International Journal of Enhanced Research in Medicines & Dental Care (IJERMDC),
ISSN: 2349-1590, Vol. 9 Issue 2, February 2022, Impact Factor: 7.125

Split Cast Metal Post and Core- A Case Report

Dr. Radhika Beri[1], Dr. Aditya Kapoor[2], Dr. Arpit Sikri[3], Dr. Jyotsana Sikri[4]

[1]Dental Observer (Prosthodontics), Dental Care Clinic, Dharam Marg, New Delhi Municipal Council
[2]M.D.S., Specialist (Prosthodontics), Dental Care Clinic, Dharam Marg, New Delhi Municipal Council
[3]Associate Professor & Post Graduate Teacher, Department of Prosthodontics, Crown & Bridge and Oral mplantology, Bhojia Dental College & Hospital, Budh (Baddi), Teh. Baddi, Distt. Solan, Himachal Pradesh, India
[4]Associate Professor & Post Graduate Teacher, Department of Conservative Dentistry & Endodontics, Bhojia Dental College & Hospital, Budh (Baddi), Teh. Baddi, Distt. Solan, Himachal Pradesh, India

INTRODUCTION

The restoration of endodontic ally treated tooth is a subject that has been evaluated and discussed widely in the dental literature. It is complicated by the fact that much or all of the coronal tooth structure which normally would be used in the retention of the restoration has been destroyed by caries, previous restorations, trauma, and the endodontic access preparation itself. All the teeth that have undergone root canal therapy will require some form of restoration to enable them to function again. Because endodontic treatment removes the vital contents of the canal, which subsequently leads to reduction in elasticity and increased brittleness of remaining tooth structure. The objective is to return them to full occlusal and cosmetic function.

This weakening leads to the need for strong interior as well as exterior support that is achieved by post core system. Often due to mechanical reasons, the prepared tooth is reinforced by post core systems. Posterior teeth lie in the closer proximity of transverse horizontal axis. An endodontically treated posterior tooth should be provided with proper cuspal coverage to prevent its fracture from occlusal forces and at the same time it should be relieved of potentially damaging lateral forces during excursive movements. [1]

Choice between a custom designed post and a prefabricated post should be made by analyzing the canal configuration. [2] Conservative option is to select the post that closely conforms to the canal shape and size because less dentin removal is required and thus enhancing fracture resistance of the tooth as well as retention of the post.[3, 4]

It has been suggested if a canal requires extensive preparation a well adapted cast post and core restoration will be more retentive than a prefabricated post that does not match the canal shape. [5] The cast post and core is custom fitted to the prepared root canal space and designed to resist forces. [1]

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 posts should be aligned parallel to one root while the other can be parallel to the crown at the cement 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. [5]

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. [5]

CLINICAL CASE REPORT

A female patient aged 48 years, was referred to the Department of Prosthodontics ,Dental Care Center, Dharam Marg, NDMC for opinion regarding the possibility of restoration of a grossly decayed mandibular left side second premolar and first molar. (Fig.1) Medical history was non-significant, as were the social and drug history. Dental

history disclosed that the teeth in question (mandibular left second pre molar and 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.2). The two largest root canals in the molar and single canal in the pre molar 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.

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.3).

Figure 1 Pre Operative view Figure 2 intra oral view of post space preparation

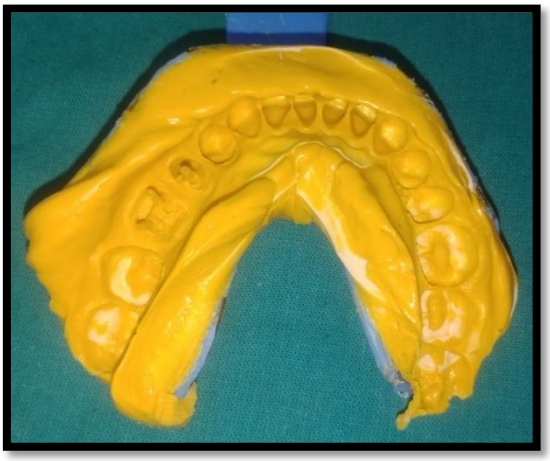

Figure 3 Impression using old reamer Figure 4 Direct split post core pattern in molar and completed post core pattern in premolar

