

**ENDOCROWN TO THE RESCUE - RESTORATION OF SEVERELY DESTROYED  
MANDIBULAR MOLAR****Sneha Hegde**<sup>1\*</sup> MDS, **Sanjayagouda B. Patil**<sup>2</sup> MDS, MFDS-RCPS, **A. Kavinilavu**<sup>1</sup> MDS and **S. Anantha Narayanan**<sup>1</sup> MDS<sup>1</sup>Postgraduate, Department of Prosthodontics Including Crown, Bridge and Implantology, Sri Hasanamba College of Dental Sciences and Hospital, Hassan-573201, India.<sup>2</sup>Professor and Head, Department of Prosthodontics including Crown, Bridge and Implantology, Sri Hasanamba College of Dental Sciences and Hospital, Hassan-573201, India.**\*Corresponding Author: Dr. Sneha Hegde**

Postgraduate, Department of Prosthodontics including Crown, Bridge and Implantology, Sri Hasanamba College of Dental Sciences and Hospital, Hassan-573201, India.

Article Received on 28/02/2023

Article Revised on 20/03/2023

Article Accepted on 10/04/2023

**ABSTRACT**

Rehabilitation of grossly destroyed endodontically treated teeth can be deemed a conservative treatment approached when compared to extraction of the same. In such cases endocrown is indicated post the endodontic therapy of severely damaged molars. This prosthesis requires specific preparation techniques so as to fulfil all the criteria that are responsible for its mechanical and biological success. Providing a cervical butt joint with the prepared tooth surface and the prosthesis as well as preserving the pulp chamber anatomy provides greater success. The case report presented here utilises this technique with all metal prosthesis, which under proper isolation and luting regime provides mechanical and biologically successful rehabilitation protocol.

**KEYWORDS:** Endocrown, All-metal crown, Resin Cement, Adhesive restoration.**INTRODUCTION**

Restoration of endodontically treated teeth is essential for the survival of the involved teeth in the long run. There have been multiple documented treatment modalities to do the same. The advent of bonded restorations has opened up great array of options for the same. The choice of restoration is influenced by the type of tooth; posterior or anterior, the amount of the remaining tooth structure and the economic factors.<sup>[1]</sup>

A grossly destroyed crown structure demands for a core-build up and full coverage crown. In case the remaining crown structure is unable to retain crown then extra retentive features have to be introduced like post or dowel. These dowels can be pre-fabricated or custom made, they are usually not included with the crown. The crown is cemented over this preparation.<sup>[2]</sup>

Unfortunately, the preparation of space conducive for the post can further weaken the already weak tooth structure hence, in 1995 Bindle and Mörmann introduced the Endocrown which was initially an all-ceramic full coverage crown including an extension which the pulp chamber of the endodontically shaped tooth.<sup>[3]</sup>

The rationale behind construction of an endodontic crown is that as a monolithic structure which has a supragingival butt junction and bonded with the enamel,

it takes retention and stability from the shape of the pulp chamber and the saddle anatomy of the floor.<sup>[4]</sup>

Advantages of endocrown over conventional crown are, they are easier to prepare and reduces clinical time and visits, these are adhesive restorations hence, can decrease the infiltration of microorganisms from the coronal to the apical part; in cases where posts are contraindicated due to short or narrow canals, this is a safe alternative. Also, in case of reduced space available for obtaining the ideal clearance. They are contraindicated in cases where the pulp chamber is shallow and narrow.<sup>[5]</sup>

Endocrown was initially fabricated with all ceramic material. There have been recorded cases of metallic endocrowns which have shown good survivability.<sup>[6]</sup> In the case report presented, the tooth is restored with a all metal endocrown.

**CASE REPORT**

A 26-year-old patient was referred to the department of prosthodontics for post endodontic restoration of 37 (Fig 1&2). On clinical and radiographic examination, it was revealed that the endodontic treatment was satisfactory but the crown height was less than 6 mm which would leave the prepared axial wall to be less than 4 mm, also the tooth presented a lingual tilt and reduced crown height on the distal aspect. The temporary restoration was removed and the under lying pulp chamber anatomy

was inspected, revealing a dept of 4 mm and a subtle saddle anatomy. Hence, the fabrication of all-metal endocrown was decided. The success and limitations of the same were discussed with the patient.

The canal orifices were sealed with a layer of type II GIC the pulp walls were cleared of any undercuts and the axial walls were reduced to keep a 2 mm ferule. The axial wall was prepped incorporating a chamfer equi-gingival margin. (Fig 3) The preparation was checked for parallelism of the walls and any undercuts. Following this a putty and light body wash impression was made and a temporary autopolymerizing resin crown was cemented. The metal endocrown was fabricated, metal trial for marginal fit and occlusal contacts were done, it was finished and polished.(Fig 4)

The crown was luted with resin cement under proper moisture control protocols. The crown was subjected to sandblasting and a layer of silane coupling agent was applied and air dried. The tooth was acid etched for 15 sec and bonding agent applied. Following which the dual cure resin cement was applied and the crown seated with application of continuous finger pressure. Excess cement was removed and the margins were polished.(Fig 5) The patient was kept of follow up for 3 days, 1 week, 1 month and 6 months. During the follow up the margins were checked, and the gingival reaction and endodontic health of the tooth was analysed. It didn't reveal any significant failures.(Fig 6)

## DISCUSSION

Endocrown has shown to be an advantageous technique as the procedure is easy; it facilitates ease of impression taking and protects the periodontium.<sup>[7,8]</sup> The single interface of a 1-piece restoration makes cohesion better hence, providing better retention and stability.<sup>[9,10]</sup>

