

AESTHETIC REHABILITATION OF MISSING MAXILLARY PERMANENT INCISOR USING “FRC” RESIN BRIDGE

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Abstract

A number of treatment modalities, from removable partial dentures to Maryland bridges to implants, can be opted for the restoration of traumatically/congenitally missing anteriors. Reinforcing composite resins with fibers can improve its fracture resistance and toughness. “Fiber-reinforced composite” (FRC) bridges can replace conventional prosthetic techniques. The aim of the present article is to present a clinical case of a single tooth replacement by FRC bridge. A Maryland-like composite bridge was indirectly fabricated to restore a missing permanent central incisor. FRC bridges can be opted as a semi-permanent treatment or, a long-lasting reversible provisional treatment and helps in minimizing the aesthetic problems, tooth reduction and cost.

Key words: Fibre reinforced composite, Provisional restoration, Esthetic rehabilitation.

Introduction

A variety of treatment modalities can be considered for restoring traumatically or congenitally missing permanent anteriors in children.¹ Implants can be considered as a treatment of choice after the end of the growth period when the local and general conditions are favourable. An economically acceptable treatment modality should be implied as a provisional restoration before implant therapy.

Some of the treatment considerations include shape and shade matching of the crown, topography of the ridge, interdental spacing, para-functional habits, contact with the opposing dentition and aesthetic expectations of the young patient.

Desirable aesthetic characteristics, strength, ease of use, adaptability of various shapes and potential for direct bonding to tooth structure make FRC a desired treatment modality when conventional treatment options are not indicated.^{2,3} Pontic can be made directly or indirectly using the avulsed tooth,^{3,4} or by a directly built composite resin tooth with^{5,6} or without⁷ ceramic veneering.

A clinical case of fibre reinforced composite bridge fabricated by a semi-direct technique for the restoration of a traumatically missing maxillary central permanent incisor is illustrated in this article.

Case report

A 13-year-old female patient reported to the Department of Paediatric and Preventive Dentistry with the chief complain of missing tooth in the upper front teeth region after an injury caused by a fall two years back. The crown of the tooth got fractured during the time of fall. The patient went to a local dentist and root canal treatment was started which was however not completed due to reduced patient compliance and limited co-operation.

With time the crown got completely fractured and the root remained there in the alveolar socket for at least one and a half years without any treatment (Figure 1).



Figure 1: Pre-operative picture showing missing 21



Figure 2: Pre-operative radiograph

The patient came to our department with the missing left maxillary central incisor for which she wanted replacement. Clinically 21 appeared missing but radiographically root stump was evident in the region of 21 (Figure 2).

Surgical extraction of the root stump was done and the socket was allowed to heal. Impression and photographs were recorded. After oral prophylaxis and polishing the shade and size of the acrylic tooth pontic was selected. While recording the size it was observed that the mesiodistal width of 11 was 10 mm and the space available for missing 21 was 13 mm.



Figure 3: Fiber reinforced composite bridge



Figure 4: Putty guide for composite build up i.r.t 11



Figure 5: Post-operative picture

To accommodate the fibre reinforced composite a 3 mm wide and 0.5 mm deep horizontal groove was prepared mesiodistally in the acrylic pontic and the adjacent teeth. An alginate impression was made for the fabrication of FRC bridge. On the working cast a wax build up was done on 11 in order to increase the mesiodistal width of 11 from 10 mm to 11.5 mm a putty guide impression was made.

A template was placed on the lingual surfaces of the left lateral incisor to the right central incisor on the diagnostic casts to measure the required amount of fibre ribbon and an equal length of 3 mm wide Ribbond was taken from its packet using the cotton pliers and special scissors. Any contact should be avoided until the ribbon is wetted with bonding resin as it may contaminate its reactive surface layer. The acrylic tooth pontic was stabilized in the desired position and cemented to ribbond using flowable composite (Figure 3).

The grooves of the lingual aspect of the adjacent teeth were etched with a phosphoric acid etchant (37%) for 15-20 seconds, rinsed with water and dried for 10 sec. Using a disposable brush Single Bond resin adhesive was applied to the etched enamel surfaces. A composite build up was done on the mesial surface of 11 with the help of putty guide (Figure 4).

The reinforcement material was impregnated with a resin adhesive (Single Bond). The surplus bonding resin was wiped off using a cotton pellet. The ribbon should not be exposed to the dental light until used. Flowable composite was thinly applied on the lingual surface of abutment teeth to hold the ribbon while adaptation. The ribbon was encapsulated into the composite resin from the left lateral incisor to the right central incisor and adapted. Keeping the composite thickness between the teeth and ribbon minimal and the ribbon wings were cured. The composite resin was shaped, finished, polished and any excess material was removed (Figure 5). The bridge was scrutinized for occlusion and aesthetic appearance. The patient was highly satisfied with final outcome of the procedure. The patient was advised to maintain proper oral hygiene and follow up.

Discussion

Loss of permanent anterior teeth can be psychologically and physiologically traumatic experience for the young patient and parents. Numerous treatment modalities can be used to address the aesthetic and functional discomfort resulting from missing teeth. The technique and material of choice should be suitable and pleasing for both the patient and clinician. In restorative dentistry, a relatively new technique of etching an enamel surface with acid and bonding composite artificial teeth directly to the adjacent natural teeth reinforced with high-density fibres without metal frameworks has produced excellent outcomes.⁸ With the construction of more and more direct resin-bonded bridges, advantage of minimal tooth preparation, little or no tissue removal and low laboratory costs have attracted extensive attention. There are several advantages of this technique. The biological cost is low, since little or no tooth structure needs to be removed, and thus all future treatment options remain available. This can be done using two approaches: one is the conventional tooth preparation and laboratory based procedures while the other is based on using the fibres in minimally invasive restorations by direct or indirect fabrication. Direct techniques are conservative, cost effective and do not jeopardize the periodontal health of adjacent teeth.⁹ This chair side technique does not require laboratory involvement, is non-invasive and reversible, so that all treatment options for tooth replacement remain open. To provide a final natural opalescence, opacity and translucency different shades of composite are used for building enamel and dentin. Using a natural tooth as a pontic can also be considered instead of direct fabrication of the missing tooth. In the above case Acrylic tooth was used as pontic because of the non-availability of the natural tooth.

Conclusion

FRC bridge can be used as a long term provisional treatment to restore a missing anterior tooth. It is more comfortable, hygienic, aesthetic and restores function. Generally, it could be removed from teeth, repaired or

modified and does not require any tooth reduction and thus no iatrogenic problems. Long-term follow-up of pre-impregnated fibre-reinforced composite will be required to prove their success.

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How to cite this article: Khan A, Mayall S, Lumbini P, Kaur H. Aesthetic Rehabilitation of Missing Maxillary Permanent Incisor Using “Frc” Resin Bridge. *TMU J Dent* 2017;4(4):153-155.