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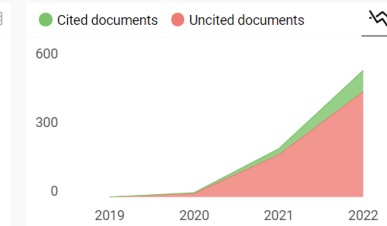
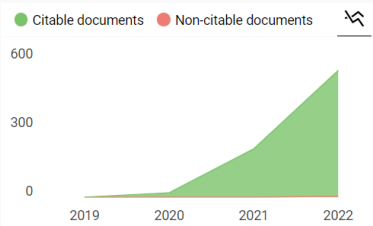
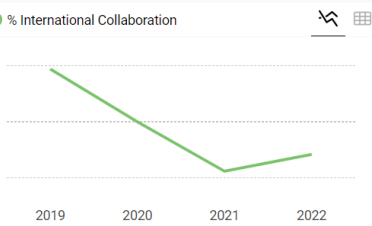
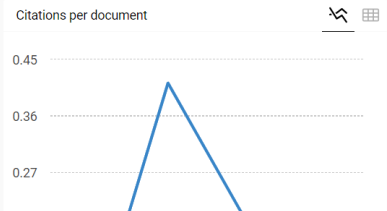
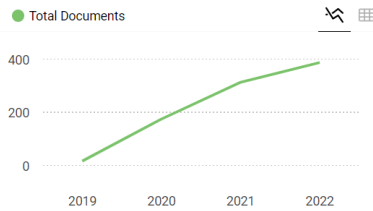
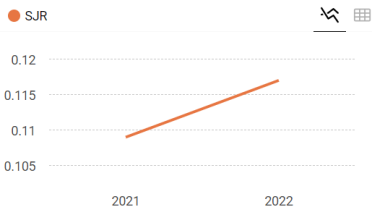
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A 3-month follow-up of fiber post placement after MTA plug in apexification

Caecilia Caroline Aliwarga¹, Eko Fibryanto^{2*}, Selviana Wulansari²

ABSTRACT

Introduction: The use of fiber posts and self-adhesive resin cement for intraradicular reinforcement has been suggested to improve the outlook for teeth with structural compromises. While the modulus elasticity of gutta-percha is lower 175-230 times than dentin, fiber post has a similar modulus elasticity to dentin. It is also known that conventional root canal sealers do not adhere well to dentin and gutta-percha. Since MTA exhibits superior sealing capacity compared to gutta-percha as an apical seal for teeth indicated for post and core, it should be considered to put fiber post directly after the MTA plug.

Case Illustration: 14-year-old female patient came with a chief complaint of unaesthetic upper front teeth. The accurate diagnosis was achieved through the assistance of radiological examinations. The potential treatment alternatives were deliberated with the parents of the patient. The upper left front teeth underwent root canal therapy, with the use of MTA as an apical plug. The canal was delicately cleaned using a #60 H-file along with irrigation using 1.5% NaOCl and 17% EDTA. An MTA plug was positioned in the apical region of the root canal, and a glass fiber post was inserted for reinforcing the root, followed by the placement of a crown.

Conclusion: The findings in this case report indicate that utilizing a fiber post after MTA plug insertion offers a practical option for achieving root end closure. This approach proves to be a straightforward and effective procedure, yielding excellent aesthetic and functional results. Despite the limitations of this case, the described technique permitted satisfactory results in teeth requiring apexification with post core restoration.

Keywords: Apexification, mineral trioxide aggregate, fiber post, post core technique.