The objective of the preparation is to get a wide and stable surface resisting the compressive stresses that are

frequent in molars.<sup>[11]</sup> The prepared surface is parallel to the occlusal plane to provide stress resistance along the major axis of the tooth.<sup>[12]</sup> The stress levels in teeth with endocrowns were found to be lower than in teeth with full coverage prosthesis.<sup>[9,13]</sup>

In this case all-metal endocrown was fabricated due to patients economic constrains and lack of restorative space available. The preparation inside the pulp chamber promoted the mechanical retention and stability of the endocrown. The gutta-percha was removed up to 2 mm from the pulp canal, to take advantage of the saddle-like anatomy of the cavity floor. Proper isolation was maintained, etching of the metal and application of silian coupling agent was carried out to aid in attaining proper retention and resin cement was used to lute the crown to the prepared tooth. Oswal et al (2018).<sup>[14]</sup> et al reported a case, where a porcelain-fused-to-metal endocrown was fabricated using similar protocols and clinical procedures as for a ceramic endocrown. Vinola et al (2017),<sup>[15]</sup> fabricated PFM endocrown, which on long term follow up showed results similar to all ceramic prosthesis. The rationale of this technique was to use the surface area available in the pulpal chamber to acquire the stability and retention through adhesive procedures.

Meticulous care was taken to enhance the retention by incorporation of secondary retentive grooves on the axial walls in addition to the sandblasting of the metal surface before cementation. These protocols were incorporated under strict isolation to ensure proper bonding of the metal to the tooth surface Mittal et al.<sup>[16]</sup> also mentions using all metal endocrown to provide full coverage for endodontically treated mandibular molar due lack of restorative space.

During the recall visits the fit of the prosthesis, the marginal adaptation and radiographic evaluation were done. The prosthesis did not show any signs of failure. And the patient was comfortable with the treatment.



Figure 1: Pre operative View (Occlusal view).



Figure 2: Pre operative View (Buccal view).



Figure 3: Tooth preparation with respect to 37.



Figure 3: Tooth preparation with respect to 37.



Figure 5: Cementation of the prosthesis.



Figure 6: 3 months recall visit.

## CONCLUSION

Endocrown is a great option for endodontically treated molars, it preserves the remaining tooth structure and a great tool to avoid additional procedures in cases of reduced restorative space. It gives superior retention with minimal stresses. It enables the clinician to provide mechanically fit aesthetic restorations. Irrespective of the choice of material, the design aids in delivering optimal treatment.

## REFERENCES

- Rosenstiel S, Land M, Fujimoto J. Contemporary fixed prosthodontics. Philadelphia: Elsevier, 2015; 5: 280- 281.
- Nayyar A, Walton RE, Leonard LA. An amalgam coronal-radicular dowel and core technique for endodontically treated posterior teeth. *J Prosthet Dent*, 1980; 43(5): 511-515.
- Bindl A, Mormann WH. Clinical evaluation of adhesively placed Cerec Endocrowns after 2 years- preliminary results. *J Adhes Dent*, 1999; 1(3): 255-265.
- Fages M, Bennisar B. The endocrown: A different type of all-ceramic reconstruction for molars. *J Can Dent Assoc*, 2013; 79: 140-143.
- Debbabi I, Nouria Z, Saafi J, Harzallah B, Cherif M. Endocrown: A reliable alternative to restorate rct molar! – two case reports. *Adv Dent & Oral Health*, 2018; 9(5): 555774.
- Alhazzani SA, Aldossary MS. Metal endocrown approach for a maxillary second molar: a novel technique. *Gen Dent*, 2019; 67(4): 67-71.
- Menezes-Silva R, Espinoza CAV, Atta MT, Navarro MFL, Ishikiriama SK, Mondelli RFL. Endocrown: a conservative approach. *Braz Dent Sci*, 2016; 19(2): 121-122.
- Carlos RB, Nainan TM, Pradhan S, Sharma R, Benjamin S, Rose R. Restoration of endodontically treated molars using all ceramic endocrowns. *Case Rep Dent*, 2013; 210763.
- Lin CL, Chang YH, Chang CY, Pai CA, Huang SF. Finite element and Weibull analyses to estimate failure risks in the ceramic endocrown and classical crown for endodontically treated maxillary premolar. *Eur J Oral Sci*, 2010; 118(1): 87–93.
- Zarone F, Sorrentino R, Apicella D, et al. Evaluation of the biomechanical behavior of maxillary central incisors restored by means of endocrowns compared to a natural tooth: a 3D static linear finite elements analysis. *Dent Mater*, 2006; 22(11): 1035–1044.
- Zogheib LV, Saavedra Gde S, Cardoso PE, Valera MC, Araújo MA. Resistance to compression of weakened roots subjected to different root reconstruction protocols. *J Appl Oral Sci*, 2011; 19(6): 648-54.
- Biacchi GR, Mello B, Basting RT. The endocrown: an alternative approach for restoring extensively

- damaged molars. *J Esthet Restor Dent*, 2013; 25(6): 383-9015.
13. Dejak B, Młotkowski A. 3D-finite element analysis of molars restored with endocrowns and posts during masticatory simulation. *Dent Mater*, 2013; 29(12): 309–317.
  14. Oswal N, Chandak M, Oswal R, Saoji M. Management of endodontically treated teeth with endocrown. *J Datta Meghe Inst Med Sci Univ*, 2018; 13: 602-04.
  15. Vinola SMJ, Balasubramanian S, Mahalaxmi S. n effective viable esthetic option for expurgated endodontically treated teeth: two case reports *J Oper Dent Endod*, 2017; 2(2): 97-102.
  16. Mittal N, Mital P, Prasad AB, Poonia L. Metal Endocrown – Novel Restorative option for Mutilated teeth; A Case Report. *Univ J Dent Sciences*, 2021; 1: 321-324.