

# Customized Posterior Split Cast Post Core System To Amend Treatment Outcome

Rashmi Saini<sup>1</sup>, Krati Mishri<sup>2</sup>, Kottor JLH<sup>3\*</sup>

<sup>1</sup>Lecturer, Department of Prosthodontics, CIIDSRC, Kerala

<sup>2</sup>Student, Department of Prosthodontics, CIIDSRC, Kerala

<sup>3</sup>Reader, Department of Prosthodontics, CIIDSRC, Kerala

## Abstract

Grossly decayed teeth are a frequent occurrence in young patients and are mainly associated with excessive intake of sweets. A grossly decayed posterior molar poses problems in restoring like multiple and bifurcated roots, access and visibility and at times inadequate crown height. We present a case of a young adult female patient who wished to have a fixed partial denture for her mandibular Kennedy class 3 partial edentulous situation. Gross destruction of molar contraindicated its use to act as a supporting abutment for a fixed partial denture. A uniquely designed foundation restoration in the form of a split cast post core was fabricated to save the tooth and fulfill its role as an abutment for a four unit fixed partial denture. The post core was designed to accommodate a hole within it, through which a pin would run to engage a differently inclined root canal. The entire fixed partial denture was fabricated using porcelain fused to metal restorations. The patient was highly satisfied with the treatment outcome.

**Keywords** — metal, ceramic, fixed partial denture, post core, endodontic, full metal crown

## I. INTRODUCTION

The gross decay of a natural tooth /teeth may begin with an incipient pit and fissure carious lesion, that progresses underneath in multiple directions involving most of the dentin before actually creating a problem to the patient. Depending upon the severity of the lesion, restorations can range from the simple class 1 restoration to a more complex pin amalgam restoration or eventually a post and core restoration. Various post core systems (PCS), whether it is prefabricated or custom cast core (CCC), is mainly indicated in an endodontically treated tooth with moderate or severe loss of natural tooth structure.<sup>1</sup> Use of post and core is however not limited to restoring an individual tooth, it has been successfully utilized as part of foundation restoration in many complex full mouth rehabilitation cases.<sup>2,3,4</sup> Incorporation of a core with a post is essential since endodontic access cavity is accomplished by removing normal healthy dental tissue.<sup>5</sup> Use of cast post and core has been observed as a commonly used post type in recent times.<sup>6</sup> Although CCC systems

have disadvantages like loss of post retention,<sup>7</sup> root fractures<sup>8</sup> and corrosion,<sup>9</sup> they are still the treatment of choice in posterior mandibular teeth when the remaining tooth structure is weakened by gross destruction. The main reason being that a CCC imparts strength to the existing tooth structure and in posterior teeth,<sup>10</sup> the forces of mastication tests the strength of the material in the long run rather than any other property. One of the chief advantages of CCC is that multiple post cores can be planned in teeth whose axial inclination is not ideal.<sup>11</sup> The CCC system also allows one to change the axial inclination of the core within limits.<sup>12</sup> There have been numerous reports on the use of custom cast post cores on an individual tooth either individually or as a part of full mouth rehabilitation.<sup>2,3</sup>

The use of a cast post core of an abutment tooth that will support a fixed partial denture has rarely been reported. This article describes a case of a mandibular molar that was weakened by gross attrition and endodontic access cavity, but successfully supported a four unit fixed partial denture.

## Case report

A young female patient in her early thirties was referred to the department of prosthodontics for replacement of missing mandibular teeth. Personal history revealed that the patient was working as a teacher in a government school, was married and had two children. Medical and social history were irrelevant to the treatment plan. Dental history disclosed that the patient had lost her mandibular posterior teeth on either side over the last five years, mainly as a result of caries and periodontitis. In total she had extracted four posterior teeth till the day of present treatment. Extra oral examination revealed a hyper active maxillary lip with a high lip line revealing the middle third of the maxillary anterior teeth (**Fig 1a**). Intra oral examination revealed a Kennedy class 3 modification 1 partial edentulous situation with second premolar and first molar missing on either side. Mandibular right first premolar showed evidence of tooth preparation, suggesting that there was a crown placed earlier (**Fig 1b**). Mandibular second molar showed gross attrition of the occlusal surface. Treatment plan suggested to the patient included an oral hygiene maintenance program followed by endodontic treatment of both mandibular second molars. This was followed by the

prosthetic treatment that would be either an implant supported single crown restorations, two individual surveyed crowns on either abutments on either side, followed by a cast partial denture and the third option

was a conventional four unit fixed partial denture. The patient consented for the third option due to financial restraints.

