Case Report

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FIBER REINFORCED COMPOSITE FPD IN DIFFERENT CLINICAL SITUATIONS: A CASE SERIES

SI Joephin Soundar [1], K Swathi[2] , S Sabarinathan[3], P Kamalashankar[4]
1.MDS, Prosthodontist, Senior lecturer, Rajas Dental College and Hospital
2.MDS, Prosthodontist, Senior lecturer, Rajas Dental College and Hospital
3.MDS, Prosthodontist, Professor, Rajas Dental College and Hospital
4.MDS, Prosthodontist, Private Partitioner

ABSTRACT:

A missing tooth is of serious concern and compromises the social life of the patient, especially if it is in anterior region. While conventional fixed partial dentures and implant-supported restorations may often be the treatment of choice, in some clinical conditions where conventional fpd treatment is not ideal and situations which demand immediate restoration followed by extraction, fiber-reinforced composite resins offer a less invasive, quick and economic alternative for missing teeth replacement. This article presents three cases where FRC technology was successfully used to restore missing tooth in different clinical situations in terms of esthetic values and functionality.

Key words: fiber-reinforced composite, Aesthetics, Fixed partial dentures, Bridges

INTRODUCTION:

Injury and consequent loss of anterior teeth are common especially in children and adolescents. On the other hand, in elderly people, because of periodontal reasons and advanced caries may lead to extraction of teeth. For pediatric patients we cannot give fixed restoration until a certain age. Patients with lost anterior teeth need immediate restoration that satisfies both esthetic and functional demands. To restore both esthetics and function as well as to cut treatment costs, the need arises for clinicians to search for materials and techniques that enable less invasive and chair side fabrication of restorations that can replace missing teeth with fixed partial dentures (FPDs).[1, 2]

Fiber reinforced composite (FRC) has become the viable treatment option because of possibility of fabricating resin-bonded, esthetically pleasing and metal-free tooth restorations for missing teeth replacement. We can consider FRC-fixed partial denture (FPD) as a good alternative to metal frame resin-bonded-FPD, and to full-coverage-crown-retained FPD and implant supported crowns. [3, 4]

Fiber reinforced composite is the only material that is available in recent times as an esthetically acceptable material, which can be processed directly in the patient's mouth and simultaneously adhere to the remaining tooth structure and reaches to adequate strength for proper functionality. In literature only a few

*Corresponding Author Address: Dr. Joephin Soundar Email: joephinsoundar@gmail.com

studies have discussed about improvement of fiber reinforced composite strength.[5,6] Continuous unidirectional glass (bundle) fiber inclusion in dimethacrylate-polymethylmethacrylate resin matrix as a substructure for the FPD is the most accepted concept for increasing strength.[7] Very few long-term clinical FRC trials were reported in literature till now. However, based on these studies, we can expect satisfactory longevity for direct technique fabricated FRC. [4, 8, 9]

This paper describes three clinical cases of chairside (directly) made FRC FPDs, in different clinical situations.

CASE DETAIL:

Case report : 1

A 13-year-old female patient with missing lower right molar reported to our dental clinic with a desire to replace it with fixed restoration (fig: 1A). Medical history revealed no specific problem. After discussing all treatment option with the patient and her parents, they opted for implant treatment. Considering the age of the patient it had been decided to fabricate a direct fiber reinforced bridge to replace the lost 46 until the implant treatment.

The material chosen was EverStick® as it is a pre-wetted glass fibers embedded in a polymer matrix. The fibers are pre-impregnated, silanized glass fibers in a multiphase polymer resin matrix (combination of thermoplastic and thermosetting polymer) with a polymethylmethacrylate rich resin sheath. The fiber bundle has 4000 fibers, resulting in a flexural strength of between 900 to 1280 MPa, comparable to that of chrome cobalt denture alloy.

The required fiber length was measured with periodontal probe and cut using a scissors. The proximal surfaces of 45 and 47 were acid etched with 37% phosphoric acid, thoroughly rinsed, dried and treated with a bonding agent (G-primio bond) followed by application of a thin layer of flowable composite (G AENIAL UNIVERAL Flow (GC) to the distal surface of 45 and to the mesial surface on the 47. The fibers were evenly extended using stick stepper to create more surface area for bonding. Transverse fibers were added in labio-lingual direction to support the composite pontic then light cured for 10-20sec. A thin layer of composite was used to cover the entire frame work and was light cured for 40sec (Fig: 1B). The pontic was built with composite around the framework by layering technique using enamel and dentine shades to get good natural effects. After completion of the restoration the occlusion was adjusted in centric and eccentric positions to reduce functional forces in the restoration. Final result was well adapted fixed bridge with natural result. (Fig: 1C,1D)

Case report : 2

A 55-year-old female patient came to our dental clinic with grade III mobile mandibular left central incisor. Extraction of tooth was indicated due to poor prognosis. The patient requested for immediate fixed replacement followed by extraction. Adjacent abutment teeth were not in ideal condition for conventional fpd fabrication because of compromised bone support and slight mobility. so patient was given an option of fiber reinforced composite tooth replacement along with splinting of mandibular anterior teeth. This option not only restores the missing tooth without much invasive procedure and has advantage of stabilizing peridontally weak abutments.

Mandibular left central incisor was extracted (Fig: 2A). After two weeks, restorative procedure started with thorough prophylaxis. Lingual surfaces of Mandibular anterior teeth were cleaned using pumice paste and were acid etched, treated with bonding agent. Frc fibers were attached to the lingual surfaces of abutment teeth, then light cured for 20 seconds (Fig: 2B). Composite pontic was built in a layering technique using the frc frame work as a support. After that restoration is finished and polished. (Fig: 2C) The patient was advised to use Interdental brush to maintain the oral hygiene in the splinted area. Supportive periodontal therapy was continued for the patient.

