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Sliding Cast Post Core System – Prosthodontic Solution for Divergent Root Canal Configuration

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ABSTRACT

Advanced endodontics have made it possible that if margin of future crown can be placed supragingivally then irrespective of coronal destruction one can restore the natural tooth. This has challenged the prosthodontic fraternity to come up with new and innovative designs to restore the posterior natural endodontically treated teeth. Degree of difficulty in treating posterior teeth with post core is their root configuration and relation that is never parallel especially in maxillary molars. With palatal root being the widest of all roots, the mechanical advantage that it offers cannot be overlooked and therefore involvement of palatal root for any post core system is mandatory. This article describes a technique of fabricating a cast post core for multiple divergent maxillary root canals using the principle of sliding one component over the other.

Keywords- *cast core, dowel crown, endodontics, metal ceramic, crown and bridge*

INTRODUCTION

Among the various post core systems, the cast core is versatile because it allows one to overcome any obstacle without compromising the principles of fixed partial denture prosthesis designing. The mechanical advantage that a cast post offers strengthens the weakened tooth but can do reverse if

the design is not based on sound engineering principles. Cast post with cores at any time should not bind within the root canal. The fitting of cast post-and-core restorations is critical to ensure good adaptation and passivity of fit. [1], [2], [3] If a passive fit is not achieved, wedging stresses may result in root fracture.[4] This is especially true when maxillary molars are restored with post cores having wide divergent roots. As it is not possible to fabricate a two post system within a single casting therefore a posterior post core system should be split into two each having a different path of insertion. One of the post should be aligned parallel to one root while the other can be parallel to the crown at the cemento enamel junction.

Among the various problems associated with restoration of divergent root canals are accessibility to apical third, difficulty in direct pattern fabrication, difficulty in root preparation for receiving post and calculation of the three dimensional angular changes present in individual roots within the alveolar bone. To overcome all these difficulties, therefore a post system should be designed that allows the operator to overcome the disadvantages associated while working and at the same time not compromise with efficiency of the restoration. This article in the form of a case report describes the development of a sliding post core system that does not compromise on advantages of cast post cores while at the same time overcomes related limitations.

CLINICAL CASE REPORT

A male patient aged 38 years, was referred to department of prosthodontics for opinion regarding the possibility of restoration of a grossly decayed mandibular left side first molar. Medical history was non-significant, as were the social and drug history. Dental history disclosed that the tooth in question (mandibular left first molar) had undergone caries followed by pulpal involvement. Treatment plan presented included oral prophylaxis, followed by endodontic treatment and post core crown fabrication. After endodontic treatment was done, the temporary restoration was removed till strands of obturating material were visible at the inner furcation area **(Fig.1).** The two largest root canals were then selected for preparation of post space depending upon the surrounding dentin around each root canal. Post space was prepared using Gates Glidden drills in successive numbers till it was clinically evident that surrounding dentin is adequate and that an impression can be made.

Figure 1: Intra oral view of the post space preparation in relation to mandibular left first molar

Final impression of the post space was made using a modified old reamer. The impressions were made with Addition polyvinyl siloxane material (Reprosil, Dentsply/Caulk; Milford, DE, USA) utilizing a putty reline technique **(Fig.2 A).** A dental cast was poured into the impression using die stone (Ultrarock, Kalabhai Dental, India) **(Fig. 2 B).** Wax

pattern (Inlay wax, Harvard, Germany) was first fabricated over the coronal surface that was carved at the margins following which a hole was drilled through the wax pattern which was directed towards the prepared distal (largest) root orifice. Through this hole a new pattern of resin (Pattern Resin LS; GC America) was directed which was allowed to harden after refinement of its surface. The first post thus fabricated was placed within the distal root on the cast and the remaining wax pattern surrounding the post was removed. This was later replaced by same resin after applying separating media on the first post **(Fig. 2 C)**. Both the post and the post core with an opening were later cast and tried for fit on the cast **(Fig. 2 D).** The entire post core system was then tried in the patients mouth **(Fig. 3 A)** following which the sliding post core system was cemented to the roots without cementing the metal portions. Porcelain fused to metal crown was then fabricated on the mandibular first left molar **(Fig. 3 B).** The patient was given instructions regarding the oral hygiene maintenance of the entire restoration.