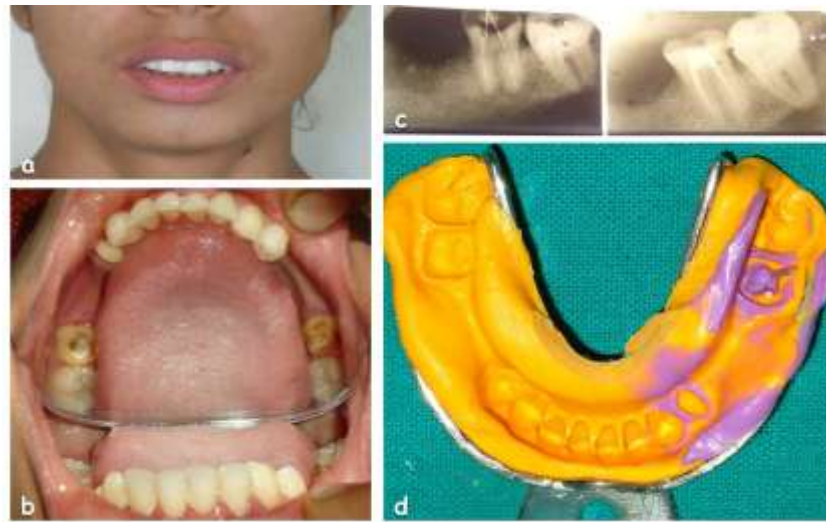


Figure 1: (a) Extra oral view (b) Intra oral view showing Kennedy class 3 modification 1 partial edentulous situation (c) and (d) IOPA radiographs before and after endodontic treatment (e) Impression of post space using putty reline techniques



Figure 2: (a) Pattern fabrication on the cast (b) Split post and core pattern using duralay resin (c) Split cast post and core (d) Completed fixed partial denture (e) Patients smile restored

After undergoing oral prophylaxis, intentional endodontic treatment was done in relation to mandibular right second molar (Fig 1c). Since the mandibular second molar was attrited and had to support a four unit fixed partial denture in the posterior area a custom cast post core was fabricated. After doing the necessary post space preparation using systematic gates glidden drills and passo reamers (Nordin, stainless steel, Switzerland), the split cast post core was fabricated using indirect technique for which a putty reline impression was made (Extrude and Extrude Extra; Kerr Corp) (Fig 1d). A resin pattern was fabricated on the master cast using a self cure resin (Duralay) (Fig 2 a) which was essentially a two piece post core (Fig 2 b). The two piece split post core was cast into base metal alloy (Remanium CSe, Dentaaurum J.P. Winkelstroeter KG, Ispringen,

Germany) (Fig 2 c) following which each was cemented into place using a zinc phosphate cement (Harvard, Germany). Routine clinical and laboratory procedures for fabrication of a four unit fixed partial denture using metal ceramic were performed. The four units fixed partial denture was cemented in place and post insertion instructions were given to the patient (Fig 2 d). During subsequent follow up, the patient expressed her satisfaction with the treatment outcome and continued to undergo treatment for the mandibular left side.

#### Discussion

A case of a young adult female patient with a Kennedy class 3 modification 1 partial edentulous situation that was successfully restored with a four unit fixed partial denture has been presented. The feature of this case is that one of the primary abutments was successfully

built up with a custom made cast post and core that was a split type (pin and pin hole). The split cast post core is necessary when we have divergent roots of the tooth and a minimum of two posts is to be placed within the canal. The role of the post in such systems is to support and retain the core material which subsequently supports the overlying final restoration.<sup>13</sup> The restoration of a natural tooth that has multiple roots and is placed posteriorly needs clinical skills to negotiate different root canals, both during endodontic root preparation as well as post space preparation.<sup>14</sup> Iatrogenic injuries during fabrication of post core restoration has also been reported.<sup>15</sup> Although several clinical studies have reported root fracture as one of the failures in cast post core systems due to stress concentration in uncontrolled areas, such failures are rare in posterior teeth.<sup>16</sup> Split post core designs,<sup>17</sup> do not pose any threat of perforations since the design is permitted to break the stress if one uses zinc phosphate as a cementing medium.<sup>18</sup> The use of fiber reinforced epoxy resins have been suggested as an alternative to cast post core systems, but most authors have concluded that the advantages of a cast metal cannot be replaced by any material irrespective of the composition.<sup>19</sup>

## Conclusion

The use of cast post core as a foundation restoration of a fixed partial denture is an excellent option for determining the long term success of a fixed partial denture.

## Acknowledgements

We, the authors of this article would like to thank the staff of the department of endodontics and periodontology for their support during treatment of this case.

