

“Endocrown” A Major Paradigm Shift in Restorative Dentistry: A Case Report

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ABSTRACT

Endocrowns are a conservative and aesthetic treatment option for restoration of extensively destructed posterior teeth. The main advantage is the fact that there is no need for imprudent preparation of the access cavity as done for post and core buildups. Moreover, the clinical visits are less time-consuming and less frequent unlike the ones for post and core buildups and subsequent crown preparation. This case report features the case of a coronally damaged maxillary first molar treated by zirconium endocrown following endodontic treatment.

Keywords: *Endocrown, Restorative Dentistry, Endodontic Treatment, Zirconia, Resin Cement*

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INTRODUCTION:

The advent of Endocrowns revolutionized restorative dentistry by providing a modernist means to restore an endodontically treated tooth. Theoretically, as a rule of thumb, every tooth with moderate to severe coronal breakdown is prescribed a post and cast core buildup followed by a crown.¹ The main goal of post and core buildup is to replace the missing tooth structure in order to provide stabilization to the tooth and an encirclement for the final restoration.²

The restoration of an endodontically treated tooth poses several concerns and controversies among dentists. An endodontically treated tooth, compared to a vital tooth, tends to lose its integrity and strength because of the extensive cavity preparation owing to caries, trauma etc.³ Due to the loss of structural integrity, the endodontically treated tooth is prone to biomechanical failure.⁴ This imposes a challenge for the dentist which requires them to conservatively prepare the access cavity, preserve as much anatomic form as possible

and choose the ideal restorative material.

There are certain limitations to use of posts in endodontically treated teeth, including presence of calcified canals, narrow canals, cases with endodontic mishaps including instrument separation.⁵ Such clinical situations lead to the advent of Endocrowns.

Endocrowns are blocks made of porcelain/metal that consist of a post/core component and a crown component. This saves dentist the time and effort of doing post and core buildups and even crown lengthening in many cases.⁶ It also decreases the chances of hybrid layer degeneration by reducing the number of adhering surfaces.⁶ This crown attaches to the inner access cavity margins to provide macro mechanical retention and the adhesive layer provides retention on a micromechanical level.⁷

The aim of this case report is to present a clinical case where a conservative endocrown restoration was cemented on the maxillary molar after endodontic treatment was done. Significant coronal destruction indicated the use of endocrown.

Case Report:

A 27-year-old male was referred to The Dental Lounge with pain on biting and food impaction in the upper right first molar which upon examination was grossly carious. The medical history was clear. Clinically, there was a substantial loss of natural tooth structure due to caries. The occlusocervical height of the remaining crown was approximately 4mm. The radiographic findings reported a radiolucency that involved the pulp chamber and periapical widening. After necessary investigations, the diagnosis was pulp necrosis with symptomatic apical periodontitis.

After explaining the treatment options to the patient and taking his consent, root canal treatment followed by an endocrown prosthesis was decided to be the treatment plan. Root canal treatment was carried out using the V Taper Gold

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rotary system with 2% NaOCl as an irrigant. (Figure 1) Calcium hydroxide was used as an intracanal medicament in between the visits. On the second visit, obturation was done using ProTaper gutta percha (GapaDent). (Figure 2)

Figure 1: Clinical view of the tooth demonstrating the three orifices of maxillary first molar

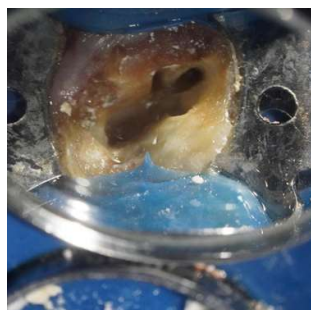
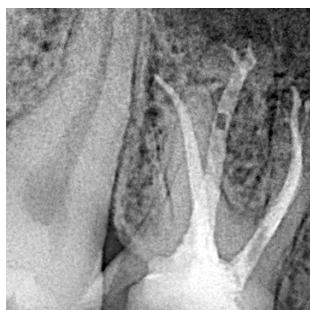


Figure 2: Radiograph of obturated molar



One week after obturation, the patient was recalled for the preparation of tooth for endocrown. It was aimed to receive butt-joint margins with no undercuts in the walls of the preparation. The internal undercuts were blocked using Flowable composite SDR plus. The cervical margins were prepared using a diamond tapered fissure bur and a taper of around 6 to 10 degrees was given in the tooth. (Figure 4) The interocclusal space was evaluated and clearance of 2mm was ensured. An impression was made using dual impression technique. Prior to impression, a retraction cord was used to expose the prepared margins of the tooth. The tooth was air dried and isolated from saliva. Light body silicone was injected along the margins of the prepared tooth, while putty silicone was loaded in a stock tray and impression was made. The impression was then sent to the laboratory along with the shade information. The chosen restorative material was zirconia due to the added strength of the material with minimal preparation as compared to PFM (Porcelain Fused to Metal) crowns.

On the subsequent visit, the tooth was etched with 37% phosphoric acid for 15 seconds, starting from the margins and then moving towards the core of the tooth.

The tooth was washed and air dried. To cement the endocrown, single-step bonding system (Prime&Bond Universal, Dentsply Sirona) was used. The bonding agent was applied on the internal walls of the tooth and cured.

Dual-cure resin (Total C-RAM, ITENA Clinical) was used as an adhesive to cement the endocrown in place. The resin was spread along the walls of the tooth and the crown seated in place, the excess cement was removed using an explorer. The restoration was polymerized and checked for occlusal interferences and finished

DISCUSSION:

Dealing with molars with considerable coronal breakdown,

Figure4: Finished endocrown restoration



it is difficult to decide a treatment option that provides efficient function and clinical durability. The endocrown is an acceptable option for all kinds of molars, especially those with short clinical crowns and narrow canals.⁸

The advantages of endocrown includes preservation of the biologic width, increased surface area providing more bonding surfaces, decreased stress concentration due to less number of restorative interfaces⁶ and ease of bonding due to a single block restoration.⁹

According to the literature, endocrowns should be limited to the monoblock restoration of molars only due to a more durable masticatory and clinical performance. The aim of an endocrown preparation is to achieve a broader and a steady surface that can resist compressive forces and is more easily achievable with molar teeth.¹⁰

Due to the advancement of bonding systems, micromechanical retention is more emphasized than macromechanical for endocrowns.¹¹

According to Belleflamme et al.¹², it has been proven that the in vitro fracture strength of endocrowns are far more optimal than that of conventional treatment for endodontically treated teeth. Hence, they are indicated for all molars and would be more efficient in cases of calcified canals, short clinical crowns and also a good option for patients with unfavorable occlusal relationships and parafunctional habits e.g.: bruxism.¹³

Endocrowns serve to be a promising alternative for the restoration of endodontically treated molars. It is conservative of tooth structure and this type of restoration should be practiced more frequently after careful case selection.

Authors Contribution:

| Amir Hamza: Case Documentation

| Parivash Anwar: Writeup

| Nehal Sher Khan: Case Documentation

| Rana Saad Bin Sohail: Writeup

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