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Fiber Rein-Forced Adhesive Bridge with Natural Tooth Pontic: A Case Report

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Abstract

Single tooth deficiencies can be removed with oral implant, adhesive bridge restorations or traditional metal-ceramic restorations. In recent years, bridge restorations made from fiber-reinforced composites have demanded more than metal restorations. The lack of preparation in this type of restoration can result in less dentin hypersensitivity or inflammation in periodontal tissues. These types of restorations are often preferred because of their economic, recyclable nature and the advantages of clinical and laboratory procedures such as their short and easy handling. In our study, we presented a fiber reinforced composite resin adhesive bridge for a patient who extracted his lower central tooth. At the end of the 1-year follow-up period, no failure was observed in the restoration.

Keywords: Fiber-reinforced adhesive bridge, polyethylene fiber, natural tooth.

Introduction

Hypodontia of the lack of permanent anterior teeth is significant aesthetic and functional problem in people.[1,2,3] Restoration types such as fixed or mobile prosthesis, implant assisted crown and adhesive bridge are applied for single tooth deficiencies lost due to periodontal diseases, infection, trauma, caries. Restoration types such as fixed or removable prosthesis, implant supported crown and adhesive bridge are applied for single tooth deficiencies lost due to periodontal diseases, infection, trauma, caries. These applications have various advantages and disadvantages. Conventional bridge restorations have difficulties in preparing teeth on both sides of the toothless space, requiring more than one session, having a long repair time, depending on the skill of the laboratory technician, and high cost. The use of fiber-reinforced composite resins in fixed prostheses has increased in the 1990s and is often used because of its aesthetic advantages.[4]

It is possible to prepare fixed prosthetic restorations with conventional preparation with fiber reinforced composites. A conservative approach can also be achieved with little or no preparation on the abutment teeth. Fiber-reinforced composites have various uses. These are as follows:[5,6]

- Direct composite restorations
- Indirect restorations (inlay, onley, full veneer crown)
- Periodontal and post-traumatic splint application
- Short or long-term temporary bridges
- Anterior and posterior fixed bridge restorations (single-member or implant supported)
- Strengthening and repair of dentures

Different fibers have been added to the structures in order to strengthen the physical properties of the fiber-

reinforced composites. These are; carbon, intermediate, polyethylene and glass fibers. It is preferred because it is colorless, harmonious with tissue, aesthetic, flexible and resistant. It also has advantages such as good adhesion properties, translucency, no corrosion.[6]

The pontic with fiber-reinforced composite resin bridges can be prepared with direct and indirect methods. The pontic may be the natural tooth that the patient has lost and pre-made acrylic teeth. It can also be shaped and prepared with a composite resin.[5,6]

The purpose of this case report is to report the integration of esthetics and functional parameters in the oral rehabilitation of extracted periodontally compromised lower central incisor through the construction of a fiber-reinforced composite resin adhesive bridge.

Case Report

A 50-year-old male patient referred to our clinic due to excessive mobility in the left lower central incisor. In the intraoral examination, resorption was observed in the alveolar crest due to chronic periodontitis and alveolar bone loss and gingival recession were observed in anterior teeth (Figure 1). Radiographic examination did not reveal any pathological condition in the concerned area. Medical history revealed no specific problem.

It was diagnosed to extract the central tooth with excessive mobility. Afterwards, the patient was informed about treatment methods for replacement of missing teeth. It was decided to apply fiber-reinforced adhesive bridges which cause minimal loss of material, which can be applied to single session, and which are quite aesthetic. It was planned to remove the missing tooth in the concerned area with the pontic obtained from the patient's extracted natural tooth using reinforced polyethylene fiber (Kerr Construct, Denmark). So, he was told to bring the natural tooth to the patient. This tooth was placed in a 9% isotonic sodium chloride solution until the patient's extraction site improved and impressions were taken for the study models. The pontic was adjusted on the study model according to the alveolar crest and adjacent teeth. Then, the length of the polyethylene fiber was measured on the study model. The fiber length was kept just short of the distoproximal surface of the abutment teeth. Polyethylene fiber of 2 mm in breadth was wetted with an unfilled adhesive resin (Clearfil SE Bond-Kuraray, Newyork, America) and kept in a dappen dish away from dental light until use.

