

**INDIRA** *of* **JOURNAL**  
INTEGRATED HEALTH SCIENCE  
AND RESEARCH



**PRIYADARSHINI DENTAL COLLEGE AND HOSPITAL**

A UNIT OF INDIRA EDUCATIONAL INSTITUTION

## Endocrowns an Ultimate Approach for Severely Damaged Tooth – Case Report

Gokulnath R<sup>1</sup>, Saraneshwaran P V<sup>2</sup>, Sibi Chakravarthy R<sup>3</sup>, Dharun Prasath N<sup>4</sup>, Felcy A<sup>5</sup>, Jayasenthil A<sup>4</sup>, Sree Vidya G<sup>5</sup>.

Professor and Head, Associate Professor, Department of Conservative Dentistry and Endodontics, Priyadarshini Dental College, Chennai, Tamil Nadu, India.

### ABSTRACT

Post endodontic restoration is the final and foremost step in determining the prognosis of the tooth with severely loss of hard tissue. Over the development in the material aspect and technology aspect the most ultra conservative approach is to save an endodontically treated teeth with extreme tissue loss is endocrowns. Due to its monoblock effect like advantages, it stands tall than the traditional post and core followed by crown. In this case report we are going to see about the two cases of endocrowns which are prepared and delivered to the patients.

**KEYWORDS:** Endocrowns, Post endodontic restoration, Monolithic lithium disilicate

### INTRODUCTION

Metal ceramic, metal, zirconia and all ceramic type of full coverage restorations were the regular indications for the severe tissue loss in an endodontically treated tooth over the years. [1] The importance of the post endodontic restoration is to restore the tooth's form, function and aesthetics, because the endodontically treated tooth could have under gone major to minor tissue loss depending on the caries, which can weaken the tooth structure. [2] Post endodontic restoration is based on the residual tooth structure after an endodontic procedure and type of tooth whether it is an anterior or posterior. [3] Apart from the aggressive approach of tooth reductions for the post endodontic restorations, the recent material technology and concepts over the tissue conservation had led a way to alternate type of approach for the tooth with extreme tissue loss. [4] An endocrown would be a wonderful approach in the cases with short clinical crown height and insufficient intraocclusal clearance and also it has sufficient tissue for adhesion. [5] The macro mechanical retention and adhesion properties of the monolithic endocrown were first researched and introduced by Bindle and Morman in 1999. Followed by the fabrication of the endocrown is by two methods either by heat pressing or CAD/CAM technology. [6] This paper discusses about two case reports of endodontically treated mandibular molar which received monolithic endocrowns as the post endodontic restoration.

### CASE PRESENTATION

Patient aged 23years reported to the Department of conservative dentistry and endodontics with the chief complaint of pain in the lower right back tooth region. After diagnosis it reveals symptomatic irreversible pulpitis, symptomatic apical periodontitis in 36. Once root canal treatment was completed in the 36. This tooth had limited interocclusal clearance and short clinical crown which was not suitable to place conventional full

**Corresponding Author:** Dr R Gokulnath, Department of Conservative Dentistry and Endodontics.

**Email Id:** rgokulnath1999@gmail.com

coverage crowns {fig 1a, b}. Hence endocrowns were planed based on the remaining tooth structure and thickness of walls. Once the orifice had been sealed with composite resin, the preparation was done using TF 12 bur [MANI, japan]. The pulp chamber space was prepared by creating flat floor about 3.5 mm of depth and axial walls were prepared which were divergent {fig: 2}. Shoulder finish line was given to obtain the resistance from the ferrule. Then the impression was made using polyvinyl siloxane material using putty was technique and then sent to laboratory for endocrown fabrication. Temporisation was done using acrylic crowns. Monolithic lithium disilicate crowns were fabricated through the CAD/CAM technology {fig: 3} After receiving the crown from lab then try in was done in 36. While try-in the prosthesis was good in marginal integrity, shade and occlusion and then proceeded for cementation. The tissue surface of the



Figure 1

Figure 2

endocrown was etched with 10% hydrofluoric acid for 20 seconds, washed with water, then air dried. After air drying, silane coupling agent was applied for 45 seconds. The tooth preparation was done by application of acid etchant of 37% of phosphoric acid for 15 second then washed and air dried. Then bonding agent was applied to the etched tooth surface with applicator tip air dried. Fusion pro [PREVEST, INDIA] dual cure cement applied on to the tooth surface and the crown was placed over the tooth. Excess flash was of cement was wiped of the cured for 20 seconds. No occlusal discrepancy was noted and the marginal adaptation was good {fig: 4}.

