

Endocrown - A Paradigm Shift in Rehabilitation: A Case Report

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Abstract

Coronal rehabilitation of an endodontically treated tooth is quite a challenge for clinicians as considerations should be taken for its minimally invasive preparation and the retention and stability of the restoration. With the development of adhesive systems, the need for intraradicular anchorage and thus the post-core system is greatly reduced. Endocrown is a restorative option for an endodontically treated tooth, and it serves as a suitable alternative to the conventional post-core restoration and full-coverage restoration. This novel approach promotes the stability and retention of the indirect restoration without the need of a cast metal core or reconstruction with intracanal post, thereby reducing the treatment time. Thus, endocrown has become a promising alternative in the esthetic and functional rehabilitation of an endodontically treated tooth. This case report describes the management of endodontically treated mandibular molar with porcelain-fused metallic endocrown.

Key words: Endocrown, Endodontically treated tooth, Minimally invasive dentistry

INTRODUCTION

The clinical success of an endodontically treated tooth is determined by post-endodontic restoration. Post-endodontic restoration will maintain and protect the existing tooth structure while restoring esthetics, form, and function satisfactorily. The goal is to achieve minimally invasive preparation to restore endodontically treated tooth with optimum tissue preservation.^[1]

Cast posts and cores have been the standard for many years and are still used by some clinicians. In general, during *in vitro* tests^[2] and clinical studies,^[3] they do not perform other types of posts. As they require two appointments, temporization, and a laboratory fee, they have fallen out of favor. Perhaps, the biggest drawback is in areas that

require an esthetic temporary restoration for cast posts and cores. Moreover, the evolution of adhesive philosophy in dentistry and the high bonding efficiency obtained by modern adhesive systems have slowly changed the precept of “devitalized tooth should be restored with post, core, and crown.”^[4]

Recently, adhesive indirect partial coverage restorations have gained popularity over full-ceramic crowns. Conservative treatments such as inlays, overlays, and endocrowns minimize the amount of tooth structure removed while maximizing the remaining amount of intact tooth structure. The endocrown technique was introduced by Bindl and Mörmann. Endocrowns have many benefits over posts and cores and crowns as they are easier to prepare and apply and require lesser clinical time and visits. Esthetic properties are also excellent.^[5] Moreover, they can also minimize the penetration of microorganisms from the coronal to the apical portion, thereby improving the clinical effectiveness of endodontic treatment.^[6] Endocrown is a good alternative to full crown in cases with endodontically treated tooth with short crown height but with sufficient tissue available for adhesion and stability.^[7-10]

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CLINICAL PRESENTATION

A 25-year-old male patient reported to the Department of Conservative Dentistry and Endodontics at the Institute of Dental Studies and Technologies, Modinagar. The patient's chief complaint was to have a crown for a previously endodontically treated tooth. The patient underwent a clinical examination, a medical history interview, and a radiographic examination [Figure 1].

The treatment plan was to give an endocrown with respect to tooth 36. A minimal occlusal reduction of 1.5–2 mm with a central retention cavity of depth 5 mm inside the pulp chamber was prepared with slight divergent walls using #169L coarse diamond burs. Supragingival margin preparation with 90° shoulder finish lines (without bevels)^[11] and complete proximal separation were given. Proximal finish lines were extended from the gingival to the contact area, and final polishing was done with #8862 fine diamond points [Figure 2].

Impression was taken with putty and light-body polyvinyl siloxane material (3M ESPE) using a double-mix single-stage technique and sent to the laboratory. Self-cured resin temporary crown was cemented using a temporary cement without eugenol (Temp-Bond NE).^[12] Metal coping was done [Figure 3].



Figure 1: Pre-operative



Figure 2: Proximal finish lines were extended from the gingival to the contact area

The porcelain layering was done [Figures 4 and 5].

The endocrown was cemented using luting GIC [Figure 6].

