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# Endocrown: An Alternative Approach for Restoring Endodontically Treated Molars with Large Coronal Destruction

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**Abstract**

Rehabilitation of endodontically treated molar still remains a challenge. After endodontic treatment, molars lost their mechanical characteristics. In fact, they became fragile and that is in relation with the removal of pulp and surrounding dentin tissues. Endocrown which is a single partial restoration could be considered as a good alternative for restoring molars having large coronal destruction and presenting endodontic treatment difficulties. Through this work, we discuss the indication and use of Endocrown to replace single crowns with intra-articular retention and to present a clinical case report of a mandibular first molar with extensive coronal destruction.

**Keywords:** Endocrown, Mandibular, Coronal.

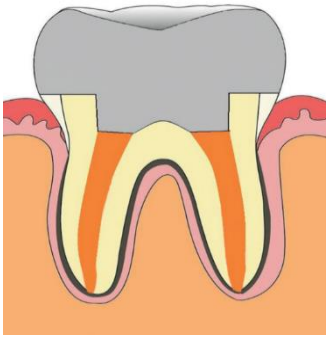
## Introduction

Over the years, rehabilitation of the endodontically treated tooth has been a widely discussed topic, with several innovations taking place from its advent. Depending on the extent of the coronal destruction of the tooth structure, post endodontic restoration varies from a direct restorative procedure (such as amalgam, glass-ionomer cement, and composite resins) to indirect procedures such as metal and ceramic inlays, on lays, and to post-retained full-coverage crowns. [(1)]

Rehabilitation of endodontically treated teeth with large coronal destruction is still a clinical challenge, especially due to the loss of strength characteristics associated to the removal of pulp and surrounding dentin tissues [(2)]

The introduction of the Endocrown as an alternative treatment modality. Pissis in 1995 was the first to introduce the heat pressed ceramic Monoblock technique, which utilized the pulp chamber to increase the macromechanical retention of the crown. [(3)]

Initially, the materials for the fabrication of an Endocrown were alumina or spinel reinforced non silica based ceramics and silica based feldspar ceramics, using either a heat-pressed technique or later CAD/CAM technology. Later, glass ceramics were the material of choice as they provide the advantage of surface modification, either with the use of hydrofluoric acid or air-abrasion, improving in that way their adhesion to the tooth tissues. (3)



Schematic representation of Endocrown

## Case Report

A twenty three year old Female patient of Indian descent was referred to the Post Graduate Department of Conservative Dentistry and Endodontics with the chief complaint of intermittent pain over one month in relation to lower left posterior teeth. Patient also complained of episodes of sensitivity to hot and cold foods in the involved tooth. Medical and dental history was non-contributory.

On clinical examination, patient's oral hygiene was found to be moderate. Deep proximal carious lesion was observed in tooth # 36 and was tender on percussion. Electric pulp test and heat test with a gutta-percha stick gave a lingering response. There was no evidence of swelling or sinus tract.

Preoperative periapical radiographic examination revealed radiolucency in association with tooth #36.

The tooth is then treated endodontically. The patient had an acceptable oral hygiene and a favourable occlusion. After removing the temporary restoration, an endocrown restoration was recommended because of the amount of remaining tooth structure and the thickness of the walls. The prosthetic decision was to restore tooth (36) with an Endocrown fabricated from porcelain fused to metal (PFM).