## References

- [1] Ozturk E, Bolay S, Tuzgiray E, Baykara M. "Esthetic restoration procedures for endodontically treated anterior roots". Clin Dent Res 2011 Jan; 35: 28-34.
- [2] Darraj A, Mattoo KA, Gupta I. "Full mouth rehabilitation of a rheumatoid arthritis patient – The Muzyanas Challenge". Annals of International Medical and Dental Research 2017; 3: DE09-DE13. DOI: 10.21276/aimdr.2017.3.6.DE3
- [3] Muneera RAG, Mattoo KA, Youseef AM. "A Novel Approach to Determine the Aesthetic Inclination of Cast Post Core – Case Report". Annals of International Medical and Dental Research 2017; 3: DE14-DE17 DOI: 10.21276/aimdr.2017.3.6.DE4
- [4] Lakshya K, Aditya K, Mattoo KA. "Full mouth rehabilitation involving multiple cast post core as foundation restorations – Case report". International Journal of Medical Research and Pharmaceutical Sciences 2018;5:11-15 DOI-10.5281/zenodo.1313550
- [5] Heydecke G, Peters MC. "The restoration of endodontically treated, single-rooted teeth with cast or direct posts and cores: a systematic review". J Prosthet Dent 2002;87:380-386.
- [6] Grandini S, Goracci C, Tay FR, Grandini R, Ferrari M. "Clinical evaluation of the use of fiber posts and direct resin restorations for endodontically treated teeth". Int J Prosthodont 2005;18:399-404.
- [7] Mattoo K, Singh M, Goswami R. "Cast foundation restoration for grossly decayed posterior teeth". International Journal Of Research In Medical Sciences And Technology 2014;1: 9-10
- [8] Balkenhol M, Wöstmann B, Rein C, Ferger P. "Survival time of cast post and cores: a 10-year retrospective study". J Dent 2007;35:50-58.
- [9] Gómez-Polo M, Llidó B, Rivero A, Del Río J, Celemín A. "A 10-year retrospective study of the survival rate of teeth restored with metal prefabricated posts versus cast metal posts and cores". J Dent 2010;38:916-920.
- [10] Jung RE, Kalkstein O, Sailer I, Roos M, Hämmerle CH. "A comparison of composite post buildups and cast gold post-and-core buildups for the restoration of nonvital teeth after 5 to 10 years". Int J Prosthodont 2007;20:63-69.
- [11] Mattoo KA, Kumar S. Multiple post core crowns – A clinical report. Clinical Dentistry 2011;5: 31-34.
- [12] Yadav L, Mattoo KA, Kapoor A, Shuja S. "Factors associated with post core correction of malpositioned teeth". International Journal of Research in Medical Sciences and Technology 2015;1:5-7
- [13] Salvi GE, Siegrist Guldener BE, Amstad T, Joss A, Lang NP. "Clinical evaluation of root filled teeth restored with or without post-and-coresystems in a specialist practice setting". Int Endod J 2007;40:209-215.
- [14] Meshni AA, Al Moaleem MM, Mattoo KA, Halboub E, Alharisi SMH, Shatifi AE, Al Amrie SA, Ghazali NAL. "Radiographic evaluation of post-core restorations fabricated by dental students at Jazan University". J Contemp Dent Pract 2018;19:66-72 DOI: 10.5005/jp-journals-10024-2213
- [15] Mattoo KA, Jain S. "Iatrogenic but preventable periodontal injury while post core fabrication". International Journal of Research in Medical Sciences and Technology 2015;1:1-2
- [16] Schmitter M, Rammelsberg P, Gabbert O, Ohlmann B. "Influence of clinical baseline findings on the survival of 2 post systems: a randomized clinical trial". Int J Prosthodont 2007;20:173-178.
- [17] Mattoo K, Garg R, Arora V. "Sliding cast post core system – prosthodontic solution for divergent root canal configuration." Journal of Medical Science and Clinical Research 2014;2:3001-04
- [18] Mattoo KA, Kapoor A, Sivach A. "Selecting the right cement for cast post core crowns – a dental students quandary". Journal of Medical Science and Clinical Research 2014 ; 2:2323-27
- [19] Ferrari M, Vichi A, Garcia-Godoy F. "Clinical evaluation of fiber-reinforced epoxy resin posts and cast post and cores". Am J Dent 2000;13:15B-18B.
- [20] Humaira Tanvir, Jasmeena Tabeen Bhatt 2 , Zoya Tanvir "Spring cantilever fixed partial denture design to replace missing lateral incisor" SSRG International Journal of Medical Science ( SSRG-IJMS ) – Volume7 Issue 5 – May 2020.