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Case Study

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FIBER REINFORCED COMPOSITE BRIDGE: A CASE REPORT

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ABSTRACT

The development of fiber reinforced composite prosthesis offers new possibilities in minimally invasive tooth replacement approaches. This article describes the use of pre-impregnated glass fiber for the chair-side fabrication of a definitive fixed partial denture for replacement of missing mandibular central incisor.

KEYWORDS: Fiber, fixed partial dentures, composite.

INTRODUCTION

The replacement of a single tooth lost due to dental caries or trauma is a challenge for the clinician. Several restorative options have been proposed in such clinical situations: implants, fixed metal ceramic or ceramic prostheses and resin bonded fixed partial dentures (FPDs). However, economic factors, occlusal disturbances, lack of adequate bone support or excessive removal of healthy dental structure are some of the limiting factors in the indication of some restorative alternatives. The evolution of adhesive dentistry has significantly modified the concepts of traditional dentistry toward the minimal intervention approach.[1]

CASE REPORT

A 22 years old female patient came to our department (Department of Prosthodontics and Crown & Bridge), with a chief complaint of missing tooth in lower left front tooth region. She was very apprehensive about her esthetics and wants rehabilitation for the same. Due to lack of bone width and periodontically compromised abutments, the treatment options of implant and porcelain fused metal bridge were excluded. And then we had planned for fiber reinforced composite bridge, so as to fulfill patient's demand without jeopardizing the abutments. This was the single visit treatment option. For this a dovetail cavity was prepared on mesial surface of 32 and 41, which were 2 mm deep and 3 mm wide inciso-gingivally and mesio-distally. The prepared cavity should not extend towards the distal surface of the tooth but it should involve the mesial line angle. Before preparing the cavity for the composite build-up, first and foremost cut the fiber of the exact distance, while placing the one end of the fiber in cavity of 32 and then the other end in 41 within the contour of the arch. Now place the sectioned fiber aside. Then the cavity is etched with etchant and washed after 30-45 seconds. After air drying the prepared site, adhesive was applied and light cured. Now the sectioned fiber was aligned horizontally, flowable composite was applied into cavities and cured, so as to stabilize the fiber then bulk-fill composite was packed over the cavities on 32 & 41 and cured. After this a vertical fiber was attached at the position where the missing tooth was to be replaced. This vertical fiber should not touch the gingival (approx 2 mm above) and must be 1 mm below the incisal surface, later on these spaces can be occupied with the composite while shaping the tooth. After properly analyzing the alignment of the fiber, then we had applied bulk-fill composite (shade A2, shade selection was done prior the commencement of the treatment) in increments so as to shape the composite into proper tooth morphology of 31, and remove occlusal interference, if present. Then the prosthesis was finished and polished. And patient's esthetics and needs were re-build. Patient was kept on weekly follow ups for a month.

Pre-operative frontal view

Abutment preparation

Horizontal & vertical placement of fiber

Complete build-up of pontic **Final Prosthesis**

DISCUSSION

Fiber-reinforced composite, or FRC, prostheses offer the potential advantages of optimized esthetics, low wear of the opposing dentition and the ability to bond the prosthesis to the abutment teeth, thereby compensating for less-than-optimal abutment tooth retention and resistance form. These prostheses are composed of two types of composite materials: fiber composites to build the substructure and hybrid or microfill particulate composites to create the external veneer surface.[2-4] These fibers can be hand-impregnated or machine-impregnated (pre-impregnated).[4,5] However, the pre-impregnated FRC creates a substructure that supports about two to three times the load and have 10 times the flexure modulus of the hand-impregnated designs. This pre-impregnated FRC is relatively translucent and requires no masking, which allows for a relatively thin (approximately 0.5 mm) layer of particulate veneering composite to be placed over the FRC substructure to provide an esthetic appearance.[6] The FRC prostheses can be fabricated indirectly in the prosthetic laboratory by a dental technician, chair-side in the dental clinic by the dentist, or directly in the patient's mouth. Veneer materials used for the chair-side fabricated prostheses are light cured hybrid or microfill composites typically found in the dental clinic. Laboratory-made prostheses, including the FRC framework, are also light cured but may have an additional heat polymerization stage with the optional use of vacuum or pressure to enhance polymerization. Deep polymerization improves mechanical properties, especially the flexural strength of the FRC framework and wear resistance as well as colour stability of the veneering composite.[3] In chair side approach prefabricated frameworks may include either a cantilever lever or dual-wing design. The wing of the framework can be positioned on either the lingual or labial surface of the abutment tooth. This is determined by the amount of incisal clearance with the opposing teeth. This spreading of the FRC increases the surface area of bonded attachment and thins the framework, leaving minimal bulk on the abutment tooth surface.[4,7]

CONCLUSION

In this case, we had tried to restore patient's esthetics by replacing missing tooth through FRC bridge, involving periodontically compromised abutments, with the help of pre-impregnated braided glass fibers. This new fiber-reinforcement technology offers new prospects and approaches to the profession.

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