## CASE PRESENTATION 2

Patient aged 34years reported to the department of conservative dentistry and endodontics with the chief complaint of pain in the lower right back tooth region. After diagnosis it reveals symptomatic irreversible pulpitis; symptomatic apical periodontitis in 36. Once root canal treatment was completed in the 36. This tooth had limited interocclusal clearance and short clinical crown which was not suitable to place conventional full coverage crowns {fig:5}. Hence endocrowns were planed based on the remaining tooth structure and thickness of walls. Once the orifice had been sealed with composite resin, the preparation was done using TF 12 bur [MANI, japan]. The pulp chamber space was prepared by creating flat floor about 3 mm of depth and axial walls were prepared which were divergent and remaining cervical thickness was about 2mm. Shoulder finish line was given to obtain the resistance from the ferrule {fig: 6}. Then the impression was made using polyvinyl siloxane material using putty was technique and then sent to laboratory for endocrown fabrication. Temporisation was done using acrylic crowns. Monolithic lithium disilicate crowns were fabricated through the CAD/CAM technology {fig: 7}.



Figure 3

Figure 4

After receiving the crown from lab then try in was done in 36. While try in the prosthesis was good in marginal integrity, shade and occlusion and then proceeded for cementation. The tissue surface of the endocrown was etched with 10% hydrofluoric acid for 20 seconds, washed with water, then air dried. After air drying, silane coupling agent was applied

for 45 seconds. The tooth preparation was done by application of acid etchant of 37% of phosphoric acid for 15 second then washed and air dried. Then bonding agent was applied to the etched tooth surface with applicator tip air dried. Fusion pro [PREVEST, INDIA] dual cure cement applied on to the tooth surface and the crown was placed over the tooth. Excess flash was of cement was wiped of the cured for 20 seconds. No occlusal discrepancy was noted and the marginal adaptation was well {fig: 8}.

## DISCUSSION

A complete success of the root canal treatment relies not only on the endodontic part but also in the post endodontic restoration in the severely damaged tooth. For that a clinician must have enough decision-making skills and technical skills to achieve good post endodontic restoration. [7] Endocrowns offers numerous advantages than the traditional post and core-based restorations because of its monoblock nature, bonding capability, no need of ferrule, ease of preparation, conservative approach, can bear more occlusal stress and time saving. [8] Hence the use of endocrowns is an innovative approach for a post endodontic restoration of severely destructed tooth.



Figure 5

Type of tooth also plays an important role in the success of the endocrowns. However clinical failure rate of endocrown in premolar is greater than molar because the molar has large surface area when compare to the premolar. [9] The clinical survival rate and fracture strength of endocrowns were compared to traditional restorations utilising intraradicular post. It found that endocrown cemented on molar performed on par with or better than restorations using resin composite and inlay/onlay restoration. [10]



Figure 6

Figure 7

As an alternative to the traditional metal post and core procedure, Pissis presented a unique technique in 1995 called the monoblock technique, which integrated the porcelain core and crown into a single unit. The goal of this invention was to improve the dental restoration. [11] Dartora et al. then looked at the biomechanical reaction of teeth repaired with different endocrown extensions inside the pulp chamber after receiving endodontic therapy. According to their research, larger endocrown extension led to enhanced mechanical efficiency. In particular, a 5 mm extension showed less stress intensity and a more advantageous distribution pattern than a 1mm extension, which showed decreased fracture resistance and greater potential for rotation during function. [12] About the preparation, no variations in fracture resistance were noted whether the endocrown was produced with or without a ferrule. [13] However, given the complexity of the preparation, prudence is advised. The ferrule's addition or the rise factors that can worsen the disparities and reduce the restoration's adaptation in the prepared cavity are the depth of the cavity and intraradicular extension. No variations in fracture resistance were noted whether the endocrown was produced with or without ferrule. [14]

## CONCLUSION

By all the consideration, it's all in the hands of a clinician in terms of decision making and skills to provide better post-endodontic restoration for a tooth with severely damaged state. Factors that are need for the success and longevity of the endocrown are correct preparation of the tooth, material selection, margin location and treatment planning.

