

Research Article

ENDOCROWN: ALTERNATIVE APPROACH BY CAD/CAM PROCEDURE

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ABSTRACT

Endocrown has emerged as a promising alternative for the aesthetic and functional restoration of a tooth that has undergone endodontic treatment. It can be difficult to restore the coronal portion of an endodontically treated tooth since retention and stability issues need to be taken into account. The mechanical properties of molars was lost after endodontic therapy. In fact, they became fragile as a result of the pulp and surrounding dentin tissues being removed. Endocrown is a suitable alternative for replacing molars with coronal destruction which is a single partial restoration. In this case study, the minimally invasive rehabilitation with new advanced lithium disilicate (IPS e.Max CAD) ceramic block is highlighted.

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INTRODUCTION

Endodontically treated tooth rehabilitation has been a debated topic for many years, with numerous advances since its inception¹. Now a days digitization is more popular word. The impacts of digitalization is on social life and dentistry also. The development of computerized technologies in restorative dentistry has led to an immense change for dentists and lab technician. In recent years, there has been a shift towards prosthesis of monolithic restorations to avoid veneering ceramic chipping on oxide ceramic frames².

The monoblock approach, first described by Pissis in 1995, was the predecessor of the endocrown. Bindl and Mormann coined the term "endocrown" in 1999. They described an adhesive monolithic ceramic restoration seated in the pulp chamber, taking use of the pulp-chamber walls micromechanical retention capabilities³.

The goal of this paper is to provide a clinical case highlights an aesthetic and conservative posterior endocrown was employed to reconstruct a mandibular molar that had undergone endodontic therapy and suffered from significant coronal damage. Through this paper, we shall discuss the indication and application of endocrown.

CASE REPORT

A 32-year-old male patient visited the Department of Conservative Dentistry and Endodontic was pain in the area of the lower left back tooth. A final diagnosis of symptomatic irreversible pulpitis was made after a clinical and radiographic evaluation, and root canal therapy was started.



Fig. 1 Root canal obturation on 36
Fig. 1 An inter occlusal clearance of 2 mm, a pulp chamber depth of 4 mm and a cervical margin of 2 mm were seen after the root canal therapy. Based on the thickness of the walls and the quantity of tooth structure still present, a post-endodontic restoration using lithium disilicate ceramic decided. As patient was not symptomatic with 36, planned procedure after 2 weeks.



Fig. 2 a) pre-operative, b) Gic placement, c) tooth preparation done for endocrown

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Rubber dam was used to achieve proper isolation the canal orifices' two millimeters of gutta percha were removed, and then glass ionomer cement used for sealing orifices (Fig. 2b). Using a coarse grit diamond-coated bur, the butt joint margin and a central retentive cavity were prepared. The depth from the pulp chamber ceiling to the intracoronal cavosurface margin was 4 mm. A WR-13 bur was used to reduce the buccal and lingual walls appropriately in order to achieve a 2 mm interocclusal clearance. The finish lines were positioned supragingivally extracoronally. Traditional resin composites were used to block the undercuts in the cavity. Shade selection was done in natural light of B2 shade (Vita pan classic, Vita Zahnfabrik).

After evaluating cavity margins the endocrown fabricated by using CAD CAM technology for this scanning is done (Fig.-3) by using intraoral scanner (shining 3D) then try in of prosthetic endocrown was done on patients mouth (Fig.4). Resin cement was used for cementation. The restoration was examined for any occlusal interference. Final restoration is shown in (Fig.5).

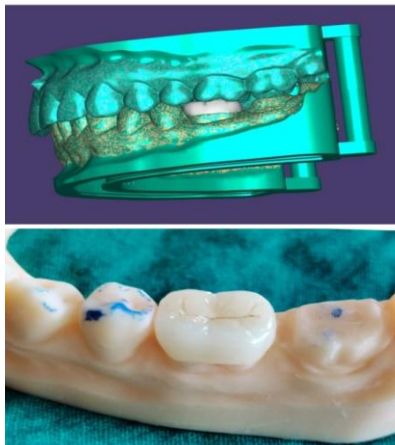


Fig. 3 a) Intraoral scanning done on 36
b) IPS e max Endocrown CAD CAM fabrication



Fig. 4 Preoperative before cementation



Fig. 5 Postoperative after cementation of endocrown

DISCUSSION

The clinical outcome of the post-endodontic restoration of severely damaged tooth structure depends on proper clinical planning and decision-making. Endocrown is indicated when molars have short, dilacerated, or fragile roots and exhibit large coronal destruction. It is contraindicated when a patient has parafunctional habits, low pulpal chamber depth < 3 mm, less cervical margin which is 2 mm, or when proper isolation and adhesion cannot be guaranteed⁴.

