CASE REPORT

Adaptive and Dynamic Endocrown Rehabilitation for Endodontically Treated Teeth: Report of Two Clinical Cases

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Abstract

Endocrowns represent a conservative restorative approach for endodontically treated posterior teeth with extensive coronal loss. By utilizing the pulp chamber for macromechanical retention and adhesive cementation, endocrowns eliminate the need for post placement while preserving remaining tooth structure. This report describes two clinical cases of endodontically treated posterior teeth restored with adhesively bonded lithium disilicate endocrowns and followed for 6 months. Teeth with significant coronal destruction were restored using adhesively bonded endocrowns following standardized preparation and cementation protocols. Clinical and radiographic evaluations were performed to assess marginal integrity, retention, occlusion, and biological response during the follow-up period. Periapical radiographs were used to assess the quality of the root canal filling, periapical status, and the presence of secondary caries or marginal discrepancies. All restorations demonstrated satisfactory functional and esthetic outcomes, with no evidence of debonding, fracture, or secondary caries during the 6-month follow-up. Within the limitations of a short observation period and two cases, the findings of this report support the use of endocrowns as a conservative restorative option for posterior teeth following endodontic treatment.

Keywords: Adhesive restorations, Case report, Conservative approach, Endocrown, Endodontically treated posterior teeth, Extensive coronal loss.

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Introduction

The clinical success of endodontically treated teeth largely depends on the quality of the postendodontic restoration, which should preserve remaining tooth structure while restoring function and esthetics.[1] Minimally invasive preparation is essential to maximize tissue conservation.[1] Although cast post-and-core systems were once considered the standard of care, studies have shown they do not consistently outperform other post systems and require multiple appointments, laboratory procedures, and increased cost, contributing to their reduced use.[2] Advances in adhesive dentistry have further challenged the traditional need for post-and-core restorations in devitalized teeth.[2]

Adhesive indirect restorations, including inlays, overlays, and endocrowns, have gained popularity as conservative alternatives to full-coverage crowns.[2–4] First introduced by Bindl and Mörmann, endocrowns offer simplified preparation, reduced clinical time, fewer patient visits, and excellent esthetics.[3,4] Biacchi and Basting demonstrated higher resistance to compressive forces in Emax endocrowns compared to conventional crowns supported by fiber posts.[5] Additionally, *in vitro* and finite element studies suggest that endocrowns can reduce coronal microleakage and favor a more favorable stress distribution compared with some post-and-core-supported restorations, which may support long-term endodontic success; however, most of this evidence is laboratory-based and should be interpreted with caution.[3,4] When sufficient tooth structure remains, endocrowns represent a clinically useful alternative to full-coverage crowns, particularly in teeth with reduced crown height, as suggested by available clinical and *in vitro* data.[3,4]

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Ethical Considerations

The procedures conformed to the ethical principles of the Declaration of Helsinki. Written informed consent was obtained from both patients for treatment and for the use of clinical and radiographic data for publication.

Case Description

Case I

The patient reported no parafunctional habits such as bruxism or clenching, and the occlusal scheme was mutually protected.

A 38-year-old female patient presented with difficulty in chewing due to extensive coronal tooth structure loss in the lower right posterior region. The patient had undergone root canal treatment 15 days earlier. Clinical examination of tooth 47 revealed severe coronal destruction with thin remaining walls; the tooth was asymptomatic

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and nontender to percussion. Radiographic evaluation showed a well-obturated root canal with no periapical pathology. Considering the clinical findings, an endocrown restoration was selected.

Shade selection (A2) for an IPS e.max lithium disilicate endocrown was performed prior to preparation. The temporary restoration was removed, and coronal orifices were sealed with glass ionomer cement followed by composite resin buildup. Circumferential supragingival shoulder margins of approximately 1.5 mm were prepared, along with 1.5 mm occlusal reduction to obtain a flat occlusal surface.

This shoulder preparation was selected to create a ferrule-like effect in sound enamel where possible. The pulp chamber and access cavity were unified using a 7–10° occlusal convergence while preserving the pulpal floor, with a minimum cavity depth of 3 mm for retention.

