

Case Report

Endocrown: An Innovative Approach for Grossly Destroyed Tooth

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ABSTRACT:

Endodontically treated molar rehabilitation is still difficult. The mechanical properties of molars are lost during endodontic treatment. As a result of the pulp and surrounding dentin tissues being removed, they become brittle. When repairing molars with significant coronal loss and endodontic treatment challenges, endocrown, a single partial restoration, may be an excellent option.

KEYWORDS: CAD-CAM, Dual cure resin, Endocrown

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INTRODUCTION:

Becoming hopeful about the rehabilitation of teeth with considerable coronal deterioration that have undergone endodontic treatment is still a significant difficulty for the majority of dentists. The biomechanical concepts of resistance and retention are often compromised.^[1]

Clinicians arrange restorative treatments based on the extent of dental tissue loss and the biomechanical alterations brought about by root canal therapy.^[2] A complete cast metal core supporting a crown has been recommended as a therapy for teeth severely affected by dental cavities or fractures.^[3]

However, following the use of intraradicular posts, perforation and weakening of canal walls may occur as a result of excessive preparation.^[4] Furthermore, dentists have been forced to consider other options such as the use of adhesive endodontic crown. This is due to limitations of using posts, which include calcification of root canals, limited canals, or fractured instrument.^[5,6]

The term 'endocrown' refers to a single-piece ceramic structure that was introduced by Bindl and

Mörmann in 1999 as an alternative to the whole crown supported by posts and cores. To increase macromechanical retention, this crown is affixed to the pulp chamber's interior walls and the hollow borders. Micromechanical retention is provided by adhesives.^[7] We report a case that involved the restoration of a mandibular molar using a conservative and aesthetic posterior endodontic crown.

CASE REPORT:

An 18 year old female patient was referred to the Department of Conservative and Endodontics of our institute for the treatment of right mandibular first molar. Her first molar needed to be repaired since she had severe coronal damage.

After doing initial radiographic and clinical exams, chronic irreversible pulpitis was diagnosed. Endodontic treatment was planned. Rubber dam isolation was used to prepare the access cavity using an endodontic access bur size 2 (Dentsply-Sirona, Charlotte, North Carolina, United States). An endodontic explorer was used to examine the pulp chamber, and 10 K file (Mani, Inc; Tochigi, Japan) was used to traverse the canals. The Hyflex CM

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(Coletene) NiTi rotary device was used for cleaning and shaping the canals. Paper points were used to dry the canals, and bioceramic sealer (BioActive RCS, SafeEndo, Gujrat, India) was used for obturation. The patient's occlusion and oral hygiene was favorable. Considering the tooth structure that was still present and the wall thickness, an endocrown restoration was advised. The prosthetic decision to use lithium disilicate endocrown to reconstruct the tooth was considered.

Compared to a traditional full crown, the endocrown requires a different kind of preparation. To meet unique biomechanical requirements, this monolithic ceramic restoration needs to be prepared in a certain way.

In addition to creating a 'cervical sidewalk' in the shape of a butt joint, the objective was to decrease the occlusal surface's total height by at least 2 mm in an axial direction. The enamel walls that are smaller than 2 mm must be removed, and the cervical edge must be supragingival.

In order to provide the endodontic access cavity and coronal pulp chamber continuous, we used a 100% occlusal convergence cylindrical-conical diamond bur. It was possible to enter the pulpal canal. A maximum of 2 mm was achieved after the extraction of the gutta percha. We lined the root canal holes with glass ionomer cement to finish the preparation and seal the canal orifice.

Following an examination of the interocclusal space and the whole cavity, a silicone impression was made of the tooth utilizing the double imprint procedure. We chose the ceramic hue and submitted the imprint to the lab after visualizing and evaluating the impression quality. The endocrown was placed on the master cast after being made in a lab with CAD-CAM technology.

Next, we investigated proximal, internal, and occlusion modifications during an endocrown try-in. We immediately returned it to the lab so that the glaze and colorant could be applied. During the subsequent session, the endocrown's inside was cleaned with water, followed by drying the hydrofluoric acid-etched crown using an air syringe. The silane coupling agent was then applied, and it was allowed to dry for a minute.

After using a rubber dam to provide adequate isolation, the tooth surface was treated for 15 seconds on the dentin and 30 seconds on the enamel by phosphoric acid. It was then thoroughly cleaned and dried & adhesive was applied. Finally, 20 seconds of light curing polymerization was done.

The prosthetic endocrown was coated with a thin coating of a dual polymerizing resin, placed within

the tooth and polymerized every five seconds, allowing extra cement to be easily removed. Following this, it was polymerized on all surfaces for 60 seconds. We looked for any occlusal interference with the restoration. The complete procedure is shown in Figure 1.

DISCUSSION:

A clinical problem in restorative dentistry is treating molars with a considerable coronal damage; this calls for cautious planning. For this reason, to ensure that the treatment is successful and that the molars will endure for a long time, the dentist must determine the best course of action.

