

CASE REPORT**Revitalizing smiles: a case report on cast post rehabilitation of anterior teeth**Harshita Gupta¹, Sakshi Jain¹, Shivani Deshwal¹, Unnati Mishra¹**Abstract**

INTRODUCTION- Although it is an older, traditional production method, the cast metal post and core remain a preferred choice for restoring severely damaged teeth. However, the direct technique used to create cast post-and-core patterns can be challenging due to inefficiencies and uncertainty in achieving the correct form and dimensions for the core segment. This article introduces deals with the technique for fabrication of cast post-and-core system, focusing on the desired dimensions for the final restoration.

OBJECTIVE: The objective of this report was to create a cast post-and-core system for cases with a compromised crown-to-root ratio and to restore the smile by providing a prosthesis.

CASE DESCRIPTION: A 24-year-old male reported to the outpatient Department of Conservative Dentistry and Endodontics, Kothiwal Dental college and Research Centre, Moradabad, presented with a chief complaint of fractured prosthesis in the upper front tooth region for the past 1 year. He had previously completed root canal treatment on the same tooth a year ago.

CONCLUSION: The classic cast post and core is still a useful and essential foundation restoration; however, the process of fabrication can be tedious. After cast post and core systems followed by full coverage crown. This approach effectively addresses both functional and aesthetic concerns.

KEYWORDS: cast post and core. esthetics. layered zirconia restoration.

1. Introduction:

In earlier days, extraction was the suggested treatment of choice for most teeth that were grossly carious, but today, the focus of dental therapy has shifted to a more conservative approach. The overwhelming success of endodontic therapy has allowed for not only the restoration of such teeth, but such teeth has also reinstated it as a long-term functional unit inside the oral cavity. The techniques and guidelines of how and when to restore endodontically treated teeth has evolved from clinical tradition and anecdotal descriptions.¹ According to the literature, endodontically treated teeth are generally more brittle and prone to fractures compared to non-endodontically treated teeth.²⁻⁴ This increased susceptibility is believed to stem from the loss of tooth structure due to caries, trauma, or both.^{4, 5} Some clinicians advocate for the placement of a post in the root after endodontic treatment to enhance its strength. However, other studies indicate that posts may not actually reinforce teeth; rather, the process of creating a post space and inserting a post can weaken the root, potentially leading to fractures.⁶⁻⁹

These studies recommend using a post only when there is inadequate tooth structure remaining to support the final restoration. When evaluating an endodontically treated tooth for restorative work, it is essential to assume that sound judgments have been made regarding the tooth's periodontal health, remaining structure, and the prognosis of the endodontic treatment. The tooth should display a good apical seal on the radiograph and show no signs of sensitivity to percussion or palpation, no exudate, no fistula, no apical sensitivity, and no signs of active inflammation.¹⁰ The restoration of endodontically treated teeth with limited remaining coronal tooth structure often requires the use of post-and-core restorations. A post serves to retain the core material, which serves to replace the missing tooth structure to provide adequate resistance and retention form for a crown.¹¹

Post-endodontic restoration significantly influences the long-term outlook of treated teeth, with cast post and core systems serving as a fundamental element in effectively restoring compromised tooth structures. When paired with full coverage crowns, this method is successful in addressing moderate to severe tooth structure loss, guaranteeing both functional stability and aesthetic enhancement.¹²

2. Case Report

A 24-year-old male reported to the outpatient reported to the outpatient Department of Conservative Dentistry and Endodontics, Kothiwal Dental college and Research Centre, Moradabad, presented with a chief complaint of fractured prosthesis in the upper front tooth region for the past 1 year. He had previously completed root canal treatment on the same tooth a year ago.

He identified as a vegetarian and denied any history of smoking, alcoholism, tobacco chewing, bruxism, or clenching, expressing a desire for aesthetic improvement. His medical history was unremarkable.

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On intraoral examination revealed secondary caries with dislodged prosthesis with #11 as shown in Figure 1.

On radiographic examination, the anterior teeth were endodontically treated. There were no signs of periapical infection and periodontal widening as shown in Figure 2; hence, our goal was to restore the form and function of the lost tooth structure. The treatment plan for the involved teeth included a custom-made cast post and core followed by layered zirconia crown with #11.