DISCUSSION

A successful clinical outcome of endodontically treated tooth depends on adequate root canal treatment as well as on the proper restorative treatment done afterward. Multiple treatment options are involved in the restoration of endodontically treated tooth and represent a challenging task for clinicians. Various improvements in adhesive techniques, composite resin materials, fiber posts, and indirect ceramic materials have led to recent changes in the methods available for restoring endodontically treated tooth. Adhesive indirect partial coverage restoration maintains the biomechanical integrity of the compromised structure of nonvital posterior tooth.^[13] According to Nagasiri and Chitmongkolsuk's study, greater remaining tooth structure means greater longevity for the tooth.^[14]

The advantages of the conservative bonded techniques are as follows:^[15]



Figure 3: Metal coping was done

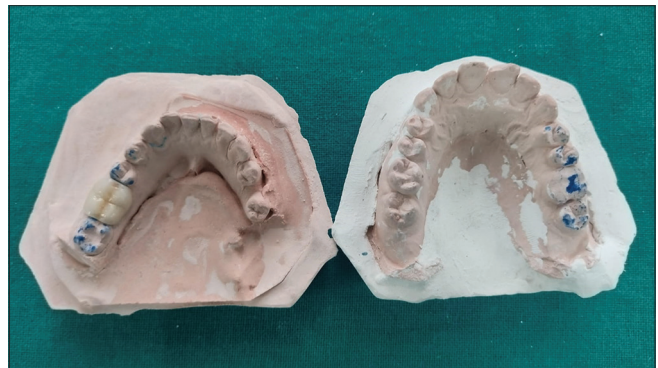


Figure 4: Impression casts with endocrown

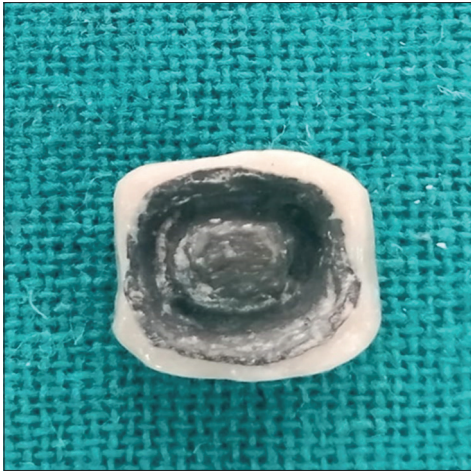


Figure 5: Inside view



Figure 6: Endocrown was cemented using luting GIC

- Bioeconomy of dental tissues
- Bioeconomy of periodontal tissues
- Reinforcing of healthy residual dental tissues, and
- Esthetic, ergonomic, and economic advantages.

The concept of endocrown was described in 1999 by Bindl and Mörmann^[6] to limit the use of root anchorages. Endocrown allows performing a more conservative, faster, and less expensive dental treatment. With the advent of adhesive dentistry, teeth with substantial coronal destruction can be restored by doing endocrown without using posts and by taking extension of the pulp chamber as a retentive resource.^[16-18] They are based on “monoblock porcelain technique,”^[5] where the pulpal walls provide macromechanical retention and micromechanical retention is imparted by the use of adhesive cementation.^[19]

In the present case report, endocrown was chosen as the preferred post-endodontic restoration. Endocrowns are a reliable restoration for damaged premolars and molars, according to Belleflamme *et al.*, even in the presence of

extensive coronal tissue loss or occlusal risk factors, such as bruxism or unfavorable occlusal relationships.^[20] The stress concentrations in teeth with endocrowns are also lower than in teeth with prosthetic crowns.^[21] A 5-mm-deep retention cavity was prepared inside the pulp chamber. This is in accordance with the study by Dartora *et al.*,^[22] where he concluded that a 5-mm extension posed over intensity and a better stress distribution pattern than a 1-mm extension, which presented a low resistance to fracture and a high probability of rotating the piece when in function.

Thus, the success and longevity of endocrown depend on several factors such as case selection, tooth preparation, selection of the most appropriate ceramic options, and the selection of bonding material.^[23-27]

CONCLUSION

Endocrowns have been a feasible alternative to traditional posts and cores. Better esthetics and mechanical efficiency, low cost, and short clinical time compared to conventional methods are the advantages of endocrowns, which can be used successfully for restorations of teeth with short clinical crowns.

Clinical Significance

The endocrown fits perfectly with the principle of biointegration and can serve as the most conservative and esthetic alternative for the restoration of nonvital posterior tooth.

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