

The Rehabilitation of Severely Damaged Tooth Through Using a Customized Cast Post

Maher M. Jwaid¹, Qabas Alanni¹, Zainab Tariq Al-Atya², Rand Mohammed Falah¹, Ali Radhi Ibrahim¹

¹ College of Dentistry, Al-Hadi University, Baghdad, Iraq

² College of Dentistry, Al-Bayan University, Baghdad, Iraq

Abstract

Posts have been proposed to reinforce weak teeth that have undergone endodontic treatment, by transferring twisting pressures through the dentin of the tooth roots to the surrounding supporting tissue. The subsequent case studies applied an interdisciplinary approach in utilizing custom cast posts to restore severely damaged treated teeth, resulting in the complete restoration of their appearance and functionality. Ensuring a satisfactory outcome and satisfying the patient required the careful coordination of prosthetic and endodontic treatments, considering the patient's expectations and needs. Traditionally, a durable metal post and core were commonly employed over an extended duration to serve as the foundational restoration for a prosthetic crown. The cast post and core system offer the advantage of having the core seamlessly integrated with the post. The purpose of the post is to maintain the core restoration, which involves rebuilding the damaged coronal structure. This article discusses the use of cast post and core and zirconia restorations for a maxillary left premolar that has been damaged.

Keywords: Full crown, Cast metal post and core, Post and core, Prosthetic rehabilitation

Citation: Jwaid MM, et al. (2025) The Rehabilitation of Severely Damaged Tooth Through Using a Customized Cast Post. Dentistry 3000. 1:a001
doi:10.5195/d3000.2025.828
Received: January 18, 2025
Accepted: February 16, 2025
Published: April 11, 2025
Copyright: ©2025 Jwaidi MM, et al. This is an open access article licensed under a Creative Commons Attribution Work 4.0 United States License.
Email: maher.m@huc.edu.iq

Introduction

We are often required to repair teeth that have had endodontic treatment before the final restoration can be made [1]. Root canal-treated teeth, which had fractures, dental cavities, and previous restoration and endodontic procedures, have been found to be challenging to restore [2]. There are currently multiple techniques and materials that can be used to secure permanent restorations in place, and repair teeth that had root canal treatment with significant loss of the upper part of the tooth [3]. When additional support is needed to maintain the core and coronal restoration in place, a supplemental post is put into the

root of a tooth with insufficient structural support [4]. The primary objective of the post and core is to restore an adequate amount of coronal tooth structure, ensuring proper retention and resistance of the crown while also restoring the tooth's function and look. Metal is the most prevalent form of post utilized to secure the core in position [5]. A post-core restoration is recommended for a tooth that has experienced significant loss of the crown, is at risk of fracturing in the cervical area, is visibly discolored, has lost two adjacent surfaces, is shorter in length, has a weak retention structure, and is in good overall periodontal and periapical health [6]. The decision to employ a cast post or a prefabricated post is

influenced by two factors: the geometry of the canal and the amount of surviving tooth structure. According to claims, a properly fitted cast post and core is said to be more retentive than a prefabricated post that does not match the canal pattern, especially when the canal requires significant preparation [7]. The cast post and core, specifically engineered to endure torsional forces, are placed into the prepared root canal space [8]. This case report describes the process of rehabilitating a severely damaged premolar tooth using a custom-made cast support and a zirconia crown.

Case Report

A 33-year-old male patient presented to the Department of Dentistry at Al-Hadi University, Teaching Dental Clinics in Baghdad, Iraq. The patient's main concern was the unsatisfactory appearance caused by a dislodged restoration in the upper left region of the jaw. The patient expressed a wish to have the restoration replaced. The clinical examination identified the presence of secondary cavities together with dislodged restorations on tooth #24. The tooth had endodontic treatment as observed on the radiography examination. Periapical infection and periodontal widening were not observed. Therefore, our objective was to repair and restore the missing tooth structure to its original form and function. The treatment approach for the affected tooth included the use of a specially crafted cast post and core, followed by the application of a zirconia crown that fully covers tooth #24.

Treatment Steps

After the elimination of secondary caries, a post space was made using a peezo-reamer (MANI Inc., Japan) and an endodontic hand device to accommodate the post. The canal was meticulously prepared to guarantee a 4 mm layer of gutta-percha, which serves to maintain the periapical seal. The assessment of the apical seal and post-space preparation was conducted (Figure 1).

A non-direct method was employed in the production of metallic posts. The separating

media was placed to the prepared post space, and a 24 impression was taken by Zetaplus C Silicone Impression Material (Zhermack, Germany) with the assistance of a dental wood wedge (Figure 2).