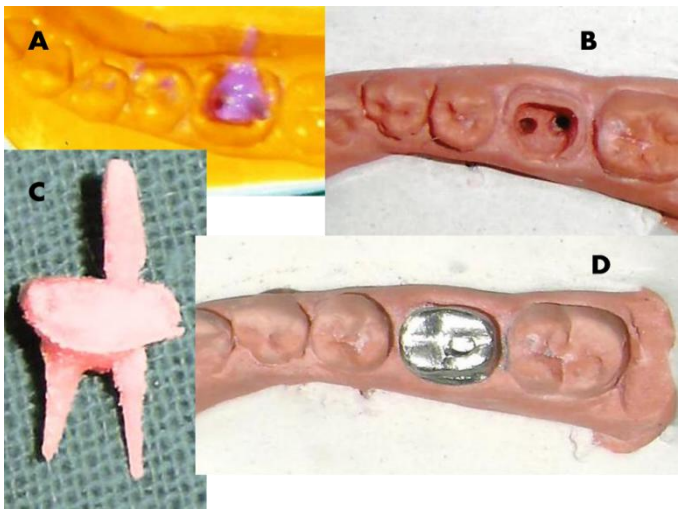

Figure 2: (A) Impression using old reamer (B) Dental cast showing prepared post space (C) Indirect split post core made of resin (D) Cast post core system with a pin

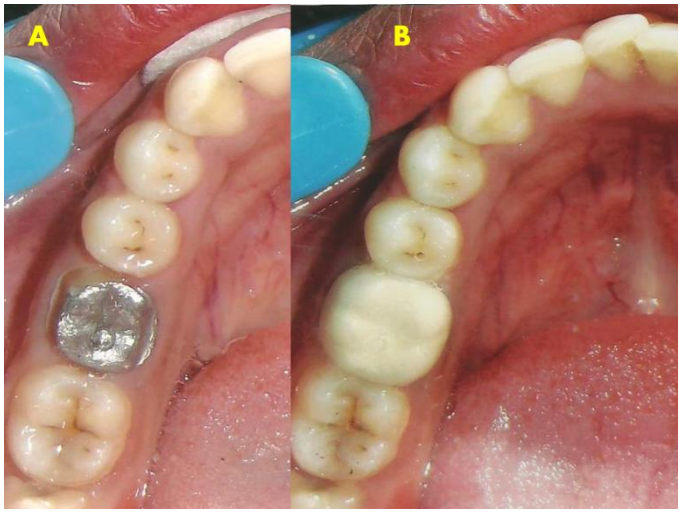

Figure 3: (A) Split cast post core system cemented in place (B) porcelain fused to metal crown cemented on cast split post core system

DISCUSSION

The versatility of a cast post core system is its ability to be customized to any situation. Whenever there is no direct access to fabricate a pattern directly on the patient, an impression can be made and indirect patterns made on the cast. Although a direct pattern could have been made in above case, the indirect procedure has been described to encompass inaccessible situations. The two components of the post core system fabricated has advantages like they are independent from each other while in function and can be placed in roots with widest divergence. It also allows one to use more than two posts. Another advantage is that the fit of both the first post and the second post core are verified from each other on the occlusal surface of the post core system. Ill-fitting post would leave a step on the occlusal surface of the core that demands additional refinement. Disadvantages as compared to other split post core systems mentioned in the literature [5-8] include time consuming

laboratory procedure that may add to charges payable to the laboratory by the dentist.[9]

CONCLUSIONS

Within the scope and limitation of the technique described it can be concluded that a sliding post core system is an effective and easy way to manage endodontically treated teeth that have limited access and wide divergence of roots.

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