

CASE REPORT

"Endocrown" A Novel Approach for Restoration of Endodontically Treated Teeth:

A Case Report

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ABSTRACT

Endocrown is a conservative restorative option for extensively damaged posterior teeth. The primary objective is to attain a bonded biomimetic reconstruction, i.e., to reconstruct a tooth without any excessive preparation for post or core. The clinical procedure is less complex for both dentist and patient as compared to conventional crowns with post and core. This article highlights case report of a mutilated molar treated by composite endocrown after an adequate endodontic treatment with a follow up of 6 months' time span.

Key Words: *Biomimetic Reconstruction, Composite, Endocrown, Endodontic Treatment, Resin Cement.*

Introduction

The propensity of a root canal treated tooth to fracture due to changes in biomechanics as a result of tissue loss is an argumentative topic for dentists. Several factors such as pathologic processes, steps of endodontic procedure and extensive restorations causes the loss of coronal and radicular structure, thus making the tooth more fragile and prone to fracture.¹ In order to prevent these deleterious effects dentists adopt a more conservative approach such as bonded overlay and endocrown instead of full coverage crowns with the aid of recent advances in adhesive techniques.²

Endocrown, a monoblock single piece construction, is an effective alternative for endodontically treated molars with severely broken down coronal structure.³ It helps in maintaining the structural integrity by excluding the steps of post and core-cementation, crown lengthening and also reduces the effect of hybrid layer degradation by decreasing the number of adhesive interfaces.⁴ The purpose of this article is to present clinical case of a molar restored with composite endocrown after endodontic treatment. The steps of its fabrication

and cementation will be discussed to ease its use.

Case Report

A 21 year old male patient visited operative department of Islamic International Dental Hospital, Pakistan with a chief complaint of pain in right mandibular molar since last one week. On examination, root canal was initiated 6 months back but was not completed due to unfortunate circumstances. Clinically there was an extensive loss of coronal structure, with a decreased interocclusal space between the maxillary and mandibular molar. Occlusogingival height of the remaining crown structure was 4mm. The radiographic findings revealed unobstructed canals and remnants of temporary restorative material in chamber along with periodical changes. (Fig. 1)



Fig 1: Pre-Operative Radiographic Image

A conservative approach of restoring the tooth with an endocrown was decided as the treatment option after explaining and taking patients consent. Root canal treatment was done by Hi Flex rotary system using 2% NaOCl as an irrigant. Triple antibiotic paste was placed as an intracanal medicament for 5 days. Obturation was done using Hi Flex gutta percha points.

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Fig 2: Post Obturation Radiograph

The tooth was prepared to achieve a butt-joint margin. The appropriate reduction of the buccal and lingual walls was done. The lateral retentions of the pulp chamber walls and the orifices were sealed with two-step adhesive and flowable resin composite. The cervical margins were leveled with a tapered diamond-coated bur. The pulp chamber was prepared with the same diamond-coated tip with an internal taper of 8 to 10 degrees. The preparation margins had a width of 1.5 mm and core exceeding the height of 3mm. (Fig.3 and Fig.4) Interocclusal space was carefully evaluated and occlusal reduction done to achieve a clearance of 2mm.

Guidelines for full occlusal coverage according to *Rocca et al.*¹

- Palatal and lingual cusps can be simply reduced by 2 to 3 mm with a butt-joint.

On the contrary, for buccal cusps there are 3 options:

- The ultra-conservative buccal cusp coverage (1.5 mm)
- The conventional buccal cusp coverage (2–3mm)
- The full buccal cusp coverage

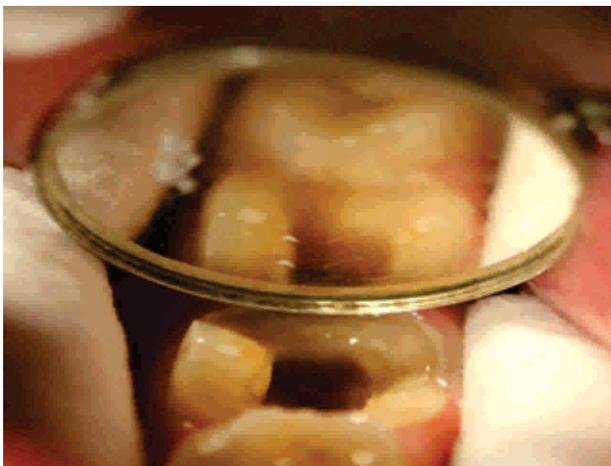


Fig 3: Pre Op Clinical Image



Fig 4: Clinical Image of Prepared Tooth

Appropriate shade with a shade guide was chosen. An impression was taken with a polyvinyl siloxane material and sent to the laboratory along with the shade information.

An endocrown may be produced from composite or mineral ceramic and, because of the slightly lower cost and ease of repair of any potential damage, the patient chose the composite endocrown.

On next visit cementation was done. The tooth was etched with 37% phosphoric acid for 15 seconds, with the application starting from the margins in enamel. Afterward preparation was washed and air dried. (Fig.5 and Fig.6). To embed the endocrown, a self-etch bonding system (ESPE Single Bond Universal Adhesive) was used, which was spread on the surface of preparation and then light-cured. (Fig.7). A dual cured composite resin cement (Rely X Ultimate Clicker Adhesive Resin Cement) was spread on the surface of the preparation. The endocrown was seated, and any excess cement was removed and the restoration was polymerized and finished after evaluating any occlusal interference Fig 8.



Fig 5: Composite Endocrown



Fig 6: Intaglio surface of Endocrown



Fig 7: Luting Cement



Fig 8: Cemented Endocrown

DISCUSSION

In modern era of dentistry, endocrowns are conservative, easier and effective alternative option for restoring an endodontically treated tooth.¹ It achieves retention macro mechanically through pulp chamber and micromechanically by adhesive cement.^{2,3} The benefits of endocrown over other

options are decreased stress concentration as a result of lesser number of adhesive restorative interfaces, conservative preparatory design maintaining biologic width and increased surface area for bonding provided through pulp chamber which is equal or even superior to post in radicular dentin.⁴

Studies have shown that albeit endocrowns are desirable option for restoration of all the teeth in the arches, but they should be restricted to the restoration of posterior teeth especially molars, because their performance in molars against the action of masticatory forces is much better as compared to premolars. Other reasons include limited bond strength of adhesive systems because of smaller pulp chamber area and adhesive surface of premolars.⁵ A long lever arm may be created because of premolar crowns configuration resulting in greater endocrown height as compared to width, increasing the risk of adhesive interface fracture and displacement.⁶ However when their use is limited to restoration of molar teeth, they have shown satisfactory performance in achievement of esthetic and functional recovery and bond strength.^{7,8,9}

It is proven by a systematic review that survival rate and in vitro fracture strength of endocrown is equal or better than the conventional treatments, hence it is indicated for all molars especially those with loss of coronal structure, calcified or constricted canals, and is also reliable in patients with bruxism and unfavorable occlusal relationship.¹⁰

Endocrowns overall success rate is quite promising although there are some limitations such as depth of pulp chamber should not be less than 3 mm and the width of cervical margin be more than 2mm, adhesion is difficult to achieve or presence of only negligible tooth structure.¹¹ For ensuring longevity of the endocrowns case selection is a critical step. Further studies are required to assess its durability in the long term.

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