An impression was made using a dual-step polyvinyl siloxane technique and sent for laboratory fabrication. No provisional crown was provided to the patient until the definitive restoration was delivered. Cementation involved selective enamel etching with 37% phosphoric acid, application of a bonding agent, and light curing. Here, selective enamel etching was performed on the enamel margins to enhance micromechanical retention, while a self-adhesive dual-cure resin cement (Calibra Universal, Dentsply Sirona, Germany) was used to simplify the luting procedure on dentin, in accordance with reports that selective enamel etching can improve marginal integrity when self-adhesive or universal resin cements are used. The intaglio surface of the endocrown was etched with hydrofluoric acid, silanated, and cemented using self-adhesive resin cement. Excess cement was removed, and finishing and polishing were completed. Occlusion was adjusted to achieve harmonious contacts in maximum intercuspation and to avoid premature contacts or interferences in lateral and protrusive movements.

Case II

The patient reported no history of bruxism or other parafunctional habits, and clinical examination revealed a mutually protected occlusal scheme.

A 26-year-old male patient presented with difficulty in chewing due to extensive coronal tooth structure loss in the upper left posterior region. The patient had undergone root canal treatment 6 months earlier. Clinical and radiographic examination of tooth 26 revealed severe coronal destruction with thin remaining walls, a well-obturated root canal, and no periapical pathology. The tooth was asymptomatic and nontender to percussion. An endocrown restoration was selected after discussing treatment options.

Shade A2 was selected for an IPS e.max endocrown prior to preparation. Following removal of the temporary restoration, the pulpal chamber and coronal orifices were sealed with glass ionomer cement and composite resin buildup. A butt-joint preparation was performed with approximately 1.5 mm occlusal reduction. In this case, a flat butt-joint margin without a circumferential shoulder was used to preserve enamel and simplify preparation, following recommendations for conventional endocrown designs. The pulp chamber and access cavity were unified with a 7–10° occlusal convergence, maintaining a minimum depth of 3 mm for retention while preserving the pulpal floor.

Impression-making and cementation were carried out as described in case I.

Occlusal contacts were adjusted to ensure stable centric contacts and absence of eccentric interferences on the endocrown. Follow-up at 1, 3, and 6 months showed both patients to be asymptomatic, with satisfactory chewing ability, good marginal integrity, adequate retention, proper occlusion, and acceptable functional and esthetic outcomes.

Clinical evaluations at 1, 3, and 6 months utilized the Modified United States Public Health Service (USPHS) criteria, assessing categories including retention and fracture (Alpha: no loss or fracture), marginal adaptation (Alpha: no visible gap, no explorer catch), marginal discoloration (Alpha: none), anatomic form (Alpha: continuous with tooth form), surface texture (Alpha: smooth), color match (Alpha: matches adjacent tooth), and secondary caries (Alpha: none observed). All parameters scored Alpha across both cases, indicating excellent performance with no clinical failures.

Periapical (IOPA) radiographs in the first case at follow-up confirmed well-obturated root canals, absence of periapical radiolucencies, no secondary caries, and intact marginal adaptation without discrepancies. In the second case, bitewing radiographs showed no interproximal caries, preserved periodontal ligament space, and no signs of restoration overhangs or gaps, supporting the absence of biological complications.

Discussion

The success of endodontically treated teeth relies on both effective root canal therapy and high-quality restorations. Advances in adhesive dentistry and indirect ceramic restorations allow conservative partial-coverage restorations that preserve tooth structure and maintain biomechanical integrity.[6] Longevity is closely linked to the amount of remaining sound tooth structure, and conservative bonded restorations offer tissue preservation, reinforcement of residual structure, and improved esthetic and functional outcomes.[7]

Pissis first described the endocrown as a "monoblock porcelain technique,"[8] and in 1999 Bindl and Mörmann coined the term adhesive endodontic crown for full-coverage porcelain restorations bonded to posterior teeth.[4] Endocrowns integrate the post, core, and crown into a single restoration, combining macromechanical retention from the pulpal walls with micromechanical adhesion.[2,3] Compared with conventional crowns, they are simpler, faster, cost-effective, and esthetic.[2,3] Finite element studies suggest endocrowns may resist failure better than fiber-post supported restorations.[3,4,7,9] They are indicated for teeth with sufficient pulp chamber depth, especially when coronal tissue loss is extensive, interproximal space is limited, clinical crowns are short, or post placement is difficult.[2]

Endocrown preparations generally do not include a ferrule; however, an alternative design incorporates a shoulder finish line to create a ferrule effect.[7,9] This design retains the butt-joint concept with the addition of a 90° shoulder margin, approximately 1 mm wide and located in sound enamel.[7,9] The short axial walls formed by the shoulder help resist shear stress and improve load distribution across the pulpal floor. In both cases, the cavity depth

was maintained at 3 mm, consistent with recommended endocrown dimensions.[7]

