ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at:www.ijdsir.com
Volume – 9, Issue – 2, April – 2026, Page No. : 16 – 19

Beyond Posts and Cores - Endocrowns for Rehabilitation of Endodontically Treated Teeth: A Case Series

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Citation of this Article: Shruthi Venkateswaran, Nandhini Palanisamy, Jothi Lakshmi Shanmugavelu, Aravindhan Venkatapathi, "Beyond Posts and Cores - Endocrowns for Rehabilitation of Endodontically Treated Teeth: A Case Series", IJDSIR- April – 2026, Volume – 9, Issue – 2, P. No. 16 – 19.

Type of Publication: Case Series

Conflicts of Interest: Nil

Introduction

Rehabilitation of endodontically treated teeth with extensive coronal damage remains a persistent clinical challenge.[1] Loss of tooth structure due to caries, trauma, and endodontic procedures often compromises the strength of the tooth, making it more prone to fracture under functional forces.[2] Therefore, achieving an optimal balance between conservation of remaining tooth structure and adequate retention of the restoration is essential.[3] With the evolution of adhesive dentistry, the need for traditional post and core systems has reduced significantly.[4] Among the available restorative options, endocrowns have gained attention as a conservative and effective alternative, especially in cases with reduced clinical crown height and sufficient bonding surface.[5]

This case series aims to assess the clinical effectiveness of endocrowns in the conservative rehabilitation of structurally compromised endodontically treated teeth. [6]

Keywords: Dentistry, Intermittent, Rehabilitation, Radiolucency

Case Report 1:

A 47 year old male reported to the department of conservative dentistry and endodontics with the chief complaint of pain in left lower back tooth region of jaw for the past 3 months. History reveals that the pain is of sudden onset, intermittent, non-radiating pricking type.

History also reveals that the patient had his root canal treatment initiated in a private dental clinic before 1 month and because of certain reasons he could not continue the treatment in that clinic. His medical history was non-contributory. On radiographic examination, there was a radiolucency seen in the central aspect of coronal region of 37. At periapex, there is widening of periodontal ligament space with disruption of lamina dura suggestive of periapical abscess.

The entire procedures of root canal treatment have been explained to the patient and the patient was also keen on saving the tooth. The patient had a favourable occlusion and good oral hygiene. Following completion of endodontic therapy, 37 was prepared for an endocrown by reducing the occlusal surface to achieve adequate clearance, establishing a circumferential butt-joint margin, eliminating undercuts, and refining the pulp chamber to serve as the primary retentive feature. All internal line angles were rounded to enhance stress distribution. Subsequently, an all-ceramic endocrown was fabricated and cemented using an adhesive resin.

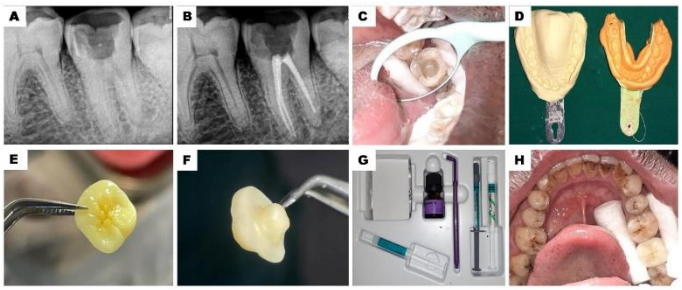

Fig 1: [A] PREOPERATIVE RADIOGRAPH [B] POSTOPERATIVE RADIOGRAPH [C] ENDOCROWN PREPARATION [D]PUTTY IMPRESSION [E, F] ENDOCROWN [G] RESIN CEMENT [H] ENDOCROWN CEMENTATION DONE.

Case Report 2:

A 29-year-old male presented with a fractured right mandibular first molar (46) of one month's duration. Clinical and radiographic examination revealed pulpal involvement, and root canal treatment was completed. Due to reduced crown height with inadequate coronal structure for conventional core retention, an endocrown was planned as a conservative post-endodontic option. Tooth preparation included 1.5–2 mm occlusal reduction and a 5 mm deep central retention cavity within the pulp chamber with slight divergence. An addition silicone impression was made, and a lithium disilicate (Emax) endocrown was fabricated. The intaglio surface was etched with hydrofluoric acid, treated with silane, while the tooth was etched with 37% phosphoric acid and bonded. The restoration was luted using resin cement, excess removed, and light cured for 20 seconds from all surfaces.