Clinical steps

After removing secondary caries, post space was prepared with 11 using a peezo-reamer #1 through #4 (MANI Inc., Japan) and an endodontic hand instrument to accept the post. The canal was prepared in a manner to ensure 4 mm of gutta-percha to maintain the periapical seal. The apical seal and post-space preparation were evaluated.

An indirect technique was used for the fabrication of metallic posts. The separating media was applied to the prepared post space, and an impression of 11 was made with inlay wax (Kerr Dental) with the help of a toothpick (Figure 3). The fabricated post was cemented using zinc-phosphate cement (Prevest Denpro, USA) (Figure 4). Postoperative radiographic shown in Figure 5.

Following it, the teeth were prepared with a circumferential chamfer, including 1.5 mm of ferrule preparation.

After that upper and lower impressions were taken for crown prosthesis. Then, zirconia crown placed with #11 shown in Figure 6. Establishment of patient's esthetics and function was hence achieved.



Figure 3 – Wax pattern



Figure 4 – Cast Post cementation (a) buccal view; (b) palatal view



Figure 1 - Clinical pre-operative photograph

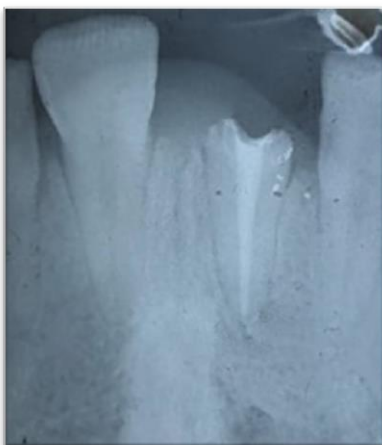


Figure 2 – Preoperative Radiograph



Figure 5 – Postoperative radiograph



FIGURE 6 - Zirconia crown with #11 (a) Zirconia crown seated on the cast; (b) Crowns cemented intra-orally with luting resin modified glass ionomer cement

Discussion

For rehabilitation of esthetic and functional teeth, custom cast post fabrication is considered for best retention and resistance. For mutilated teeth, post and core restoration is regarded as the cornerstone procedure.

In 2005, Cruegers et al. studied the success rates of cast and metal posts over a 60-month period, evaluating the long-term effectiveness of metal posts during follow-ups.¹³ Similarly, a 109-month follow-up study by Ellner et al. in 2003 found that the success rates of cast and metal dowels were comparable.¹⁴ The main objective of this procedure is to preserve the core restoration, which replaces lost coronal structure by providing retention. Both prefabricated composite posts and one-piece custom posts and cores serve as alternatives.¹⁵ To facilitate the eventual restoration of a severely damaged tooth with an indirect extra coronal restoration, the majority of the coronal portion is typically restored using a post-and-core system.¹⁶

In the case report, custom cast posts and cores were considered the gold standard for restoring teeth that had undergone endodontic treatment. However, today, prefabricated posts are often preferred over custom cast options. Despite this trend, cast posts and cores offer distinct advantages, including enhanced adaptability to the root canal and the ability to preserve more natural tooth structure. Since the core is an integral part of the post, it doesn't have to rely solely on the post for support.

An important feature of custom cast posts is their anti-rotational property, although they require multiple visits for placement.¹⁷ The benefits of using custom cast posts for root canal and crown preparation include enhanced strength and minimal loss of tooth structure. The strength of a tooth is

closely tied to the amount of remaining tooth structure, making preservation of as much tooth structure as possible vital for the success of post and core restorations.¹⁸ In contrast, prefabricated cylindrical posts primarily depend on cement for retention, which can lead to decreased core retention and an increased risk of rotation—key drawbacks of this post type.¹⁹

Prefabricated posts are available in various materials, including metal (stainless steel and titanium), fiber (carbon and glass), and ceramic (zirconia). These prefabricated posts come with different surface characteristics and may feature circular cross-sections, which can be serrated, smooth, threaded, or roughened. Additionally, they can be found in both parallel and tapered shapes, and corresponding drills are provided to create post spaces.¹⁸

3. Conclusion

When selecting the optimal post and core systems, it is essential to consider the quantity and quality of preserved tooth structure, aesthetic requirements, as well as the indications, advantages, and disadvantages of each option. A significant body of research compares the effectiveness and applications of different types of posts and the materials used to manufacture them. While additional studies are needed to further validate the method outlined in the case report, it is straightforward, effective, and offers a viable alternative for preserving severely damaged or decayed teeth. The process of fabricating a custom post and core has yielded successful results.

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