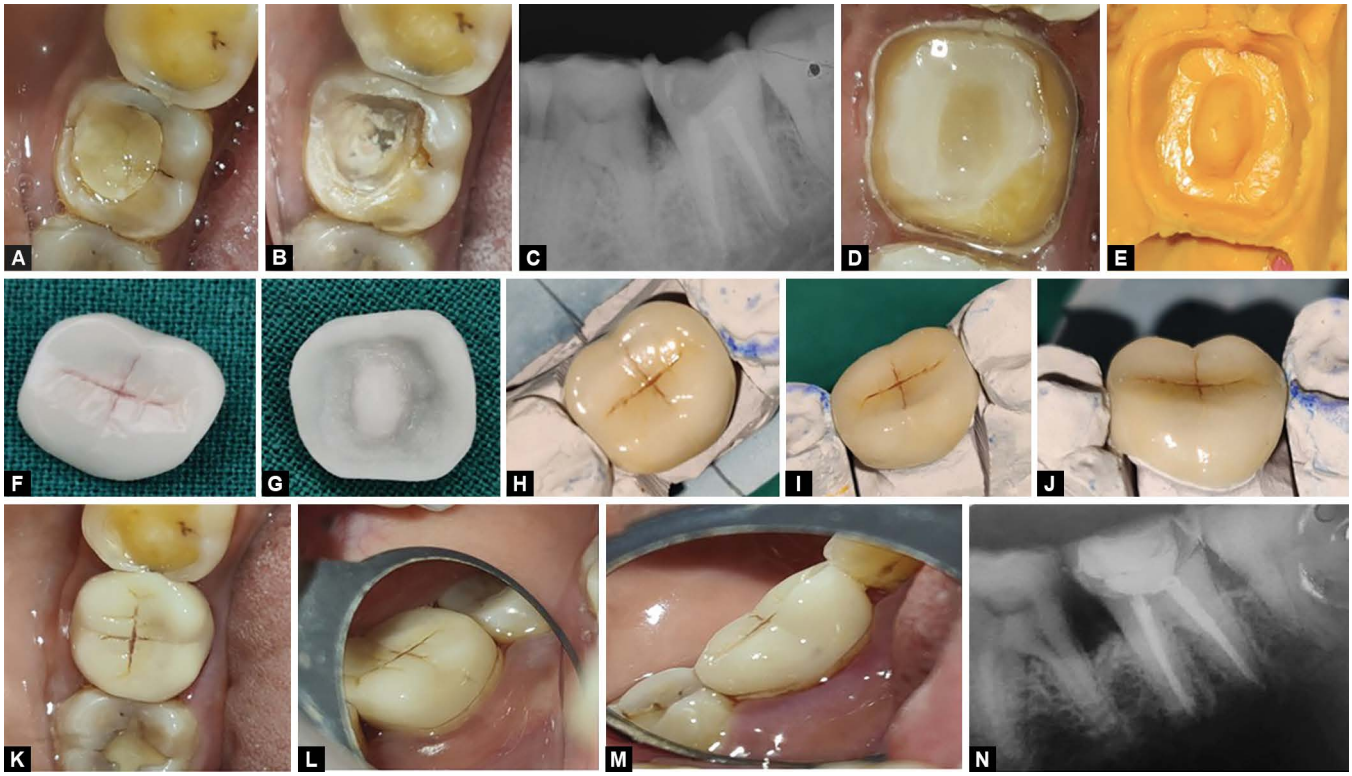
In the present report, a shoulder design with a ferrule-like effect was used in case I, whereas a conventional butt-joint design was used in case II, reflecting the differences in residual tooth structure and clinical crown height.[7,9] In case I, the shoulder margin was chosen to provide additional enamel support and improve resistance form, while in case II the butt-joint design was preferred to maximize tissue preservation and simplify preparation.[7,9]

Compared with the shoulder design incorporating a ferrule, the conventional butt-joint design is simpler and has demonstrated superior marginal integrity and internal adaptation.[7,9] However, studies evaluating ferrule and shoulder designs report conflicting results, with some indicating improved fracture resistance and reduced catastrophic failure with the shoulder design, while others show no significant difference between the two approaches.[7,9] Most of these findings are derived from *in vitro* or finite element analyses and should not be directly extrapolated to clinical performance without caution.[2,3,7,9]

