



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2020; 6(3): 84-86
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www.oraljournal.com
Received: 08-05-2020
Accepted: 10-06-2020

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Rehabilitation of endodontically treated tooth with cast post and core: A case study

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Abstract

Endodontic retreatment, when properly indicated, allows the maintenance of dental elements. The successful treatment of teeth with substantial damage to the tooth structure not only depends on good endodontic treatment, but also on prompt post endodontic restoration of the tooth after the completion of the same. The evolution of endodontic techniques and materials has reduced the indication of surgical procedures even for teeth with intracanal posts. When a large amount of tooth structure is lost or if an insufficient ferrule is present, a custom cast post and core is indicated.

Keywords: Cast post, post and core, ferrule, post endodontic restoration

Introduction

According to literature endodontically treated teeth are more brittle and may fracture more easily than non-endodontically treated teeth [1-3]. It is believed that it is the loss of tooth structure from caries, trauma or both that makes endodontically treated teeth more susceptible to fracture [4, 5]. Some clinicians believe that a post should be placed into the root after endodontic treatment to strengthen or reinforce it. Some studies, however, point out that posts do not strengthen teeth, but instead that the preparation of a post space and the placement of a post can weaken the root and may lead to root fracture [6-9]. These studies further suggest that a post should be used only when there is insufficient tooth substance remaining to support the final restoration. When assessing an endodontically treated tooth for restorative treatment, it has to be assumed that good judgments have been made previously concerning the periodontal status of the tooth, the remaining tooth structure, and the prognosis of the endodontic treatment. The tooth to be restored should exhibit a good apical seal when evaluating the radiograph, and also exhibit no sensitivity to percussion or palpation, no exudates, no fistula, no apical sensitivity, and no active inflammation [10].

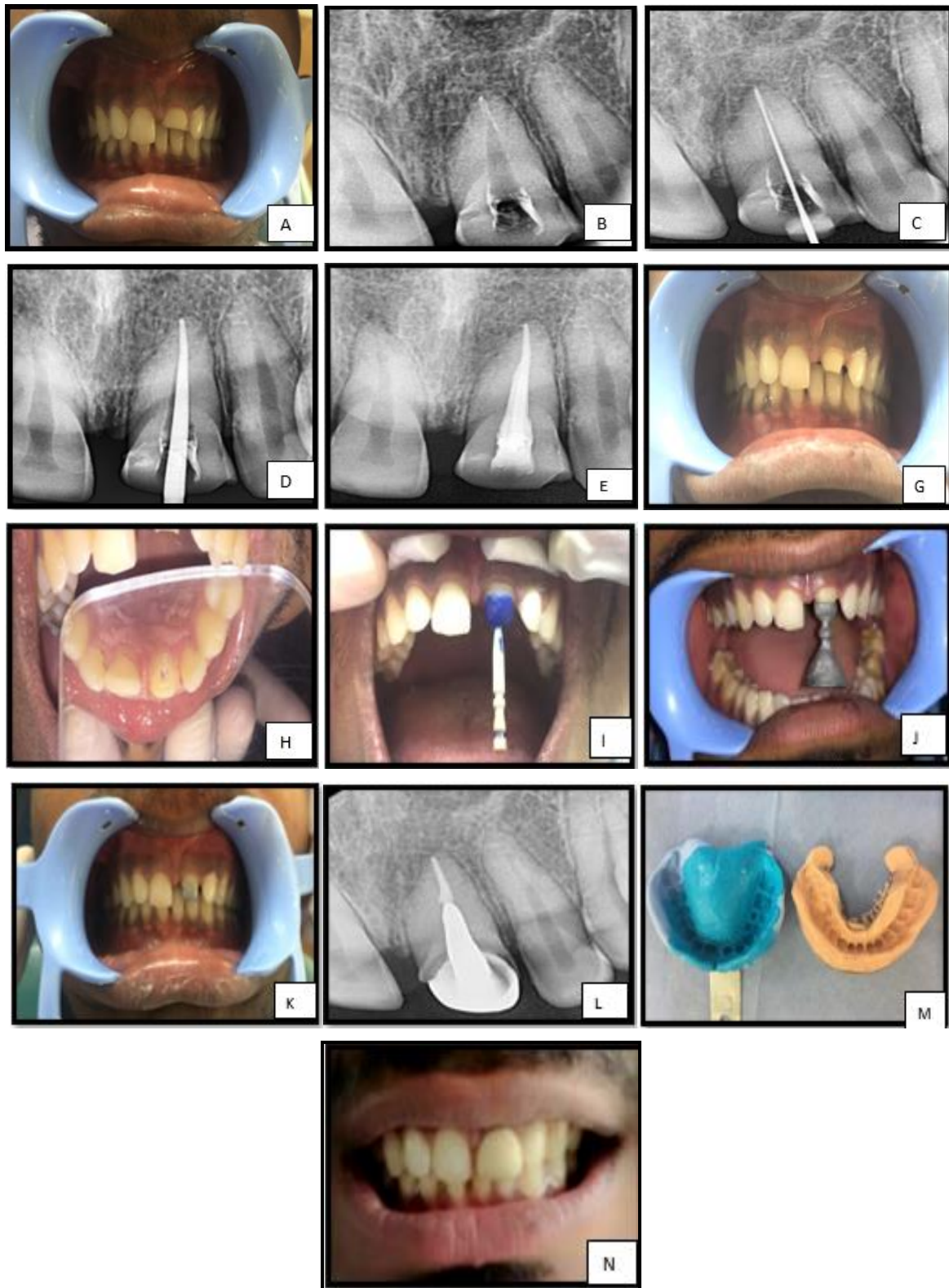
This case report shows restoration of maxillary incisors by custom cast post followed by porcelain fused to metal restorations.