## REFERENCES:

- Dietschi D, Duc O, Krejci I, Sadan A. Biomechanical considerations for the restoration of endodontically treated teeth: a systematic review of the literature, part II (evaluation of fatigue behavior, interfaces, and in vivo studies). *Quintessence Int* 2008;39:117-129. PubMed
- Endocrowns - a literature review. Ciobanu P, Manziuc MM, Buduru SD, Dudea D. *Med Pharm Rep.* 2023;96:358–367. doi: 10.15386/mpr-2581. [DOI] [PMC free article] [PubMed] [Google Scholar]
- Restoration of pulpless teeth: application of traditional principles in present and future contexts. Morgano SM. *J Prosthet Dent.* 1996;75:375–380. doi: 10.1016/s0022-3913(96)90028-1. [DOI] [PubMed] [Google Scholar]
- Rocca GT, Krejci I. Crown and post-free adhesive restorations for endodontically treated posterior teeth: from direct composite to endocrowns. *Eur J Esthet Dent* 2013;8:156-179. PUBMED
- Veselinovic V, Todorovic A, Lisjak D, Lazic V. Restoring endodontically treated teeth with all ceramic endo-crowns case report. *Stomatoloski Glasnik Srbije.* 2008; 55: 54-64.
- Bindl A, Mörmann WH: Clinical evaluation of adhesively placed Cerec endo-crowns after 2 years preliminary results. *J Adhes Dent.* 1999, 1:255-65.
- vinothkumar TS, Kandaswamy D, Chanana P. CAD/CAM fabricated single unit all restoration. ceramic post core crown *Journal of Dentistry.* 2011; 14(1):86–89.
- Sevimli G, Cengiz S, Oruc MS. Endocrowns: Review. *J Istanb Univ Fac Dent* 2015;49:57-63.
- Bindl A, Richter B, Mörmann WH. Survival of ceramic computer-aided design/manufacturing crowns bonded to preparations with reduced macroretention geometry. *Int J Prosthodont* 2005;18:219-24.
- Sedrez-Porto JA, Rosa WL, da Silva AF, Münchow EA, Pereira-Cenci T. Endocrown restorations: A systematic review and meta-analysis. *J Dent* 2016;52:8-14.
- Pissis P: Fabrication of a metal-free ceramic restoration utilizing the monobloc technique. *Pract Periodontics Aesthet Dent.* 1995, 7:83-94.
- Dartora NR, de Conto Ferreira MB, Moris IC, et al.: Effect of intracoronal depth of teeth restored with endocrowns on fracture resistance: in vitro and 3-dimensional finite element analysis. *J Endod.* 2018, 44:1179-85. 10.1016/j.joen.2018.04.008
- Einhorn M, DuVall N, Wajdowicz M, Brewster J, Roberts H. Preparation ferrule design effect on endocrown failure resistance. *J Prosthodont* 2017 Oct 6. doi: 10.1111/jopr.12671. [Epub ahead of print] PUBMED | CROSSREF
- Gaintantzopoulou MD, El-Damanhoury HM. Effect of preparation depth on the marginal and internal adaptation of computer-aided design/computer-assisted manufacture endocrowns. *Oper Dent* 2016;41:607-616. PUBMED | CROSSREF

PRIYADARSHINI  
DENTAL COLLEGE & HOSPITAL



**Indira**  
EDUCATION

Publisher:  
PRIYADARSHINI DENTAL COLLEGE AND HOSPITAL  
Tiruvallur, Tamil Nadu  
Website: <https://indiraedujournals.in>  
Email: [journal@indiraeducational.org](mailto:journal@indiraeducational.org)