Case Report

Fiber-Reinforced Composite Resin Bridges: A Case Report on the Aesthetic and Functional Rehabilitation of a Missing Anterior Tooth

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Abstract

Replacing missing teeth, particularly in the anterior region, is a crucial aspect of dental practice. Fiber-reinforced composite resin bridges offer a conservative alternative to traditional fixed dental prostheses or implants. Fiber-reinforced composite (FRC) resin bridges are gaining popularity as a minimally invasive, aesthetic, and cost-effective solution for the replacement of missing teeth, particularly in the anterior region. This minimally invasive and reversible technique can be completed in just one visit. This case report details the clinical procedure, challenges, and outcomes associated with an FRC resin bridge for an anterior tooth replacement.

Keywords: Fiber-reinforced composite, resin bridges, anterior tooth replacement, minimally invasive dentistry, dental aesthetics, case report.

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Introduction

Resin fiber or Ribbond is a sophisticated bondable fiber-reinforced material, composed of ultra-high molecular weight polyethylene fibers arranged in a leno wave pattern. Its applications in dental practice are diverse, including the stabilization of traumatized teeth, the restoration of fractured teeth, the fabrication of fixed partial dentures, and the creation of direct-bonded endodontic posts and cores.[1,2]

Losing an anterior tooth can be devastating for patients, necessitating immediate replacement to preserve psychological well-being, facial aesthetics, and phonetics. Key factors in tooth replacement include conservation, minimal invasion, aesthetics, and cost. While conventional PFM bridges require significant tooth reduction, resin-bonded Fixed Partial Dentures present a less invasive option. Metal alloys are used for FPD frameworks, but Fiber-Reinforced Composite is now preferred due to its favorable elastic modulus and better adhesion with composite.

FRC bridges are adhesive, minimally invasive, and cost-effective solutions suitable for single-visit tooth replacements. Studies shows that its d has good aesthetic provides good longevity. Thus, Fiber reinforced composite bridge can replace metal frame resin-bonded FPD, full-coverage crown-retained FPD, and implant-supported crowns in many situations.[3]

Here pontics can be made from natural extracted teeth,

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acrylic resin teeth, or composite resin. Prefabricated acrylic resin teeth often fail to match in color, size, and shape, and bond unpredictably to composite resin.[1-7] While composite resin pontics offer good aesthetics, using a patient's natural extracted tooth crown provides ideal size, shape, and color, yielding excellent aesthetic and functional results, along with significant psychological benefits.

Case Report

A 29-year-old male patient reported to our clinic with the complaints of pain and swelling on upper left central incisor for 2 weeks. After history taking it was found that he had undergone root canal treatment with a screw retained post core crown few years back. After clinically and radiological examination it was found that associated tooth had large periapical abscess with discharging sinus labially. The tooth was also mobile. Upon close examination it was found that patient had a fracture along the way the screw was placed.

The tooth needed extraction, and an FDP or implant would have been the conventional treatment options. However, the patient did not want a surgical procedure for an implant or excessive preparation of the intact adjacent teeth for an FDP on that moment. Therefore, a direct FRC bridge was chosen with consent of the patient.

After extraction of the teeth and proper curettage patient was advised antibiotics. After 10 days suture was removed and primary soft tissue healing was observed and decided to put FRC bridge on the same day.

Initially the adjacent tooth no 11 and 22 were polished with a prophy paste, also slightly roughened with diamond fissure bur. The tooths were etched with 37% ortho phosphoric acid for 15 seconds, washed and dried with gentle air spray. A pre-curved molar sectional matrix band was taken and sufficient amount of flowable composite was placed in the inner side of the band and cured it. This curved disk shaped composite disk will be placed on gingival margin for better contouring and it'll help to prevent the free flow of composite material gingivally.

Meanwhile the gap was measured and appropriate length resin fiber were cut and placed in a tray. The fiber was wet in bonding agent for better handling.

Bonding agent were applied on the etched surface and cured. The resin fiber was placed palataly in such a way that it was slightly concaved labially on missing space. It was made sure that the fiber was out of occlusion from lower teeth. A little amount of flowable composite resin was used on 11, and 22 no tooth and cured thus the fiber is placed firmly in the missing space. (Fig no. 1)

The gingival disk was taken out carefully from the matrix and placed along with the gingival line in relation to the adjacent tooth. A slight flowable composite was placed to stabilize the disk with the fiber. Incremental composite buildup was done until it resembles a natural tooth. Palatal aspect was also checked to see if there's any gap or bite interference.

The tooth was then polished with carbide polishing bur, Aluminum oxide stone, Super snap polishing kit, and finished with one gloss rubber polishing bur. Patients bite was adjusted very carefully because traumatic or abnormal bite can result failure of the bridge within no time.

The patient was satisfied with the result and recalled for follow-up after 1 week.

Figure1: Procedural Steps of Fabricating FRC bridge.

Discussion

Patients with missing anterior teeth need prompt restoration to maintain aesthetics and function. A directly fabricated FRC bridge, chosen for its cost-effectiveness and minimal invasiveness, offers a single-visit solution. Clinical studies show FRC FPDs have a 75% survival rate after 5 years, outperforming metal framework FPDs.[3,4]

FRC bridges allow the use of a patient's natural crown or Composite material as a pontic, providing ideal shape, color, and size, and enhancing psychological well-being. The Ribbond FRC material, made from ultra-high molecular weight polyethylene fibers with a lock-stitch design, enhances bonding and strength, resisting cracking.

This technique is noninvasive, reversible, and cost-effective, potentially serving as a permanent solution. However, it requires intact natural teeth, precise technique, and proper case selection. Further studies are needed to assess long-term success.[6]

Outcome

Follow-up visits at 1 week, 1-month, post-procedure showed satisfactory results. The FRC resin bridge exhibited excellent aesthetic integration with the surrounding teeth, stable bonding, and functional occlusion. The patient expressed high satisfaction with the overall appearance and comfort of the bridge. No complications such as debonding, fracture, or gingival issues were observed till date.

Conclusion

Fiber-reinforced composite resin bridges offer a reliable and aesthetically pleasing option for the replacement of missing anterior teeth. This case report highlights the benefits of FRC resin bridges, including their conservative approach, ease of fabrication, and favorable aesthetic outcomes. Further research and long-term clinical studies are recommended to establish the durability and broader applicability of this treatment modality.

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