Figure 1. Space preparation for a custom-made cast post. For an apical seal, it was left at least 4 mm of gutta-percha in the canal and a preparation up to the #5 peeso reamer was done.



The post was affixed with Breeze Self-Adhesive Resin Cement (Kerr, USA). Subsequently, the teeth had preparation with a circumferential chamfer (Figure 3). Impressions were created using silicone impression material. The process of selecting shades has been completed. The ZIRCONIA crown was cemented using dual cure

resin cement (breeze, Kerr, USA), as shown as Figure 3.

Impressions were created using silicone impression material. The process of selecting shades has been completed. The ZIRCONIA crown was affixed using breeze, as shown as Figure 4.

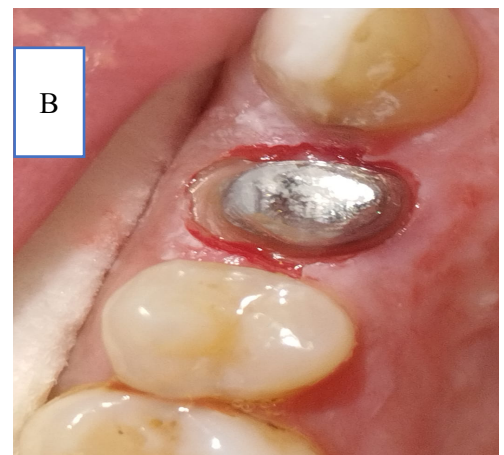
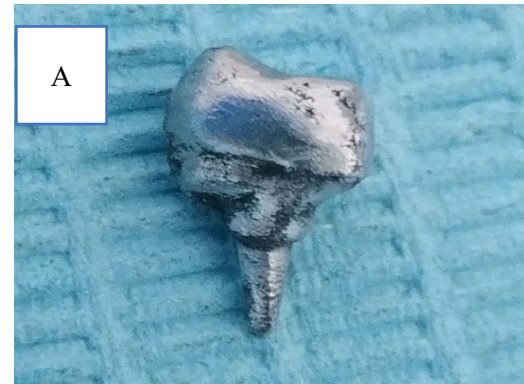


Figure 3. A custom-made cast post was created and cemented intraorally.

A: Cobalt-chromium alloy cast post; B: Ferrule preparation for remaining coronal tooth structure and cemented cast post.

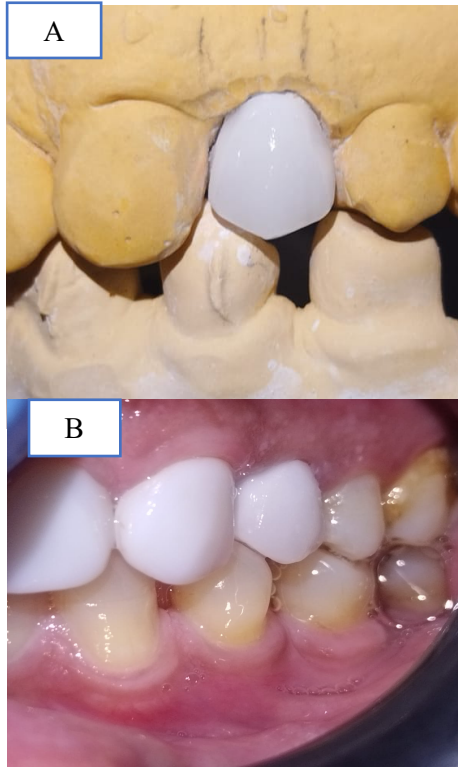


Figure 4. Zirconia-ceramic crowns with #24.

A: Metal-ceramic crowns seated on the cast; B: Crowns cemented intra-orally with light cure resin cement.

Discussion

Custom cast post fabrication is the preferred method for achieving optimal retention and resistance when rehabilitating both the aesthetic and functional aspects of teeth. Post and core restoration is considered the fundamental process for repairing damaged teeth. In 2020 Phang ZY et al. assessed the long-term success rate of metal posts in the follow-ups and compared the success rates of cast and metal posts over a 7-year period [8].

Suleiman AB et al In a 52.9-month follow-up study, the outcome of ETT restored with CMPC was favorable. CMPC may be

regarded as a viable restorative option for structurally deficient ETT [9].