A rubber cover (OptraGate; Ivoclar-Vivadent, Schaan, Liechtenstein) was used to eliminate cheeks and lips and to isolate the working area before the intraoral procedure began. Pontic was placed between adjacent teeth and temporarily fixed with buccal flowable composite without using an adhesive resin. Subsequently, grooves were formed in the palatinal of all lower anterior teeth to accommodate the polyethylene fiber and the wedges were placed between all the teeth. (Figure 2). The lingual enamel surfaces of the abutment teeth and pontic were etched with 37% phosphoric acid (ScotchbondTM, 3M, ESPE, USA) for 15 seconds, rinsed with water, air dried, and two-step self-etch adhesive resin (Clearfil SE Bond-Kuraray, Newyork, America) was applied and photopolymerized for 10 seconds. Prior to polymerizing a thin layer of flowable composite applied to the palatal surfaces of the teeth, polyethylene fiber (Kerr, Contruct, Newyork, America) were implanted into the palatinal groove region and polymerized with the LED light device (3M ESPE Elipar S10, wavelength: 430-480 nm, light intensity: 1200 Mw/cm^2) for 20 seconds. Subsequently, the whole palatinal groove area was formed by covering with an anterior composite resin material (Clearfil Majesty Anterior, Kuraray, Japan). Then polished with polishing tires (Figure 3). The final result was a well-adapted bridge with good esthetic result. As a result of the 18 months

control of the patient, no loss of function was observed in the fiber-reinforced adhesive bridge, the mobility of the adjacent teeth was decreased, and the pontic showed coloring similar to the adjacent teeth.

Discussion

Various therapeutic solutions can be used to replace a single missing tooth. For many years, metal-ceramic fixedpartial dentures (FPDs) have been the treatment of choice. However, the metallic framework is less than esthetically pleasing.[7]

The development of implants supported restorations led to a more conservative approach to a single-tooth replacement. However, some patients reject this therapeutic option, either because of the higher cost or for fear of surgery.[8]

Fiber-reinforced adhesive bridge applications with single-tooth deficiencies are initially thought to be a temporary method for the restoration of the anterior teeth, but can also be applied as permanent restoration in selected cases due to the simplicity and noninvasive nature of the construction phases.[9] In the previous years, the development of fiber-reinforced composites fiber-reinforced composites provided an opportunity for dentists to produce adhesive, esthetic bridges even in one visit. In comparison with other prosthetic solutions, fiber-reinforced composites bridges are quickly and easily made and they generally cost less.[10]

In dental applications, such as fixed prostheses, splints and posts, fiber-reinforced composites are usually subjected to flexure or bending in clinical service. While clinical performance is the final determinant of success, flexure is still the most widely reported mechanical property.[5]

Freilich et al. were classified fiber-reinforced adhesive bridges according to preparing methods; at the beginning of the patient or in the laboratory. They stated that bridges prepared at the beginning of the patient were more practical and less time consuming than those prepared in the laboratory.[5]

Greugers et al reported that the most important factor among the risk factors affecting fiber-reinforced adhesive bridges as a result of a five-year follow-up was localization and that the lower jaw plays a major role in this respect.[11]

However, disadvantages include difficulty in maintaining the oral hygiene and its questionable ability to withstand heavy masticatory load. Hence, fixed fiber-reinforced adhesive bridges might offer a metal-free and clinically acceptable option for interim replacement of a missing permanent anterior tooth, but further studies are needed to verify the success of these fiber-reinforced adhesive bridges.

Conclusions

Fiber-reinforced adhesive bridges made from single session are a fast, minimally invasive approach that combines all the advantages of adhesive technology so that a aesthetic, functional and potentially permanent result can be achieved. In particular, incisors can be considered as an alternative to prosthetic restoration in cases where the gap on the teeth is not too wide.

Figure 1: The apparence before the treatment and the pontic that prepared from the patient's extracted natural tooth.

Figure 2: Placing the pontic and forming the grooves in the palatinal of all Lower anterior teeth.

Figure 3: The apparence after the treatment

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