Ribbond reinforced composite bridge: a case report

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Abstract
Various options are presently available to address the challenge of immediately replacing a missing anterior tooth. These include a removable /fixed temporary/ permanent acrylic prosthesis, or resin-bonded bridges. Ribbond single-visit bridges provide strength, durability, and immediate convenience. They are cost effective and reliable and are excellent for emergencies like: implant temporization, congenitally missing teeth and patients who cannot afford conventional lab fabricated bridgework. In place of the pontic, a natural tooth, denture tooth can be used or composite build-up can be done.

Conclusions: The procedure was completed at the chair side, thereby avoiding additional laboratory costs. Creating an adhesive FRC bridge by using a composite resin pontic is a successful treatment option for the direct aesthetic replacement of missing anterior teeth.

Keywords: Ribbond, Fiber reinforced.

Introduction
Fiber reinforcement has revolutionized the manufacturing industry by providing a diverse range of applications from building pillars and monuments to making bullet proof vests.[1] Dentistry has also incorporated the concept of fiber reinforcement to enhance the strength and stability of various restorative materials, such as ceramics, composite resins and glass ionomer cements.

Nowadays, fiber reinforced composites are employed for various situations in clinical practice. Modern dental treatments are increasingly governed by factors such as: enhanced esthetics, biocompatibility of restorative material and minimal tooth preparation.

Successful replacement of a single anterior tooth is often a challenging situation. The options commonly employed are: temporary acrylic prosthesis, fixed partial denture or implants.[2] Resin bonded bridges are a recent conservative option. The combination of fiber reinforced composite resin and adhesive techniques have provided strength, durability and immediate convenienc Commonly used bondable reinforced fibers in clinical practices are: Ultrahigh molecular weight polyethylene fibers- Ribbond (Ribbond,USA), Connect (Kerr), glass fibers- GlasSpan (GlasSpan), fiber splint ML (Polydentia), fibers pre-impregnated with resin Vectris (Vivadent), etc.

Ribbond is a bondable fiber reinforced restorative material consisting of ultra high strength polyethylene fibers introduced in 1992.[2,3] It offers advantages such as: biocompatibility, unsurpassed fracture toughness, eases of use and manageability along with indefinite shelf life. A study done by Jiang et al reported that with fiber reinforced composite restoration replacement of upto three missing teeth had approximately 89.7% survival rate.[2]

In conservative dentistry and endodontics, Ribbond (Ribbond, USA) is used as a reinforcement material along with composite resin during large build ups, for post and core fabrication and for fabrication of composite bridge. The advantages of this technique are: minimal tooth preparation, optimal esthetics, predictable adhesion, ease of customization of prosthesis, and enhanced strength of the fiber reinforced composite connector.[4]

Purpose- This paper reports a case of immediate replacement of a missing anterior tooth with a chair side fiber reinforced composite bridge.

Case report
A 67 year old male patient reported to the department of Conservative Dentistry and Endodontics with a fractured maxillary anterior tooth. On clinical examination, the maxillary left lateral incisor #22 was fractured at the cervical level. The patient was interested in an esthetic solution to his problem. Since the tooth was unrestorable, extraction of the same was suggested. Post extraction various options were put forth to the patient were: implant replacing the lateral incisor, fixed partial denture, removable partial denture or a fiber reinforced composite bridge. Since it was minimally invasive and cost effective, the patient opted for a fiber reinforced composite bridge.

Materials and Methods
The required length of the Ribbond (Ribbond, USA) fiber strip was predetermined by using dental floss as a template. A piece of a 3 mm-wide Ribbond (Ribbond, USA) fiber strip was cut, using special scissors. The palatal surface of teeth # 21 and #23 were prepared to receive the Ribbond (Ribbond, USA). A slot preparation was done to a width of 2mm-3mm and depth of 1mm. The next step was to create the composite resin pontic. To get the perfect gingival emergence profile, flowable composite (Tetric Evo Flow, Ivoclar Vivadent) of A3 shade was selected and placed on the inner surface of a Palodent matrix band (Palodent, Dentsply) and light cured for 20 secs (Bluephase, Ivoclar Vivadent). This provided the correct gingival contour for the pontic. The cured composite was then placed on the gingival area of #22, the excess was marked and trimmed. Following this the Ribbond fiber strip was placed

on the prepared palatal surface of #21 and #23 and bonded using the flowable composite resin (Tetric Evo Flow, Ivoclar Vivadent). It was contoured to a 'C' shaped curve (with the concavity facing the palatal side) over the missing lateral incisor area. The base of the pontic was then secured with the Ribbond fiber strip using bulk fill composite resin, (IPS Empress, Ivoclar Ivodent) and light cured for 20 secs. Since the missing lateral incisor was slightly labially inclined, the composite pontic was also fabricated in the similar manner.

