

Pre-Treated Post Placement in Primary Maxillary Incisors-A Case Report

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Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Introduction: Restoring grossly carious primary teeth is challenging compared to permanent teeth which have a greater bulk of tooth structure to offer promising retention for restorations. Pulpal involvement in primary teeth is faster and endodontic intervention further leaves very little tooth structure.

Aim/Objectives: The presentation of the clinical sequence of restoration of the maxillary anterior primary tooth with coronal destruction(62) in a 4-year-old female child.

Case Report: Endodontic treatment was done in 62 followed by the placement of a pre-treated glass fiber-reinforced composite resin post and the crown reconstruction with composite restoration and child's esthetic was restored with 51,61 restored using composite followed with strip crown. The case was followed for a period of 1 year.

Result: The child's esthetics was maintained during 1 year follow up of Pre-treated glass fiber reinforced composite resin post and composite core build-up in 62 was functional clinically.

Conclusion: Pre-treated composite resin post-restoration in primary teeth can be a better alternative to extraction and space maintainers in the maintenance of severely destructed primary anterior crowns.

Keywords: Pre-Treated, fiber reinforced, strip crown, post.

Introduction

Severe early childhood caries is a devastating condition for both the child and their concerned parents¹. It is not very uncommon to see young patients with multiple grossly decayed anterior as well as posterior primary teeth. Restoring primary teeth is important not only for mastication, speech, alveolar growth and harmonious stomatomusculoskeletal system but also for the psychological well-being of the child. Restoring grossly carious primary teeth is challenging compared to permanent teeth which have a greater bulk of tooth structure to offer promising retention for restorations. Pulpal involvement in primary teeth is faster and endodontic intervention further leaves very little tooth structure².

The most preferred restoration of primary anterior is preformed crowns and composite resin followed by strip crown. The indications for strip crowns include extensive decay of the primary anterior teeth, fractured or malformed teeth, teeth that exhibit discoloration, and as coverage for teeth that have received pulp therapy. Conversely, strip crowns are contraindicated in cases where primary teeth are too severely decayed that they present with insufficient tooth structure for retention and bonding³.

In cases where permanent teeth are severely decayed, endodontic treatment and placement of intracanal posts or retainers become necessary before crown restoration. Posts may be constructed of a variety of materials, including resin composite, metal, and biologic material. In recent years, various types of fiber reinforcement have come into widespread use as an alternative to cast or prefabricated metal posts in the restoration of endodontically treated teeth. The advantages of using reinforced fiber to construct an intracanal post include resin composite crown reinforcement, translucency, and relative ease of manipulation⁴. Glass impregnated fiber as post and core in primary anterior has shown good retention and marginal adaptation after 12-month follow-up in comparison with omega-shaped stainless steel wire.⁵

The bond strength the fiber post and the core were found to be not sufficient to withstand the occlusal stresses. So, the surface pretreatment of the fiber post was commonly employed to improve the adhesion property of the material. Vano et al, recommended treatment of glass fiber posts with Hydrogen Peroxide as an effective method to improve the clinical performance of methacrylate - resin-based glass fiber posts⁶. Yenisey et al, demonstrated H₂O₂ to be the most effective pre-treatment of glass and quartz fiber post and core to improve shear bond strength of post and core. Advances in the surface treatments of the fiber

posts represent one of the most important factor⁷. Wherein, influences the interfacial bond strength between fiber posts and core build-up materials⁸. Pre-treatment of fiber post with ascorbic acid has shown an improved success rate of post systems and aid in the esthetic restoration of grossly destructed primary and permanent anterior.

Case Description

A 4-year-old child reported to the Department of Pediatric Dentistry with a chief complaint of a decayed upper front tooth. Intraoral examination revealed dental caries in relation to 51, 61, 62, 64, 65, 74, 75 and 84(Fig A). The child was asymptomatic and there was no history of pain or swelling in relation to any of the teeth. The treatment sequence followed were oral prophylaxis and non-fluoride remineralizing agent (GC MI Varnish™ Recaldent, fresh mint flavor) application, with post-application and brushing instruction. GIC restoration of 64, 65 and 74 and 84 pulpectomies followed by stainless steel cementation. After 3 months the patient was reviewed (Fig B) and the non-fluoride remineralizing agent was reapplied and recalled after 3 months which showed the arrest of caries was observed in relation to 51,61and 62. To restore the esthetic smile of the child strip crown restoration was made in 51 and 61(Fig C) whereas, the crown structure was very minimal for the placement of strip crown in 62. Hence pulpectomy followed by post and core placement was decided.