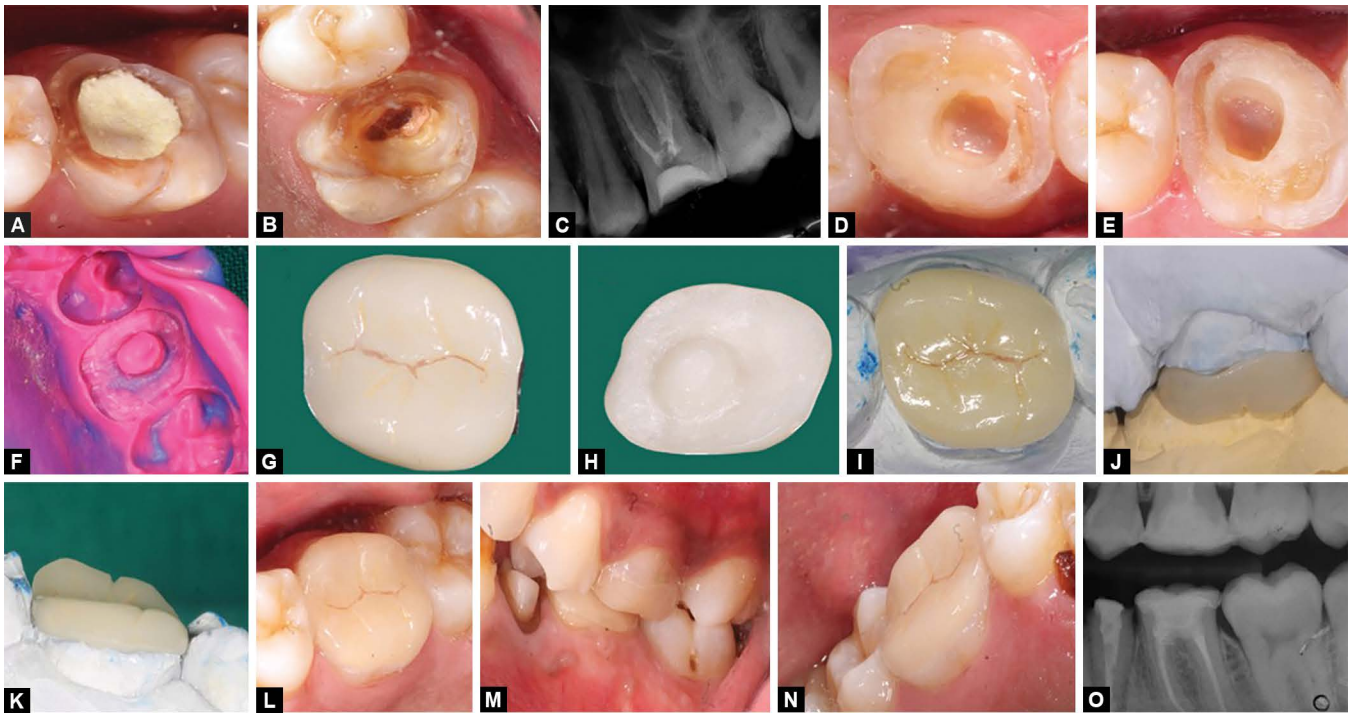
The two-step putty/wash impression technique has been shown to be more accurate than the one-step technique. Cementation was performed using a dual-cure self-adhesive resin cement (Calibra Universal, Dentsply Sirona, Germany), which ensures adequate polymerization beneath the endocrown.[7,9] A meta-analysis reported an estimated 5-year survival rate of 91.4% and a success rate of 77.7% for endocrown restorations.[10] However, the follow-up in the present cases was limited to 6 months, which does not allow any conclusions to be drawn regarding long-term survival.[10]

Lithium disilicate (IPS e.max) was selected because it provides a favorable combination of high fracture resistance, reliable adhesive bonding, and excellent translucency and color matching, which are advantageous for posterior endocrowns.[2–4] Finite element and *in vitro* studies have shown that lithium disilicate endocrowns display acceptable biomechanical behavior and predominantly repairable fracture patterns under functional loads.[2–4]

Proper occlusal design and adjustment are critical for the longevity of endocrowns because excessive or off-axis forces, particularly in the presence of parafunctional habits such as bruxism, can increase the risk of failure.[2–4] In both cases, the absence of parafunctional habits and the establishment of stable, well-distributed occlusal contacts likely contributed to the favorable short-term outcomes (Figs 1 and 2).[2–4]