For the chair side fabrication of composite pontic "Natural Layering" technique was chosen using various shades of composite (IPS Empress, Ivodent) matching the natural tooth.[3] Finally the gross finishing and polishing of the pontic was done.

The patient was recalled at a later date to complete the final finishing and polishing using finishing diamond burs (Mani, FO-21EF) and Soflex disc (3M)

The case was followed up for a period of 1 year and the fiber reinforced composite (FRC) bridge was found to be satisfactory.

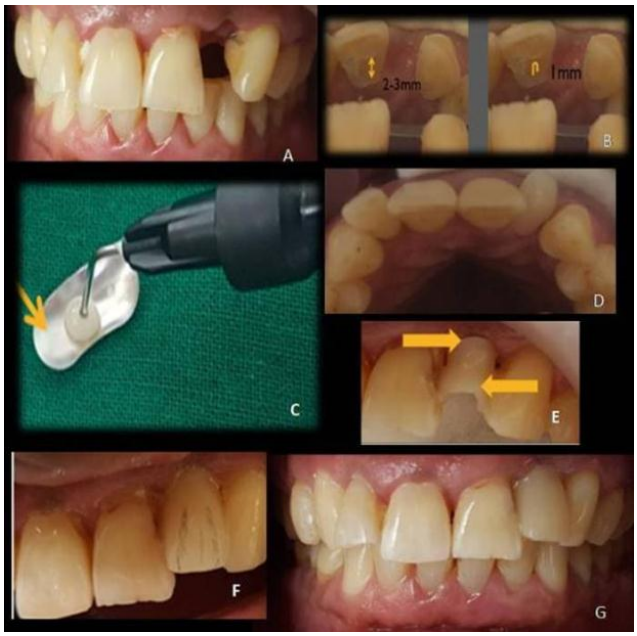

Fig. 1:

Discussion

The loss of anterior teeth requires immediate attention for re-establishing esthetics and function. The fabrication of a direct fiber reinforced composite bridge provides a chair side, single visit, cost effective and minimally invasive fixed solution to the patient.[6,10]

A 2 year study done by Malmstrom et al. concluded that the cumulative success rate of FRC Bridge was 84.32% while survival rate was up to 92.7%.[2,6] Several studies have also shown satisfactory performance of fiber reinforced composite bridges comparable to those of fixed partial dentures over a 5 year period. Studies where FRC was employed as the connector have not reported fracture of the connecter over many years. This can be attributed to the high strength provided by the fiber reinforcement.[3]

A ridge lap design was chosen for the pontic in order to provide the correct gingival emergence profile.[2] This has the benefit of preventing bone resorption in that area. The crown of the lost tooth can also be used as a natural tooth pontic.[5] Since the natural crown was missing in the present case the pontic was fabricated using composite resin which gave optimum esthetic result. This was best achieved using IPS Empress direct composite resin which is available in a variety of shades to incrementally buildup the dentin and enamel layers of the tooth. IPS Empress closely mimics the natural tooth in color, lusture and polishability with superior mechanical properties.

The FRC material, Ribbond (Ribbond, USA) which was used in this case is an ultra high molecular weight polyethylene fiber connector. The lenoweave design provides superior toughness and effectively distributes the stresses throughout the material. [1] It is also reported to have excellent bonding characteristics to the composite resin. With FRC bridge the abutment teeth requires minimal preparation. The clinical technique described in this case is reversible. In case of failure all other options can still be performed.[7,8]

An important factor in such cases is to minimize the occlusal loading during centric and lateral excursive movements. In the present case this was achieved by giving a 'C' shaped configuration to the connector. Occlusion was evaluated after the bridge was in place and it was noticed that there was minimal stress on the connector.

A laboratory technique has also been suggested to overcome the increased chair time necessary for this procedure. However this makes it more elaborate and requires two visits.[9]

Only a few cases of FRC bridges have been reported in the literature. Although this type of treatment is suggested as an interim option, reports have shown a success rate of up to 5 years[2] The present case was followed up for a period of 1 year and was found to be stable. Considering the effective service of this type of restoration for over a year, the authors anticipate several move years of successful retention. Further studies are necessary to evaluate the long term success of FRC bridges.

Conclusion

The versatility of Ribbond provides us with innumerable possibilities. Natural tooth pontic using Ribbond is a well-accepted protocol for missing anterior teeth. In cases where the natural tooth is not salvageable, building up a pontic using composite resin is a novel option.[4] The noninvasive nature of the Ribbond – reinforced composite bridge is an innovative approach to esthetic management of missing anterior teeth. It can be used in patients who have to undergo implant placement but require immediate temporary restoration of the anterior segment. The promising results of this technique also make it a definitive restorative treatment option since it is effective and minimally invasive.

Conflict of Interest: None.

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