Case report

A 26 years old male patient came to the department of Conservative Dentistry and Endodontics with the chief complaint of broken upper front teeth and wanted to get that treated. Patient was apparently asymptomatic 3 years back when he met with an accident and the tooth in the front region of his upper jaw broke off. There was no history of pain or swelling in the region. Patient has previously undergone root canal treatment in the same tooth that was not completed. After examination there was no tenderness on percussion and no pain on palpation.

Biomechanical preparation was done using hand files in a step back technique and intracanal medicament of calcium hydroxide was placed in relation to 21 for 1 week. On recall obturation was completed using gutta percha by lateral compaction technique. After obturation the 2/3 of gutta percha was removed using peeso reamer. Then the tooth preparation was done and the ferrule was created in relation to 21. Finally the wax pattern was taken for cast post. After the cast post was luted the upper and lower impressions were taken for crown prosthesis. Establishment of patient's esthetics and function was hence achieved.

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(A)Preoperative clinical picture (B) Preoperative radiographic picture (C)Working length determination (D) Master cone radiograph (E) Obturation (F) Space created for wax pattern (G) Tooth preparation done (H) Palatal view tooth prep (I) Wax pattern taken (J) Cast post before cementation (K) Post Cementation picture (L) Post cementation radiograph (M) Impression (N) PFM crown placed

Discussion

When the remaining tooth structure cannot provide adequate support and retention for restoration, endodontically treated teeth are usually restored with posts. Restoring these teeth using materials with a similar elastic modulus to dentine appears advantageous due to the reduced risk of root fracture. The fracture resistance of endodontically treated teeth has been reported to be principally dependent on the amount of remaining tooth structure and adhesive surface, the quality of

adhesion, and the type of post because posts increase the fracture resistance of the root, especially in the absence of a full crown^[11]. Cast posts conform to the canal morphology and can be used in all types of canal configurations- oval or elliptical. A slight change in core angulation can be done using cast posts and hence they can be used for correcting proclined teeth unlike other prefabricated posts^[12]. Also, according to Gomez Polo *et al.*, cast metal posts have shown higher survival rates over 10 years^[13].

Ferrule is the circumferential ring of tooth structure that is enveloped by the cervical portion of the crown. It provides a bracing action to improve the integrity of root canal treated tooth. It allows the crown and root to function as an integrated unit and transmits the occlusal forces to the periodontium physiologically^[14]. It has also been shown that a 2mm ferrule in teeth restored with metal crowns reduced the level of stress concentration in dentin for different metal and non-metal post systems^[15]. Thus, stiffness of the post and core materials did not appear to significantly influence the strain values and fracture resistance as long as sufficient dentin remained. Also, according to Santos Filho PC *et al.*, it has been reported that the presence of a 2mm crown ferrule surrounding remaining tooth structure enhanced fracture resistance of anterior teeth which were restored with a cast post and core and metal ceramic crowns^[16]. The choice of crown in this case was porcelain fused to metal crown.

Conclusion

The anatomical post constituted a clinical alternative for coronal and radicular reconstruction on endodontically treated teeth with significant destruction of dentin tissue. In addition to rehabilitating the tooth, this clinical proposal promotes a more balanced distribution of tensions from mastication without compromising the remaining tooth, minimizing the risks of radicular fracture. The use of cast metallic posts and cores are recommended to restore severe loss of coronal tooth structure with insufficient ferrule and to retain metal-ceramic crowns. Establishment of esthetics and function for the patient has been achieved in this case using cast metal posts and metal ceramic crowns for rehabilitation of anterior teeth.

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