Figs 1A to N: (A) Preoperative record; (B) After removal of temporary cement; (C) Preoperative IOPA; (D) Tooth preparation for endocrown; (E) Impression taken; (F) Fabricated lithium disilicate endocrown—occlusal surface; (G) Fabricated lithium disilicate endocrown—intaglio surface; (H) Fabricated lithium disilicate endocrown—occlusal view on model; (I) Fabricated lithium disilicate endocrown—lingual view on model; (J) Fabricated lithium disilicate endocrown—buccal surface on model; (K) After cementation—occlusal surface; (L) Buccal surface; (M) Lingual surface; (N) Postoperative IOPA



Figs 2A to O: (A) Preoperative record; (B) After removal of temporary cement; (C) Preoperative IOPA; (D) Composite build up; (E) Tooth preparation for endocrown; (F) Impression taken for endocrown; (G) Fabricated lithium disilicate endocrown—occlusal surface; (H) Fabricated lithium disilicate endocrown—intaglio surface; (I) Fabricated lithium disilicate endocrown—occlusal view on model; (J) Fabricated lithium disilicate endocrown—buccal view on model; (K) Fabricated lithium disilicate endocrown-palatal view on model; (L) Occlusal view after cementation; (M) Occlusion record; (N) Palatal view after cementation; (O) Postoperative radiograph

Conclusion

Within the limitations of two cases and a 6-month follow-up, lithium disilicate endocrowns provided satisfactory clinical and radiographic outcomes in endodontically treated posterior teeth with extensive coronal loss. The adhesive approach allowed preservation of remaining tooth structure and avoided the use of intraradicular posts. Endocrowns should be considered a conservative restorative option for carefully selected posterior teeth, provided that appropriate preparation design, occlusal management, and adhesive cementation protocols are followed. Long-term prospective studies with larger sample sizes are required before definitive conclusions about their predictability can be made.

Clinical Significance

Endocrowns offer a conservative, adhesive option for restoring endodontically treated posterior teeth with extensive coronal loss when adequate pulp chamber depth and enamel margins are present. The present cases illustrate that careful case selection, appropriate choice of preparation design (butt-joint or shoulder with ferrule-like effect), and meticulous adhesive cementation verified by Modified USPHS Alpha ratings and favorable IOPA/bitewing findings can lead to favorable short-term outcomes without the use of posts. Clinicians should remain aware that current evidence is still evolving and should avoid extrapolating short-term results to long-term success.

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Author Contributions

All authors have contributed equally to the study.

AI Disclosure

No AI tool is used in the preparation of this manuscript.

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References

1. Bejoy BM, Anitha S, George L. Conservative bonded restoration (an alternative to full coverage crown): a case report on endocrown. Cons Dent Endod J 2020;5(2):42–47. DOI: 10.5005/jp-journals-10048-0061
2. Polesel A. Restoration of the endodontically treated posterior tooth. G Ital Endod 2014;28(1):2–16. DOI: 10.1016/j.gien.2014.05.007
3. Hamdy A. Effect of full coverage, endocrowns, onlays, inlays restorations on fracture resistance of endodontically treated molars. J Dent Oral Health 2015;1(5):1–5.
4. Bindl A, Mörmann WH. Clinical evaluation of adhesively placed Cerec endo-crowns after 2 years—preliminary results. J Adhes Dent 1999;1(3):255–265. PMID: 11725673.
5. Biacchi GR, Basting RT. Comparison of fracture strength of endocrowns and glass fiber post-retained conventional crowns. Oper Dent 2012;37(2):130–136. DOI: 10.2341/11-105-L

6. Veselinovic V, Todorovic A, Lisjak D, et al. Restoring endodontically treated teeth with all ceramic endo-crowns: case report. Stomatoloski Glasnik Srbije 2008;55(1):54–64. DOI: 10.2298/SGS0801054V
7. Nagasiri R, Chitmongkolsuk S. Long-term survival of endodontically treated molars without crown coverage: a retrospective cohort study. J Prosthet Dent 2005;93(2):164–170. DOI: 10.1016/j.prosdent.2004.11.001
8. Pissis P. Fabrication of a metal-free ceramic restoration utilizing the monobloc technique. Pract Periodontics Aesthet Dent 1995;7(5):83–94. PMID: 7548896.
9. Elagra MEI. Endocrown preparation: review. Int J Appl Dent Sci 2019;5(1):253–256.
10. AlDabeeb DS, Alakeel NS, Al Jfshar RM, et al. Endocrowns: indications, preparation techniques, and material selection. Cureus 2023;15(12):e49947. DOI: 10.7759/cureus.49947