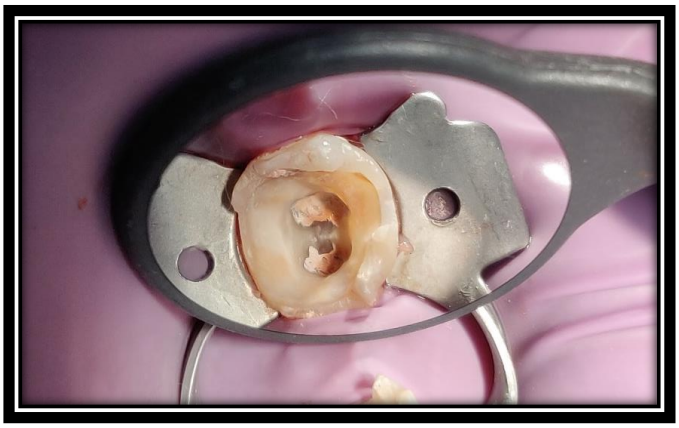


Fig.1: Preoperative clinical picture

Fig.2: Composite build-up

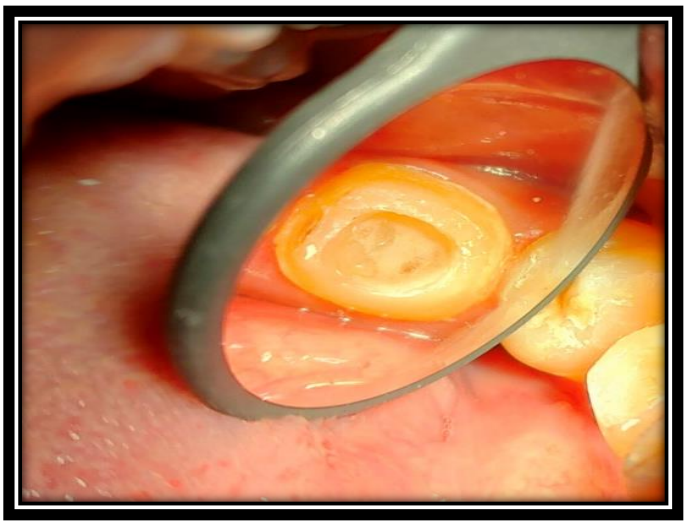


Fig.3: Tooth preparation

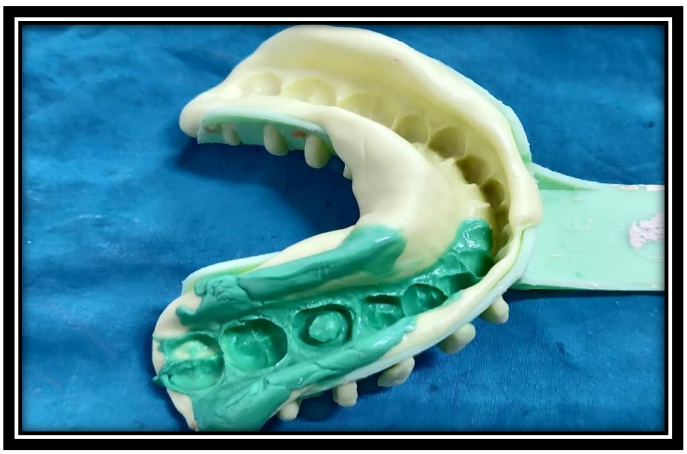


Fig.4: Impression recorded

Fig.5: Final Prosthesis

**Discussion**

The choice of postendodontic dental restoration is based on several factors. These factors include the healthy tissue structure of the remaining teeth, the teeth location in the mouth, and the esthetics that are important as a selection guide of adequate restorations. Other consideration factors include the function activity in the tooth occlusal area, tooth age, endodontic/periodontal prognosis, and patient financial aspects. [4]

The project of the restorative treatment of molars with a large coronal destruction, a clinical challenge, requires careful planning. That is why the dentist has to decide for the best treatment option to ensure an efficient treatment providing clinical longevity of molars. The Endocrown is convenient for all molars, particularly those with clinically low crowns, calcified root canals, or narrow canals. But it is not recommended if adhesion cannot be assured, if the pulpal chamber is less than 3 mm deep, or if the cervical margin is less than 2 mm wide for most of its circumference. [5]

Endocrown assemble the intracoronal post, the core, and the crown in one component, thus representing Monoblock restorations. Endocrown restorations are anchored to the internal portion of the pulp chamber and on the cavity margins, thereby resulting in both macro- and micro-mechanical retention, provided by the pulpal walls and adhesive cementation, respectively. [2]

An investigation made by Darwish et al. showed that endodontically treated maxillary premolars restored with resin nanoceramic Endocrown presented better internal 4 Case Reports in Dentistry adaptation compared to those restored with lithium disilicate Endocrown and that Endocrown preparation with smaller axial wall divergence ("6"degree) provided better internal fit [6]. In a recent study, Zoidis et al. proposed polyetheretherketone (PEEK) as an alternative framework material for Endocrown restorations. They demonstrated that the elastic modulus of the polyetheretherketone framework (4 GPa) veneered with indirect composite resin could dampen the occlusal forces protecting tooth structures better than ceramic materials. But further long-term clinical evidence is required [7].

CAD-CAM system, with an estimated success of 90.5% for molars and 75% for premolars in 55 patients [8, 9]. According to Belleflamme et al., even in the presence of extensive coronal tissue loss or occlusal risk factors, such as bruxism or unfavourable occlusal relationships, Endocrown could be a reliable approach to restore severely damaged molars and premolars [10].

**Conclusion**

The preparation for Endocrown is simple and can be achieved quickly. Root canals are not engaged in the process, and the procedure is less traumatic than others. The supragingival position of the cervical margin protects the marginal periodontium, facilitates impression taking, and preserves the solid substance of the remaining tooth. Forces are dispersed over the cervical butt joint (compression) and axial walls (shear force), thus moderating the load on the pulpal floor. The Endocrown represents a very hopeful treatment alternative for endodontically treated molars, it allows maintaining of tooth structure, it is compatible with goal minimally invasive dentistry, and it is adequate for the concept of biointegration. It is a conservative approach for mechanical and aesthetic restoration of nonvital posterior teeth. This type of reconstruction, which is still uncommon, should be more widely known and practised.

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