Endocrowns provide a more beneficial choice than conventional and post- and core-retained restorations due to the little and simple preparation required. Any prosthesis' long-term longevity depends on its fracture resistance, which is related to the occlusal thickness. Conventional restorations typically have a thickness of 1.5 to 2 mm, however endocrowns can have a thickness of up to 3-6 mm, providing increased occlusal stress loading⁵. Endocrowns take advantage of their monoblock structure to provide higher stress loading⁶. According to a systematic review by Sedrez Porto et al., assessed survival rate and fracture strength of endocrowns in comparison to conventional restorations using intraradicular posts, direct resin composites, and inlay/onlay restorations found to be better⁷.

In this study due to its aesthetic, adhesive, and mechanical interlocking with resin cement, the lithium disilicate ceramic used to create the study's endocrown offers an advantage over the alternatives. A study by Altier et al. that examined the fracture resistance of three different endocrowns constructed of indirect resin composite and lithium disilicate ceramic came to the conclusion that lithium disilicate had a higher fracture strength than indirect composite⁸. But in study by Tribst et al. found that leucite had a better distribution of stress and more trustworthy substitute for lithium disilicate in the production of endocrown⁹.

In a recent study, Polyether etherketone (PEEK) was suggested for usage in the creation of endocrowns. It demonstrated how indirect composite resin and PEEK's higher elastic moduli than ceramic will provide superior support for tooth structure¹⁰.

CONCLUSION

The preparation for endocrowns is quick. The technique does not include root canals, thus it is less stressful than others. The cervical margin's supragingival position shields the marginal gingival, aids impression taking, and retains the solid material of the surviving tooth. The pressure on the pulpal floor is moderated by dispersing forces over the cervical butt joint and shear force on axial walls. In dental practise, chairside restorations are becoming more and more significant. Dental professionals can create monolithic restorations in only one appointment with the possibility of laboratory finalisation thanks to commercially available ceramic blocks. This type of rebuilding, which is currently unusual, should aware to used and practised more broadly.

Ethical consent

Informed consent of patient for publication of photographs and radiographs was written on form.

Conflicts of interest

Declaration of no conflict interest with regard to the publication of this case report by this case report.

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Reference

1. Gupta R, Thakur S, Pandey NK, Roopa B, Fares KT. Endocrown–A paradigm shift in rehabilitation: A report of two cases. *Contemporary Clinical Dentistry*. 2021 Apr; 12(2):195.
2. F. Beuer, J. Schweiger, and D. Edelhoff, “Digital dentistry: an overview of recent developments for CAD/CAM generated restorations,” *British Dental Journal*, vol. 204, no. 9, pp. 505– 511, 2008.
3. Bindl A, Mörmann WH. Clinical evaluation of adhesively placed Cerec endo-crowns after 2 years Preliminary results. *J Adhes Dent* 1999; 1:255-65.
4. M. Fages and B. Bennaser, “The endocrown: a different type of all-ceramic reconstruction of molars,” *Journal of the Canadian Dental Association*, vol. 29, no. 79, article d140, 2013.
5. Motta AB, Pereira LC, Duda FP, Anusavice KJ. Influence of substructure design and occlusal reduction on the stress distribution in metal ceramic complete crowns: 3D finite element analysis. *J Prosthodont* 2014; 23:381-9.
6. Tay FR, Pashley DH. Monoblocks in root canals: A hypothetical or a tangible goal. *J Endod* 2007; 33:391-8.
7. Sedrez-Porto JA, Rosa WL, da Silva AF, Münchow EA, Pereira-Cenci T. Endocrown restorations: A systematic review and meta-analysis. *J Dent* 2016;52:8-14
8. Altier M, Erol F, Yildirim G, Dalkilic EE. Fracture resistance and failure modes of lithium disilicate or composite endocrowns. *Niger J Clin Pract* 2018; 21:821-6.
9. Tribst JP, Dal Piva AM, Madruga CF, Valera MC, Borges AL, Bresciani E, et al. Endocrown restorations: Influence of dental remnant and restorative material on stress distribution. *Dent Mater* 2018; 34:1466-73.
10. Zoidis P, Bakiri E, Polyzois G. Using modified polyetheretherketone (PEEK) as an alternative material for endocrown restorations: A short-term clinical report. *J Prosthet Dent* 2017; 117:335-9.
11. P. Zoidis, E. Bakiri, and G. Polyzois, “Using modified polyetheretherketone (PEEK) as an alternative material for endocrown restorations: a short-term clinical report,” *The Journal of Prosthetic Dentistry*, vol. 117, no. 3, pp. 335 –339, 2017.

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