



Endocrown-A Unique Way of Retention-Case Report

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Authors' contributions

This work was carried out in collaboration between all authors. Author BSR designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SB and SK managed the analyses of the study. Author SN managed the literature searches. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

All the teeth that have undergone root canal therapy require some form of restoration to enable them to function again. Endodontic treatment removes the vital contents of the canal, which subsequently leads to reduction in elasticity, desiccation and increases brittleness of remaining tooth structure.

The loss of structural integrity increases the incidence of crown fractures and microleakage at the margins of restoration in endodontically treated teeth compared with 'vital' teeth. Minimally invasive preparation to preserve maximum amount of tooth structure is considered to be the standard main goal for restoring teeth.

This is a case of endodontically treated right maxillary 1st molar requiring post endodontic management which was treated with EndoCrown.

Keywords: Endodontically treated teeth; EndoCrown.

1. INTRODUCTION

Post-endodontic restoration should preserve and protect the existing tooth structure, while satisfactorily restoring esthetics, form, and function. The goal is to achieve minimally invasive preparations with maximal tissue conservation for restoring endodontically treated teeth. This will help to mechanically stabilize the tooth-restoration complex and increase surfaces available for adhesion [1].

The treatment modalities available depend on structural integrity, functional load and esthetics. In this perspective, EndoCrown is a good alternative to full crown followed by post and core in cases with endodontically treated teeth with short crown height but sufficient tissue available for adhesion and stability [2,3,4,5,6].

In this paper we have presented a case report of 18 months follow up of zirconia EndoCrown fabrication and luted with resin cement.

2. CASE REPORT

A 25 year-old male patient reported with a fractured restoration in upper right back region of upper jaw. On clinical examination, tooth number 16 was root canal treated one month back (Fig. 1). It was asymptomatic and the surrounding structures were normal. The radiographic findings revealed well obturated canals with no periapical changes (Fig. 2).



Fig. 1. Occlusal view after post-obturation

Various treatment modalities were discussed and conservative approach of restoring the tooth with an endocrown was decided as the treatment option, as more than half the residual tooth

structure was remaining and there were no occlusal wear facets. The occlusogingival height of the remaining crown structure was approximately 4 mm.



Fig. 2. Radiographic image of well done RCT

After removal of the provisional restoration, preparation for endocrown was initiated. Undercuts were blocked using Resin modified glass ionomer cement (Fuji II LC GC ASIA). The preparation consisted of a circular equigingival buttjoint margin and central retention cavity into the entire pulp chamber constructing both the crown and the core as a single unit. The appropriate reduction of the buccal and lingual walls was done (Fig. 3).



Fig. 3. Tooth preparation

Interocclusal space was checked to achieve a clearance of 2 mm. Retraction cord was placed and impressions made with polyvinyl siloxane impression material (Aquasil LV, Putty/Light Body, Dentsply, Germany) using putty wash technique.

The restoration was fabricated using the lost wax technique of investing and wax pattern burnout

followed by pressing of the ceramic ingot in the pressable furnace at a press temperature of 915–920°C. It was then finished and polished with Proxyl pink polishing paste (Ivoclar/Vivadent, Schaan / Liechtenstein). The cementation was done by resin luting cement (panavia F 2.0 kuraray japan). A 6 and 18-months followup shows no signs of decementation, No recurrent caries, No fracture. No radiographic changes evident (Figs. 4, 5, 6, 7 and 8).



Fig. 4. Endocrown

3. DISCUSSION

A successful endodontic treatment depends not only on proper obturation but a good post-endodontic restoration to integrate the pulpless tooth with the masticatory apparatus [7]. In the era of minimal invasive dentistry teeth with more than half of the coronal tooth structure is missing,

complete occlusal coverage is achieved conservatively using newer method EndoCrown.



Fig. 5. Etching and cementation



Fig. 6. Final cementation

Various conservative treatment modalities based on the same conservative approach such as

Amalcore, sharonlay for pre-molars, inlays, and onlays are based on this principle. The Amalcore harnessed the large and retentive contours of the root canal orifices and the pulp chamber to provide a monoblock foundation. Inlays and onlays promoted the concept of a supragingival finish line and conservative preparations. The endocrown is a newer esthetic and conservative addition to this continuum.



Fig. 7. Buccal view after cementation



All ceramics have become more popular in this era because of esthetics as well as function [8]. Custom shaping and precise milling of ceramic restorations is now a reality which can be achieved by CAD/CAM systems and software.

The 18-month follow-up in the case of EndoCrown showed no esthetic and functional degradation on clinical as well as radiographic examination. These results are in agreement with the previous studies.

Bindl and Mormann demonstrated similar results in a clinical study of Cerec EndoCrown shows that out of 19 EndoCrown only one molar

EndoCrown failed because of recurrent caries [9].



Fig. 8. Follow up after 18 months

Similar results were reported by Lander and Dietschvi where a three year follow up of Empress II EndoCrown shows excellent results in terms of esthetics, restoration stability, and tissue preservation [10].

Merits of EndoCrown over conventional crowns are-I. Reduced number of interfaces in the restorative system based on monoblock concepts, so Stress concentration is less because of less homogenous materials. II-The preparation design is conservative compared to the traditional crown maintaining biologic width and hence less damage to periodontium. III-Bonding surface offered by the pulpal chamber of the Endo Crown is often equal or even superior to that obtained from the bonding of a radicular post of 8 mm depth. IV- Application and polymerization of luting resin cement is also better controlled.

Case selection is critical as we all know due to differences in elastic modulus of harder ceramic and softer dentin so there are disadvantages such as debonding and risk of root fracture.

4. CONCLUSION

EndoCrown gives better retention in cases where there is more than half of the residual tooth remaining with minimal load and lateral stresses.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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