Fig a: Pre-treatment photograph of 4 year old child

Single sitting pulpectomy using zinc oxide eugenol as obturating material was done (Fig D). After 2 weeks the patient was recalled for post and core placement. Glass fiber reinforced composite resin post, a new generation of fiber posts composed of densely packed silanated glass fibers 7 to 10 μm in diameter in light-cure gel matrix was used. This was selected as its flexural strength reported 1280 MPa which is closer to dentin, thus expected decrease root fracture. Greater ease of handling and can be used in high stress-bearing areas. Also, they are invisible in the resin matrix and hence most suitable for esthetic purpose¹



Fig b: Arrest of caries in one year follow up

Pre- Treatment of Post

The post was pretreated by immersing it in 24% hydrogen peroxide for 10 minutes and then rinsed with water followed by immersing the post in 2% Ascorbic acid for 5 minutes and rinsed with water.

Post Placement

Post space of 3 mm was created by removing the obturating material using the piezo reamer. The post was placed and the excess trimmed using bur so that 2mm was visible outside and was luted using GIC. The core was built using composite and strip crown restoration (Fig E).

Follow UP

First, follow up was done within one month, and subsequent follow up in 3 months and 6 months. The patient was asymptomatic and no fracture or damage to

the restoration was noted even after 1 year of the treatment.



Fig c: Strip crown placed irt 51& 61



Fig d: Pulpectomy was done in relation to 62



Fig e: Post is then placed and excess trimmed using bur so that 2mm is visible outside and it is luted using gic



Fig g: Strip crown placed in relation to 62

Discussion

Restoring grossly carious primary teeth is challenging compared to permanent teeth which have a greater bulk of tooth structure to offer promising retention for restorations. Pulpal involvement in primary teeth is faster and endodontic intervention further leaves very little tooth structure. To prepare these mutilated primary anterior teeth to receive complete coronal restorations, retention is gained from short intracanal posts². An ideal post and core should be resorbable but it should provide adequate retention and resistance. The post should be well adapted to the inner dentinal wall as it is one of the factors governing the retention of the restoration¹.

The development of the fiber-reinforced composite technology has brought a new material into the realm of metal-free adhesive esthetic dentistry. Different fiber types such as glass fibers, carbon fibers, Kevlar fibers, Vectran fibers, and polyethylene fibers have been added to composite materials. The properties of fiber-reinforced posts are dependent on the nature of the matrix, fibers, interface strength, and geometry of reinforcement. The advantages of this material over the older fibers are greater flexural strength (1280MPa), and over 650MPa of the older fibers, greater ease of handling, can be used in high stress-bearing areas and can be bonded to any type of composites.⁴ Al-Eheideb and Herman (2003) reported a 70% success rate for 23 teeth with composite resin strip crowns followed between 6 and 27 months³. Lack of proper adhesion between the fiber post surface and the resin cement as well as the resin cement and the intra-coronal dentin are clearly the most challenging aspects and clinical failures are common outcomes. Methods to improve the adhesion between the post surface and the resin material used for cementation haven't been extensively investigated, and dentists are still looking for a

simple protocol using common chemical solutions available in the dental office able to create a better adhesion between the fiber post surface and the resin cement⁹. The bond strength achieved with the fiber post and the core is not sufficient enough to withstand the occlusal stresses. So, the surface pretreatment of the fiber post was commonly employed to improve the adhesion property of the material⁸. The use of antioxidant agents significantly increases the microtensile bond strength between hydrogen peroxide(H₂O₂) pre-treated glass fiber posts and composite resin core. The results of one of our studies unpublished demonstrated that ascorbic acid showed the highest effect followed by proanthocyanidin and lycopene on the microtensile bond strength between H₂O₂ pretreated glass fiber posts and composite resin core. In this case report, we have presented a case where glass fiber reinforced post was placed in primary anterior after pre-treatment with H₂O₂ and ascorbic acid followed by strip crown placement with follow up of 1 year being functional with adjacent teeth restored after treating with remineralizing agents. This procedure followed in the management of compromised primary anterior resulted in better aesthetics and self-esteem of the child.

Conclusion

This method of Glass Fibre Reinforced Composite Resin post and core for restoring mutilated primary anterior has shown promising results and has presented the pediatric dental world with an additional treatment option. The treatment described in the case report was reassuring for the child.

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