Case report : 3

A 21-year-old female patient with missing upper left central incisor came to our dental clinic for replacement of that tooth (Fig: 3A). Reason for tooth loss was trauma. All the treatment options were discussed with the patient. Because of financial constraints she couldn't afford for conventional fpd or implant treatment. Direct Fiber reinforced resin bonded bridge was offered as an alternative prosthetic solution for the patient.

Without preparing the abutment teeth, FRC framework was constructed on palatal surfaces of 32 and 41 that supports the pontic (Fig: 3B). Dentin and enamel shades in the pontic were selected carefully so that they closely resemble with the adjacent teeth. Final restoration was finished and polished (Fig: 3C). Patient was satisfied with the fixed restoration that was aesthetically pleasing and economical.

DISCUSSION:

Missing teeth can be replaced by various prosthetic options, among them Fixed FRC restoration is a good alternative considering its ease of fabrication, adhesive properties, relative longevity, immediate replacement when compare to cast metal resin bonded FPDs.[10]

In young permanent tooth, preparing the abutment teeth for conventional FPD always have the high risk of pulp exposure.[11] Fiber reinforced FPD have the potential to become a cost-

effective treatment option in selective patients.[12]

In periodontally compromised teeth the most common failure with resin bonded FPD is debonding of the cast metal framework from the luting cement.[13] by using fiber reinforced composite with lower modulus of elasticity than that of cast metal alloy can reduce stress at the interface, thus reducing the fatigue failure. Using a fiber reinforced composite resin as a splint is a conservative, aesthetic and cost-effective method for replacement of missing tooth in periodontally compromised teeth.

Even though replacing the missing tooth with implant has many advantages, it may not be an ideal treatment for all clinical situations. Especially implant placement in adolescent age is not advisable.[14]

Flexural strength of fiber reinforced crown is about 500N, which is higher than the expected masticatory forces, that makes the FRC as a material of choice for posterior restorations also.[15] Aesthetics play a major role for overall acceptance of the restoration by the patient and thus important for clinical success. FRC frame-work veneered by composite provides excellent aesthetics for the restoration.[16] Using different shades of dentin and enamel composites to fabricate a pontic in layering technique provides a natural opalescence, translucency, and opacity to the restoration. Plaque adhesion in FRc crowns is higher and much more prone to bacterial accumulation. Better surface finishing might be useful in reducing plaque accumulation.[17]

From a clinical point of view, there is lack of long-term clinical research on FRC prosthesis. However longitudinal studies show failure rates between 5 and 16% over periods up to 4 to 5 years.[18] Fiber reinforced composite FPDs can satisfy the expectations of patients who seek immediate, affordable and aesthetic restoration. The long-term behaviour of FRC needs to be assessed for better understanding of their performance.

CONCLUSION:

Fiber reinforced composites are not the permanent solution for missing tooth replacement. However, in some clinical situations this reversible and cost-effective procedure, offers a viable alternative to conventional teeth replacement techniques because of its minimal invasiveness and desirable esthetic, biological properties.

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FIGURES:

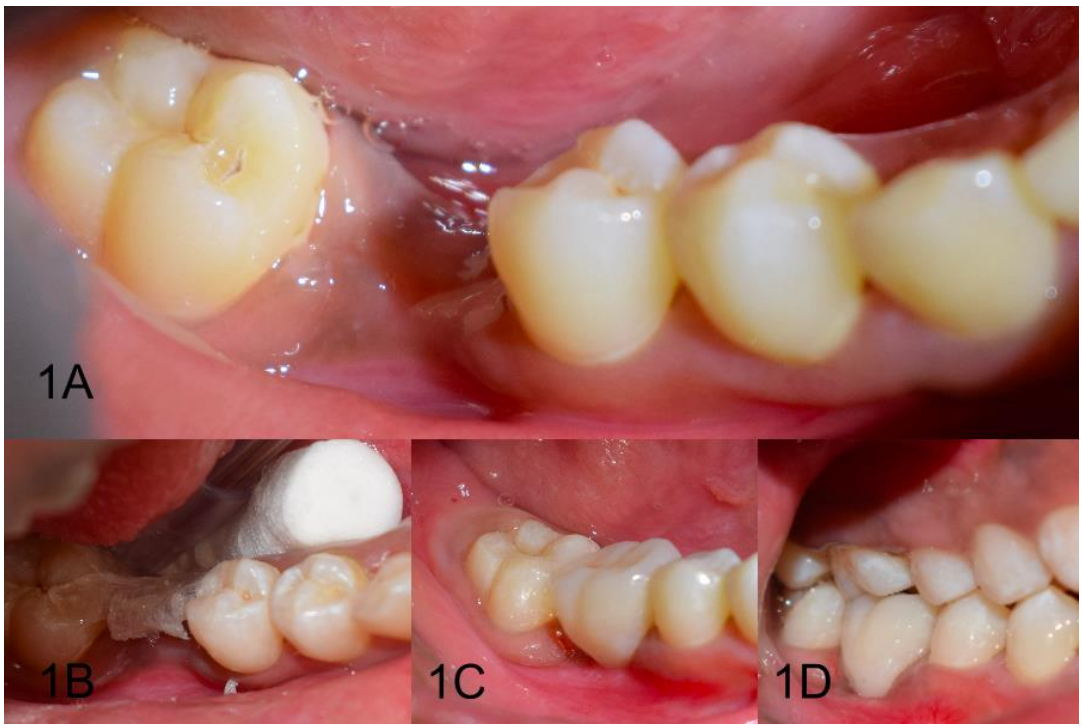

Figure 1:

Figure 2:

Figure 3: