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Aesthetic rehabilitation of an anterior tooth with customized cast post and core

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Abstract

The judicious post endodontic restoration of the tooth afterwards the accomplishment of endodontic management, is just as bossy for the effective cure of teeth with striking tooth structural disfigurement as, is the eminence of the endodontic rehabilitation. The pivotal objective of the post is to retain the core that ropes/pulleys the absolute prosthesis. When there is diminutive tooth structure left, a post and core also encouragements in augmenting the fracture confrontation after root canal management. The genus of post endodontic restoration must be elected with consideration for the diversity of post schemes obtainable and the clinical scenario. A custom cast post and core are endorsed when a noteworthy aggregate of tooth structure has been removed or if not ample ferrule is accessible. The overhaul of carious anterior tooth is publicized in the case study below, utilising custom cast post and PFM crown.

Keywords: Custom cast post, anterior teeth, post endodontic restoration, ferrule

Introduction

The assortment of a satisfactory post endodontic restorative substantial might be challenging for relentlessly dented endodontically treated tooth with less coronal tooth assembly left because of a gigantic predating restoration or extensive access cavity preparation^[1]. Clinicians are recurrently confronted with the verdict of whether to use a partial or full coverage crown, a direct or indirect restoration or a post. Once more, electing between custom-cast and prefabricated posts is blurred. Franklin Weine stresses that the bulk of endodontically treated teeth frequently flop after root canal therapy due to subpar post endodontic restoration rather than the initial endodontic reason^[2]. When selecting a post-endodontic restorative material, contemplations such as the expanse of coronal tooth structure still existent after root canal treatment, the tooth's purposeful necessities, aesthetics, the patient's age, and the state of their periodontal health must be made^[3].

Composite resin can be used to modernize anterior teeth that have endured endodontic treatment if there is only a little to judicious loss of tooth assembly and no discoloration, since this abates the vulnerability of the tooth to fracture^[4, 5]. Composite resin can be used to renovate teeth with an unspoiled cingulum/incisal edge and one or two trivial proximal lesions^[6]. If a tooth that has had a root canal blemished, non-vital bleaching is counselled before direct or indirect veneers. The choice between direct composite or full coverage restoration in circumstances of endodontically treated teeth with noteworthy tooth construction loss (50%) depends on the tooth's site and occlusal loading state. In order to upturn core retention and fracture resistance, endodontically treated teeth with crack lines, severe occlusal loading, mesial and distal caries, or cervical abrasion indubitably need intraradicular posts^[7].

Post and core tracked by full coverage restoration is mandatory for anterior teeth that have more than 50% of their tooth assembly lingering^[8]. There are several different post systems available, ranging from older cast metal posts to more modern fibre posts. The use of fibre posts as an alternative to metal posts is buttressed by their uncomplicatedness of use, less time requests, and reachable laboratory and clinical statistics. This does not entail that bespoke/personalized/custom-built cast posts are no longer worthwhile in therapeutic settings today. Adapted cast post is still an appropriate choice when changing the core's angulation and when there has been more tooth structure lost.

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Case Presentation

The foremost complaint of a 43 year old male patient who visited the Conservative Dentistry and Endodontics department was that his upper front tooth was fractured and desired to be filled. The patient strongly pronounced that a year ago, he experienced discomfort in the upper front tooth that progressively went away after taking medicine. Without losing vertical dimension, guided occlusion was present, with a satisfactory overjet and overbite. The tooth was non

responsive to any pulp sensitivity tests and did not provoke pain on percussion.

Our objectives were to cure the implicated tooth's pulpal infection and profit the tooth to its superlative states of form, function and aesthetics. The treatment plan included endodontic therapy tracked by cast post and core and finally completed by porcelain bonded to metal crown for tooth #11. (Figure 1 to 4).

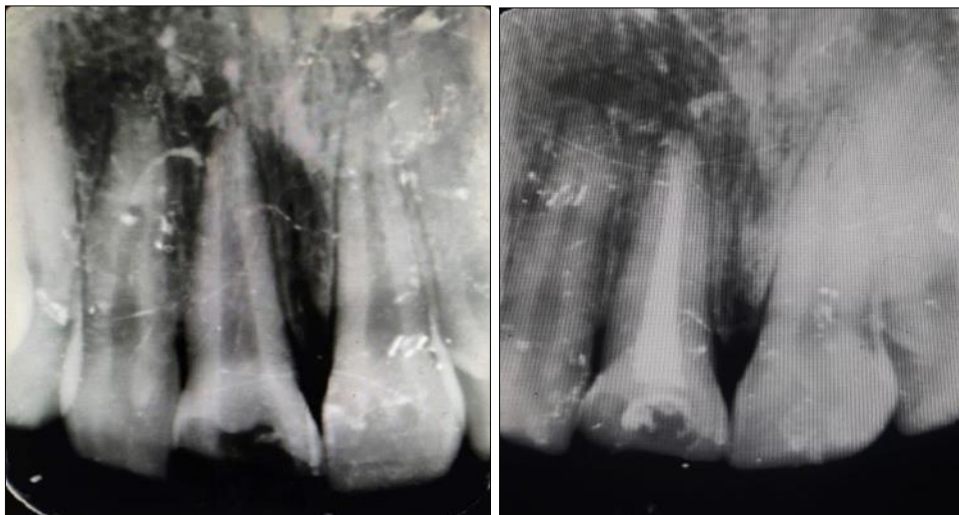


Fig 1a: Preoperative Radiographic image of tooth #11. b) Obturation completed w.r.t. tooth #11.



Fig 2a: Apical seal maintained by preserving 3-5mm apical gutta percha along with preparation of the post space w.r.t. tooth #11. b) Clinical image showing crown dentine prepared to receive the ferrule w.r.t. tooth #11



Fig 3a: Occlusal view of tooth #11 showing dentine prepared to receive the ferrule w.r.t. tooth #11. b) Wax pattern prepared w.r.t. tooth #11



Fig 4a: Customised post placed in the post space w.r.t. tooth #11 b) Post operative clinical picture.

Discussion

In 91.4% of the teeth, a virtuous post endodontic restoration and admirable endodontic therapy recurrently upshot in the soothing of periapical inflammation, but a bad restoration and a poor endodontic treatment only seldom led to the absence of periradicular inflammation. Furthermore, the success rate was 67.6% when bad endodontic therapy was followed by satisfactory permanent restoration. This demonstrated unequivocally that, contrary to Trope and Ray's suggestion^[9] the outcome of endodontically treated teeth depended much more on the post endodontic restoration. It is essential to assess the benefits and drawbacks of both during treatment planning in light of the vast variety of post systems on the market and the movement in clinical practise from conventional custom cast posts to prefabricated posts.

Endodontically treated teeth and teeth with fractures are often renovated with full coverage crowns over bespoke metallic cast posts or prefabricated post and cores. Metal ceramic or all-ceramic crowns are both acceptable options for full coverage. Custom cast post and core repair has the benefit of a tight fit, little cement-to-luting interaction, and built-in antirotation mechanism^[10]. They also benefit from prodigious strength and less tooth bargain during groundwork for the root canal crown. The degree of tooth structural retention is critical to the triumph of post and core^[11]. Due to numerous factors, counting substantial loss of anterior tooth assembly, coronal impairment, and functional rehabilitation, custom-made metallic post and core paired with metal ceramic individual crowns were hired in this case.

The tenacity of the post is to fortify and securely clutch the core for crown retention, however it does not reinforce or upkeep the teeth that have had endodontic management^[12-16]. Cast posts, whether oval or elliptical, might be consumed in all layouts of canals and authorize the canal contour. Cast posts, unlike other prefabricated posts, can be employed for reparation of proclined teeth by creating an inconsequential refinement to the core angulation^[10]. Furthermore, cast metal posts have validated amended survival rates over a 10-year period, according to Gomez Polo *et al.*^[11]. Rendering to Santos Filho PC *et al.*, it was discovered that front teeth that were mended/renovated with a cast post and core and metal ceramic crowns had amplified fracture resistance due to the existence of a 2mm crown ferrule encompassing any surviving tooth structure. A boosted stress dissemination to the root may be to blame for this^[12]. Posts having a great modulus of elasticity fared better, following a systematic review by Rafael Sarkis Onofre *et al.*^[13].

Since there is less tooth structure offered for bonding in the absence of a ferrule and there are no long-term studies on fiber posts to upkeep this, cast posts with a superior modulus

of elasticity are desirable^[14]. The amalgamation of numerous mechanical parameters, not merely the post's material, governs the apparatus of let-down and the fracture resistance of swapped teeth. Nevertheless, cast posts are endorsed in some irrefutable circumstances, such as in teeth without cervical toughness or in teeth with considerable impairment, where there is no ferrule or where a ferrule cannot be attained. The cervical section of the crown surrounds the circumferential hoop of tooth construction acknowledged as the ferrule. It entertainments as a prop to enrich the veracity of a root canal treated tooth. Furthermore, it physiologically transfers the occlusal strains to the periodontium, empowering the crown and root to graft together as a solitary well-designed unit^[15].

Additionally, it has been validated that alternative metal and non-metal post systems with a 2mm ferrule in teeth refurbished with metal crowns depressed the grade of stress absorption in dentin^[16]. As a consequence, as long as plentiful dentin was present, the toughness of the post and core materials did not seem to ominously affect the strain values and fracture resistance. Additionally, according to Santos Filho PC *et al.*, front teeth that were repaired with a cast post and core and metal ceramic crowns had amplified fracture resistance due to the existence of a 2mm crown ferrule encompassing any surviving tooth structure^[12].

In this instance, cast posts were nominated for post endodontic restoration followed by full coverage restoration since tooth #11 showed reduced peri-cervical tooth structure. Having a good palatal ferrule is just as beneficial as having a perfect continuous 360 degree ferrule in maxillary incisors.

Either an all-ceramic crown with a zirconia coping to cover the discoloration or a porcelain fused to metal crown would be the best option in this situation. PFM crowns were selected as the ultimate restoration with consideration for the patient's financial situation.

Zinc phosphate, glass ionomer cement (GIC), polycarboxylate, resin-modified glass ionomers, and composite resins are the five primary categories of cements used for post cementation. Among these, GIC is more widely utilised. Through chemical retention, GIC clings to dentin. The two fundamental processes in the setting reaction of GIC are the consumption of the water contained in their initial chemical composition and the water present in the dentinal tubules. An initial constriction was seen during the setting response, followed by a rise in volume brought on by hygroscopic expansion. This better contact between the GIC and dentin increased post retention.^[19]

In order to guarantee complete filling of the post space with no gaps and an even coating of the canal walls, the modified method of cementation employing glass ionomer was

espoused in this case. As the luting cement needs to be handled, put into the syringe, and administered in the post area before the post and core are placed, the procedure calls for rapid handling. When the plunger is squeezed, luting cement that has a thick consistency will hinder correct flow through the needle, which might result in inadequate material or failure to fill the post space [15]. Therefore, a pumping motion was used to insert the cast post and core into the canal. This enables sufficient coronal venting of the luting cement and averts hydraulic pressure buildup.

Conclusion

The figure and superiority of residual tooth assembly, aesthetic norms, as well as their indications, benefits and flaws, should all be taken into contemplation when electing the paramount post and core system. For the restoration of sternly lost coronal tooth structure with unsatisfactory ferrule and for the retention of metal-ceramic crowns, cast metallic posts and cores are counselled. Cast metal supports and metal ceramic crowns were used in this instance to restore the patient's appearance and functionality for the anterior teeth.

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