DPI, India). The sticks were tried in the canals and trimmed until they snugly fit. Root canal surface were coated with a suitable lubricant. An auto-polymerizing resin were applied on the custom-made acrylic posts and replaced into the prepared post spaces. When the material was in dough stage, post was slowly withdrawn and again resealed to prevent binding of acrylic resin into the root canal. During the initial settings of the acrylic resin, the pattern was moved in and out of the canal so that it was not locked into undercuts in the

canal. As the resin polymerized, the post was removed from the canal to confirm extension of the bottom of the preparation. The post spaces were lubricated and were seated in place. Another mix of acrylic resin was placed on the exposed part of the stick to provide adequate bulk for the final restoration. The final restoration preparation was completed with the placement of post-core pattern. The post-core assembly was carefully removed from the prepared tooth and stored in distilled water until it was invested and casted in metal alloy. (Figures 5 and 6)

The prepared post and core was checked in the tooth by applying light pressure. The core portion of the casting was polished and inserted into the post space by using luting cement (3M ESPE, KetacTM, USA). The post and core was inserted slowly into the canal allowing excess cement to escape away from the post spaces so that post and core were seated completely. (Figure 7)

The preparation was finished and impressions were made with putty and light-body polyvinyl siloxane impression material (Bonasil, DMP, USA) for the maxillary arch and alginate (Plastagin, Septodont, India) for the mandibular arch. The metal crown was fabricated and cemented at subsequent appointments. (Figures 8 and 9)



Figure 3: Post space preparation



Figure 4: Post space preparation IOPA view



Figure 5: Direct post pattern fabrication



Figure 6: Acrylic post pattern



Figure 7: Cast metal post and core



Figure 8: Metal crown cementation



Figure 9: Post and core with metal crown cementation IOPA

## DISCUSSION

Traditionally, root filling material of good quality, using appropriate technique provides an effective seal and critical for success of root canal obturation. Poor quality of filling material and leakage along the canal will result in failure.<sup>5</sup> Ray and Trope evaluated periapical status of coronal restoration and root canal obturation of endodontically treated teeth on the radiographic. The study found that good post endodontic restoration is critical in the healing of periapical inflammation. Poor restoration and endodontic treatment seldom led to the absence of peri-radicular inflammation. Furthermore, the success rate of incomplete/poor endodontic therapy was only 67.6% followed by satisfactory permanent restoration. In endodontically treated teeth post-endodontic restoration was substantially more important to the success of teeth.<sup>6</sup> It is essential to assess the benefits and drawbacks during treatment planning as variety of post systems are available in the market. Both prefabricated metal posts and cast post-and-cores available are acceptable and successful post materials.<sup>7</sup> Cast posts, whether oval or elliptical, can be utilized in all layouts of canals and confirm the canal shape. Unlike other prefabricated posts, cast posts can be utilized to repair proclined teeth by making a minor adjustment to the core angulation. Gomez Polo et al. conducted a retrospective study, to assess the cumulative survival rate of teeth restored with prefabricated posts and cast post-cores. Study concluded that the survival rate was

83% in a mean of 10-year follow up.<sup>8</sup> Cast posts with a higher modulus of elasticity were favored in the absence of ferrule because there was less tooth structure available for bonding. Da Silva et al mentioned that metal crown restorations with no ferrule, showed better biomechanical performance in cast post and cores than glass fiber posts. The combination of numerous mechanical parameters determines the mechanism of failure and fracture resistance of replaced teeth.<sup>9</sup> However, cast posts are recommended in some clinical circumstances such as; teeth without cervical stiffness or in teeth with considerable destruction, absence of ferrule or cannot be obtained. The stiffness of post and core materials does not significantly affect the strain values and fracture resistance when enough dentin was present.

## CONCLUSION

There is no specific post-and-core system or final restoration can be applied in every clinical circumstance. We must therefore comprehend these variables and the fundamental principles of how to employ them for the patient's maximum benefit and comfort. Selection of good post is crucial for the success of teeth restoration. As much tooth structure must be preserved as possible. Restoration with customized post and core is efficient and also offers a viable substitute for the rehabilitation of severely broken or decayed teeth.



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