The primary objective of this procedure is to ensure the core restoration, which replaces the missing coronal structure, is in position by providing retention. Both prefabricated composite and one-piece customized posts and cores are viable alternatives.[10] In this case report, custom cast posts and cores were the most advanced method of restoring teeth that had previously undergone endodontic treatment. In the present day, prefabricated posts are frequently preferred to custom cast posts and cores. On the other hand, cast posts and cores offer their own benefits, including the preservation of the maximum quantity of tooth structure and improved flexibility in the root canal. It is not necessary for the post to retain its essence, as it is an intrinsic component. An additional characteristic is an anti-rotational property. Conversely, it necessitates numerous visits [11]. The prefabricated posts (Zirconia) are available with metal posts (stainless steel, titanium), fiber posts (carbon, glass), and ceramic posts. The prefabricated posts may have a circular cross-section and may have a variety of surface characteristics, including serrated, smooth, threaded, and roughened. Parallel and tapered post configurations are available for use, and corresponding drills are included to create post gaps [12].

Conclusion

When selecting the optimal post and core systems, it is important to examine factors such as the quantity and quality of maintained tooth structure, esthetic needs, as well as the indications, advantages, and disadvantages associated with each option. Extensive research exists that compares the efficacy and utilization of different types of posts and the diverse materials employed in their construction. Further research is needed to validate the approach outlined in the case report, although it is a straightforward, efficient, and offers a possible substitute for preserving extensively damaged or rotting teeth. The procedure of fabricating a distinct post and core has yielded favorable results

Conflicts of interest

The authors declare no competing interest.

References

- [1] B. Bhuvu, M. Giovarruscio, N. Rahim, K. Bitter, and F. Mannocci, 'The restoration of root filled teeth: a review of the clinical literature', *Int Endod J*, vol. 54, no. 4, pp. 509–535, Apr. 2021, doi: 10.1111/iej.13438.
- [2] U. Umre, S. Sedani, P. P. Nikhade, and A. Bansod, 'A case report on the rehabilitation of severely worn teeth using a custom-made cast post', *Cureus*, Oct. 2022,

doi: 10.7759/cureus.30528.

[3] B. Bhuvu, M. Giovarruscio, N. Rahim, K. Bitter, and F. Mannocci, 'The restoration of root filled teeth: a review of the clinical literature', *Int Endod J*, vol. 54, no. 4, pp. 509–535, Apr. 2021, doi: 10.1111/iej.13438.

[4] M. Kocacikli, 'General Consideration of Post Systems', *Cumhuriyet Dental Journal*, vol. 26, no. 1, pp. 87–96, Mar. 2023, doi: 10.7126/cumudj.1236585.

[5] M. Zahran, M. El-Madhoun, S. Redwan, K. Merdad, H. Sonbul, and D. Sabbahi, 'Treatment concepts for restorations of endodontically treated teeth: Survey of dentists in Jeddah city, Saudi Arabia', *Saudi Endodontic Journal*, vol. 11, no. 2, p. 154, 2021, doi: 10.4103/sej.sej_167_20.

[6] G. M. Parentela, 'Mental health research studies in Saudi Arabia for the years 2009–2019; a systematic scoping review', *Arch Psychiatr Nurs*, vol. 35, no. 2, pp. 232–241, Apr. 2021, doi: 10.1016/j.apnu.2021.01.001.

[7] T. Pranati, M. Ranjan, and A. Hima Sandeep, 'Marginal adaptability of custom made cast post made by different techniques-A literature review', *Int J Dent Oral Sci*, vol. 8, no. 8, pp. 3954–3959, 2021, doi: 10.19070/2377-8075-21000809.

[8] Z. Phang, S. Quek, K. Teoh, K. Tan, and K. Tan, 'A retrospective study on the success, survival, and incidence of complications of post-retained restorations in premolars supporting fixed dental prostheses with a mean of 7 years in function', *Int J Prosthodont*, vol. 33, no. 2, pp. 176–183, Mar. 2020, doi: 10.11607/ijp.6090.

[9] A. Ben Suleiman et al., 'The outcomes of endodontically treated teeth restored with custom-made cast post-and-core restorations: A

retrospective cohort study', *J Endod*, Dec. 2023, doi:

10.1016/j.joen.2023.12.006.

[10] D. abdulhameed April, 'Restoration of endodontically treated teeth of conservative, in Partial Fulfillment for the Bachelor of Esthetic and Restorative Dentistry Nabaa ali fadhel', 2023.

[11] D. M. Vikhe, 'Restoration of Endodontically Treated Teeth', 2022.

[Online]. Available: www.intechopen.com

[12] M. Ranjan, 'Marginal adaptability of custom made cast post made by different techniques - A literature review', *Int J Dent Oral Sci*, pp. 3954–3959, Aug. 2021, doi: 10.19070/2377-8075-21000809.