A dental cast was poured into the impression using die stone (Ultrarock, Kalabhai Dental, India).Pattern resin was used to fabricate the pattern of the post and core in the second premolar and split post and core in the first molar. The first post's pattern thus fabricated with a female component (key way) was placed within the distal root on the cast (Fig.4). Followed by application of separating media on the first post the same pattern resin material was used to fabricate the post and core in the mesial root with a key way (male component) which was inserted into the slot present in the core of the distal root of the molar. Both the post and the post core with the key-key way mechanism were later cast and tried for fit on the cast (Fig.5).



Figure 5 casted post and core tried extra orally Figure 6 intra oral view of cemented post and core

The entire post core system was then tried in the patients mouth following which the split post core system was cemented to the roots of both the second premolar and first molar(Fig.6.). Porcelain fused to metal crown was then fabricated on the mandibular left second pre molar and first molar (Fig. 7). The patient was given instructions regarding the oral hygiene maintenance of the entire restoration.

Figure 7 PFM crown cemented over the post and core restored teeth

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. According to Morgano [11] and Hydeche [12] custom fabricated cast post and cores are still the established technique or gold standard for restoring extensively damaged teeth. [1]

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. [5] 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[6-9] include time consuming laboratory procedure that may add to charges payable to the laboratory by the dentist. [10]

CONCLUSION

Within the scope and limitation of the technique that has been described in the above clinical case report it can be concluded that a split post and core system is an effective and easy way to manage an endodontically treated teeth that have limited access, extensive loss of crown structure and wide divergent roots.

REFERENCES

[1]. Kunhappan, S., Patil, S., Agrawal, P., & Kunhappan, N. (2015). Split Cast Metal Post and Core- A Case Report. *Bangladesh Journal of Dental Research &Amp; Education*, *5*(1), 33–35. https://doi.org/10.3329/bjdre.v5i1.22460
[2]. Smith CT, Schuman N. Restoration of endodontically treated teeth: a guide for the restorative dentist. Quintessence international. 1997 Jul 1;28(7).
[3]. Sorensen JA, Engleman MJ. Effect of post adaptation on fracture resistance of endodontically treated tooth. J Prosthet Dent 1990;64: 419-24.
[4]. Craig RG, Frah JW. Stress analysis and design of single restoration and fixed bridges. Oral Sci Rev 1977; 10: 45-74.
[5]. Fokkinga WA, Kreulen CM, Vallittu PK, Creugers NH. A structured analysis of in vitro failure loads and failure modes of fiber, metal and ceramic post-and-core systems. Int J Prosthodont 2004; 17(4):476–82.
[6]. Hsu YB, Nicholls JI, Phillips KM, Libman WJ. Effect of core bonding on fatigue failure of compromised teeth. Int J Prosthodont 2002; 15(2):175–8.
[7]. Paul SJ, Werder P. Clinical success of zirconium oxide posts with resin composite or glass-ceramic cores in endodontically treated teeth: a 4-year retrospective study. Int J Prosthodont 2004; 17(5):524–8.
[8]. Kumar L, Jurel SK, Mishra N, Yadav A, Gupta DS, Malhotra P. Split Post and Core: A systematic approach to restore grossly decayed teeth. Int J Med and Dent Sci 2013; 2(2): 224-228.
[9]. Mattoo K, Shalabh K. Multiple post core crowns – A case report. Clinical dentistry. 2011; 7: 31-3.
[10]. Morgano SM, Rodrigues AH, Sabrosa CE. Restoration of endodontically treated teeth. Dental Clinics of North America 2004; 48: 397-416.
[11]. Ash M Jr. Wheeler's dental anatomy, physiology and occlusion (7^{th} edi), Philedelphia: WB Saunders 1993;170-217, 274-331.