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INTRODUCTION

The suggestion of intraradicular reinforcement involving a fiber post and self-adhesive resin cement aims to improve the overall prognosis for teeth that are structurally compromised. While the modulus elasticity of gutta-percha is lower 175-230 times than dentin, fiber post has a similar modulus elasticity to dentin. It is acknowledged that traditional root canal sealers do not bond effectively to dentin and gutta-percha. MTA has been recommended for establishing an apical plug at the root end, contributing to the prevention of filling material extrusion. MTA is composed of small hydrophilic particles, including tricalcium silicate, silicate oxide, and tricalcium oxide. When MTA is combined with sterile water, it transforms into a colloidal gel, with a setting time of 3-4 hours in the presence of moisture. Due to its superior sealing ability compared to gutta-percha for apical sealing in teeth designated for post and core, it is advisable to directly place a fiber post after the MTA plug.

CASE ILLUSTRATION

14-year-old female patient came with a chief complaint of unaesthetic upper front teeth. The proper diagnosis was made with the help of radiological investigation (Figure 1A). The potential treatment alternatives were deliberated with the parents of the patient. Subsequently, root canal therapy was performed on the upper left front teeth, employing MTA as an apical

plug. The canal was carefully cleaned using a #60 H-file, along with irrigation using 1.5% NaOCl and 17% EDTA. To achieve canal disinfection before MTA placement, the canal was dried with paper points, and then calcium hydroxide was inserted into the root canal, followed by the placement of a sterile cotton pellet. After the initial appointment, the access cavity was sealed with a temporary restoration material. The patient was scheduled for a follow-



Figure 1. (A) Preoperative radiograph of maxillary left central incisor with an open apex, (B) Radiographic evaluation of MTA in the apical area, (C) Fiber post placement with dual-cure resin cement, (D) Radiograph after three months.

up one week later. During the subsequent appointment, the tooth was re-accessed, and calcium hydroxide was removed using 1.5% NaOCl irrigation and 17% EDTA. The canal was then dried with paper points. MTA, prepared according to the manufacturer's instructions, was placed with a carrier and adapted using hand pluggers in the 4 mm apical portion of the canal, confirmed radiographically. An MTA plug was positioned in the apical area of the root canal (Figure 1B), followed by the placement of a glass fiber post using dual-cure resin cement (Figure 1C). The procedure continued with crown placement, and a follow-up was conducted after three months (Figure 1D). At the three-month clinical follow-up, satisfactory clinical function was observed, and there were no clinical symptoms.

DISCUSSION

The use of a fiber post reduces the likelihood of restorative failure and provides more effective support against tensile stress. Additionally, fiber posts may contribute to a more uniform distribution of forces along the root, minimizing stress concentrations.¹ In this case, the fiber post was placed over the MTA apical plug without backfilling with gutta-percha. Fiber post was cemented with dual-cure resin cement. The literature shows that composite resin can be placed directly over MTA with no adverse reactions.^{2,3} Zhabuawala et al. assessed the fracture resistance of simulated immature teeth by utilizing a biodentine apical plug and

backfilling with gutta-percha, dual-cure resin, and Biodentine.⁴ During immediate testing, the dual-cure resin group exhibited a higher mean fracture resistance, followed by the Biodentine and gutta-percha groups, respectively.⁴ Directly inserting a fiber post into MTA could prove to be an efficient procedure, reducing treatment time and material usage. However, a drawback of this technique is the limited availability of clinical data concerning the adhesion between resin cement and MTA, as fiber posts are typically placed in root canals using resin cement adhesive.⁵

CONCLUSION

The outcome in this case report suggests that fiber post placement after MTA plug provides a viable alternative to achieve root end closure and can be a simple and efficient procedure with excellent functional results. Despite the limitations of this case, the described technique permitted satisfactory results in teeth requiring apexification with post core restoration. Additional clinical studies are advised to validate the efficacy of this approach.

CONFLICT OF INTEREST

The authors affirm that they have no conflicts of interest.

ETHICAL CLEARANCE

Written informed consent was obtained from the patient and parent.

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AUTHORS CONTRIBUTION

Caecilia Caroline Aliwarga: Writing-Original draft preparation. Eko Fibryanto: Supervision, Writing- Reviewing and Editing. Selviana Wulansari: Supervision, Writing- Reviewing and Editing.

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