The endocrown is beneficial for all molars, but is especially helpful for those having clinically low crowns, calcified canals, or tiny canals.^[8] Nevertheless, it is not indicated if the cervical border is less than 2 mm broad across most of its circle, less than 3 mm in depth of the pulpal chamber, or if adhesion cannot be ensured.^[9]

It has been demonstrated that the use of endocrown has advantages such as; it is simple to use, helps obtaining easy impressions, and safeguards the periodontium.^[10] Furthermore, ceramic wear coefficients are comparable to those of real teeth, and their use offers the benefits of biocompatibility and biomimicry. Moreover, cohesiveness seems better due to the single interface of a one-piece repair.^[11,12]

The preparation process aims to provide a broad, robust surface that is able to endure the compressive strains of the molars.^[13] Proximal to the occlusal plane, the prepared surface provides stress resistance along the tooth's major axis.^[14]

Compared to teeth with prosthetic crowns, teeth with endocrowns experience less stress.^[15] The advent of adhesive cementation techniques has reduced the requirement for macroretentive crown preparation.^[16]

Stability and retention are also provided by the pulpal chamber cavity. The maxillary molars have a triangular shape, whereas mandibular molars have a trapezoidal form which improve resolve the need for additional preparation and achieve restorative stability. The saddle-shaped construction of the pulpal floor increases stability. This layout and adhesive qualities of the bonding substance eliminate the need for extra post-involving root canal treatment.^[14]

Research has demonstrated that endocrowns composed of ceramics based on lithium disilicate are among the best materials for restorative procedures due to their adhesive qualities, which also encourage resin cement micromechanical interlocking.^[7]

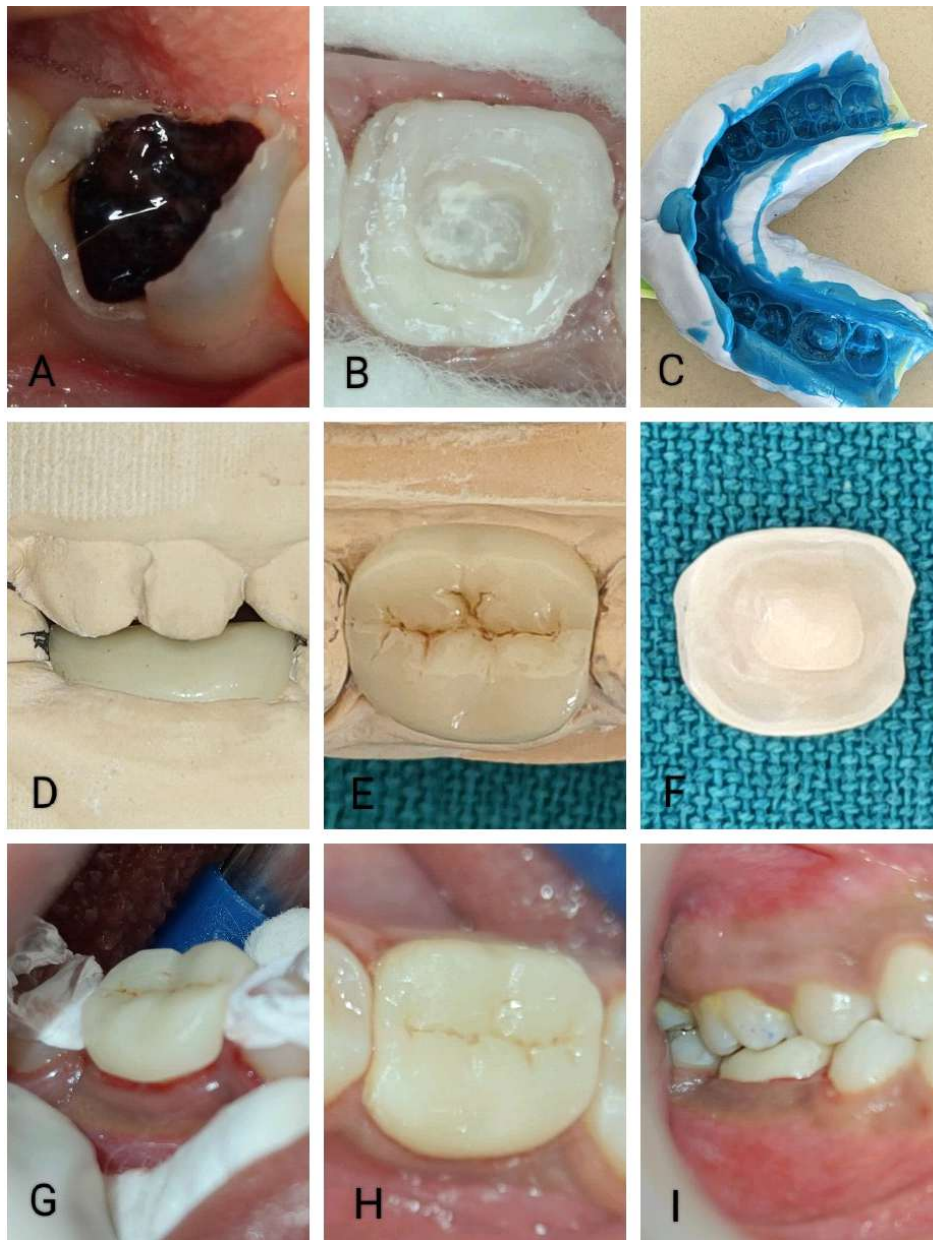


Figure 1: Endocrown preparation with respect to mandibular first molar (Right side).

A. Pre operative clinical photograph; B. Tooth preparation for endocrown; C. Impression after tooth preparation; D. Occlusion check on cast; E, F. Aspects of endocrown; G. Isolation of the adjacent tooth and placement of endocrown and H, I. Final views after placement of the endocrown.

According to Belleflamme et al, endocrowns may be a practical method for repairing severely injured premolars and molars, despite the possibility of substantial loss of coronal tissue or occlusal risk factors such bruxism or adverse occlusal connections.^[17]

CONCLUSION:

For molars that have had endodontic treatment, the endocrown offers a highly promising treatment option since it preserves tooth structure, is consistent with the objective of minimally intervention dentistry

and biointegration. For the mechanical and cosmetic repair of nonvital posterior teeth, it gives reasonable results.

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Conflicts of Interest

There are no conflicts of interest.

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