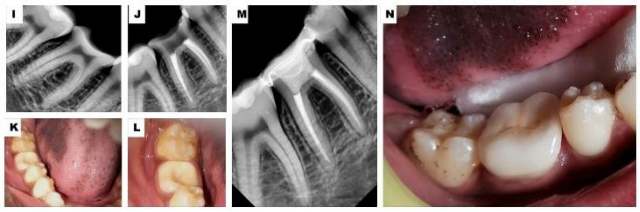

Fig 2: [I] PREOPERATIVE RADIOGRAPH [J] OBTURATION RADIOGRAPH [K& L] ACCESS CAVITY REFINED & ENDOCROWN PREAPARATION PHOTOGRAPH [M] ENDOCROWN LUTED RADIOGRAPH [N] ENDOCROWN LUTED PHOTOGRAPH

Case Report 3:

A 38-year-old male patient, presented with pain in the right maxillary posterior region for one week. Clinical examination revealed an existing amalgam restoration in 16. RVG showed coronal radiopacity with underlying radiolucency, suggestive of secondary caries involving the pulp. Root canal treatment was completed. Considering the minimal loss of tooth structure and intact distal proximal contact, a conservative preparation was performed, and a metal endocrown was fabricated. The restoration was luted using Type II glass ionomer cement.

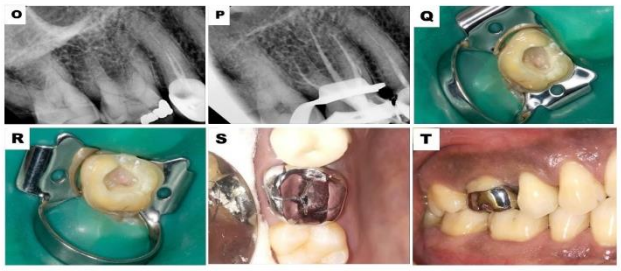

FIG 3: [O] PREOPERATIVE RADIOGRAPH [P] OBTURATION RADIOGRAPH [Q] ACCESS CAVITY REFINED [R] ENDOCROWN PREAPARATION [S&T] ENDOCROWN LUTED PHOTOGRAPH

Discussion

The endocrown represents a sophisticated evolution in restorative dentistry, shifting the clinical focus from traditional radicular posts toward a biomimetic, adhesive-based paradigm.[7] This restorative concept was formally introduced by Bindl and Mörmann in 1999, evolving from the monoblock concept proposed by Pissis.[5 8]

The clinical significance of endocrowns lies in their ability to utilize the pulp chamber as a retentive feature, thereby eliminating the need for invasive canal preparation.[9] Preservation of radicular dentin significantly reduces the risk of vertical root fractures commonly associated with post-and-core systems.[10]

The preparation protocol is designed to create a stable macro-retentive base while conserving sound tooth structure.[11] An occlusal reduction of approximately 2 mm ensures adequate material thickness, followed by a cervical butt joint margin of 1–1.2 mm for structural stability.[11] Internal divergence of 6°–8° with a minimum depth of 3 mm enhances bonding surface area.[11 12] Sealing of canal orifices and rounding of internal line angles help reduce stress concentration and protect the endodontic seal.[13]

Endocrowns are primarily indicated in molars with reduced clinical crown height or calcified canals where post placement is not feasible, whereas insufficient cervical enamel and deep subgingival margins serve as contraindications.[14] Biomechanically, endocrowns function as a single unit, distributing occlusal forces more evenly across the tooth structure.[15] Material selection plays a critical role, with lithium disilicate demonstrating favorable mechanical properties and fracture resistance.[6]

Compared to conventional crowns, endocrowns offer superior conservation of tooth structure, reduced procedural complexity, and improved esthetics.[7] Avoidance of radicular preparation minimizes procedural errors such as perforation.[10] Long-term clinical studies have demonstrated high success rates, reaching up to 98.8% over a 10-year period.[6] Overall, endocrowns represent a reliable, minimally invasive restorative option that aligns with modern prosthodontic principles of preserving biological structure while ensuring functional durability.[15]

Conclusion

This case highlights the clinical effectiveness of endocrown restorations as a conservative and reliable treatment option for endodontically treated teeth with extensive coronal loss. By preserving tooth structure and utilizing adhesive principles, endocrowns provide favorable esthetics, functional stability, and long-term success. Careful case selection, proper preparation design, and adherence to bonding protocols are essential to achieve optimal outcomes.

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