

Endocrown with deep margin elevation as a conservative approach for Management of endodontically treated teeth: A clinical report

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Abstract: Restoration of extensively damaged endodontically treated teeth remains a challenge. With the advancement in adhesive technology and minimal invasive approach taking precedent in practice today endocrowns are an excellent alternative to posts combined with full coverage restorations. Endocrowns gain their retention from the coronal portion integrated into the apical projection that fills the pulp chamber space. Endocrowns provide good retention, minimizes microleakage and have high success rate. The present report discusses the advantages and indications of endocrown and presents a clinical case of endodontically treated 46 wherein the excessively damaged distal wall was constructed by deep margin elevation and the teeth was restored using a bonded lithium disilicate endocrown. With careful case selection and adherence to specific guidelines endocrown restorations present a satisfactory clinical outcome. Use of CAD CAM technology is adjunct with adhesive technology has opened the exciting avenues towards the single day dentistry.

Key words: Endocrowns, Deep margin elevation, Endodontically treated teeth, All ceramic, Adhesive Restoration

Introduction: The Evolution of superior adhesive techniques has established minimally invasive dentistry as a successful treatment option.^[1] Pissis was the forerunner of the endocrown technique and has described it as the ‘mono-block porcelain technique’.^[2] The term endocrown however was first used by Bindl and Mormann in 1999 described an adhesive monolithic ceramic restoration anchored in the pulp chamber, exploiting the micromechanical retention properties of the pulp-chamber walls.^[1] Rehabilitation of endodontically treated teeth presents an important challenge for most dentists.^[3] Moreover, the limitations to the use of intraradicular posts, such as calcified root canals, narrow canals, or a fracture of an instrument, have led practitioners to consider other alternatives.^[3]

Endocrowns offers certain distinct advantages over their counterparts as it is more conservative and adhesive thus minimizes microleakage.^[4] It ensures better periodontal health due to supragingival position of the joint.^[5] Endocrowns are superior to

full crowns in cases with minimal crown height but sufficient tooth structure available for stable and durable adhesive cementation.^[6]

The incorporation of computer-aided designing computer-aided manufacturing (CAD/CAM) technology into this process has opened new horizons, both in material processing, as well as in the restoration of teeth, providing accuracy, esthetics, and less time consuming restorative procedure.^[7] Endocrowns are also a perfect integration into a single day dentistry due to these advantages.^[8] Clinical studies have also revealed the success rates of as high as 95% after 2 years.^[8] The present report describes a clinical case of endocrown along with deep marginal elevation.

Case Report: A 40 year old Male Patient reported to the Department of Prosthodontics and Crown & Bridge at VYWS Dental College and Hospital, Amravati for post endodontic restoration with #46. A thorough clinical and radiographic evaluation was performed. Medical History was non-significant and Patient presented with good oral hygiene and fair

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occlusion.(Figure 1). Radiographic findings revealed well-obturedated canals with no evident periapical changes. (Figure 1) Various treatment options were discussed with the patient. The Prosthetic decision was made to restore tooth (46) with an endocrown fabricated from lithium disilicate ceramic taking into consideration the amount of remaining tooth structure and the thickness of the walls. Distal wall of the tooth was subgingival due to carious destruction thus the distal margin was build using Glass Ionomer Cement to an acceptable height.(Figure 2)

The technique for the tooth preparation of endocrown as it differs from conventional preparation was followed. An overall 2 mm of occlusal reduction was done in the axial direction using cylindrical diamond bur and diamond wheel bur was used to create the flat surface to get a cervical margin or “cervical sidewalk” in the form of a butt joint. The cervical margin is kept supragingival as given and enamel less than 2mm in thickness was eliminated. Continuum was created between the access cavity and the coronal pulp chamber of the tooth. The axial preparation was done using cylindrical bur to eliminate any undercuts present. Care was taken to keep the depth of minimum 3 mm. a heated plunger was used to remove 1mm gutta purcha from the canals. (Figure 3)

After finishing and polishing of the preparation evaluation of the entire preparation and interocclusal space was done. The preparation was thoroughly cleaned. A Single step double mix elastomeric impression was made using Polyvinyl Siloxane impression material. Impression of the antagonist arch was made using irreversible hydrocolloid. Shade Selection was done. Provisionalization was done using self-cure tooth molding material and cementation with eugenol free zinc oxide. The cast was poured and sent to laboratory.

The endocrown was fabricated from lithium disilicate-based ceramic. (Figure 4) Occlusal and proximal adjustments was done during try in using finishing burs. The crown was sent back to laboratory for final polishing and application of glaze. The

finished and polished endocrown was checked on master cast to verify complete seating.

The tooth was isolated and etched using Phosphoric acid for 20 seconds. Then it was washed and dried followed by application of adhesive and curing for 20 seconds. (Figure 5) The inner layer of the endocrown was etched using hydrofluoric acid followed by washing air drying with three way syringe. silane coupling agent was coated onto the crown and air dried. A layer of dual cure acrylic resin was applied on the crown and crown was positioned on the tooth. (Figure 6, 7) Curing was done for 5 sec which makes the removal of excess cement easy. All the excess cement was cleaned out using floss and curing was performed from all the directions for 30 seconds. (Figure 8, 9, 10) Post cementation radiograph was taken to ensure complete seating and regular follow up was kept at the interval of 1, 3 and 6 months. (Figure 11)

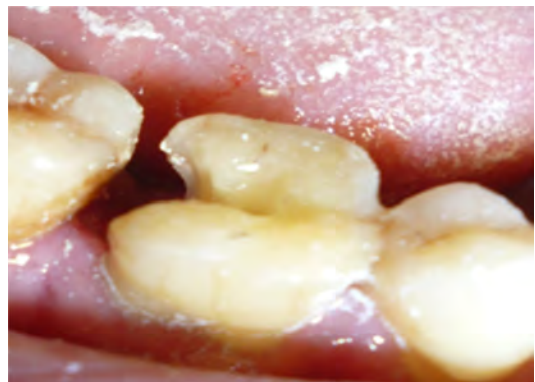


Figure 1: Pre-operative view (A) Clinical



Figure 1: Pre-operative view (B) Intra oral Periapical Radiograph showing obturedated canals

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Figure 2: Deep Margin Elevation using Glass Ionomer Cement.



Figure 2: Deep Margin Elevation using Glass Ionomer Cement.



Figure 3: Tooth preparation (A) Intracoronal preparation



Figure 3: Tooth preparation (B) Occlusal clearance



Figure 4: Endocrowns fabricated of lithium Disilicate



Figure 4: Endocrowns fabricated of lithium Disilicate



Figure 5: (A) Etching the tooth with phosphoric acid for 20 seconds



Figure 5: (B) Application of Bonding Agent



Figure 5: (C) Curing the Bonding agent



Figure 6: (A) Etching of inner surface of endocrown using hydrofluoric acid

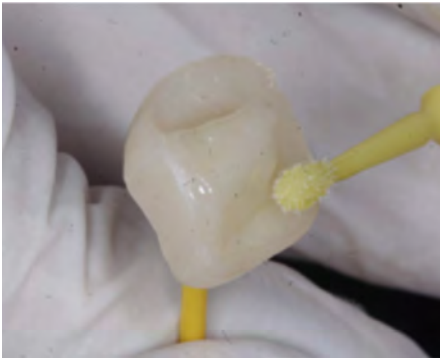


Figure 6: (B) Application of Silane Coupling Agent



Figure 6: (C) Layer of Dual Cure Acrylic resin on inner surface of Endocrown.



Figure 7: Placement of endocrown on the prepared tooth.



Figure 8: Removal of excess cement from Interdental Area.



Figure 9: Final curing



Figure 10: Final Prosthesis in Place



Figure 10: Final Prosthesis in Place



Figure 11: Postoperative Radiograph

Conclusion: In the literature, there has always been a controversy regarding the ideal treatment for restoration of endodontically treated teeth.^[9] For long term success, conservation is the new mantra and with the adhesive technology available today endocrown presents an exciting alternative.^[9] Various researches and clinical evidence conforms to the claim that the endocrown fits perfectly with the concept of biointegration and is the novel and successful restorative options for posterior endodontically treated teeth and badly damaged molars.^[10]

Conflict of Interest: Authors declare no Conflict of Interest.

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