Fixed Prosthodontic Rehabilitation Using Fiber-Reinforced Composite In Conical Lateral Teeth and Tooth Loss

Konik Lateral Dişler ve Diş Kaybında Fiber ile Güçlendirilmiş Kompozit Kullanılarak Yapılan Sabit Protetik Rehabilitasyon

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ABSTRACT

Congenitally missing teeth and conical lateral incisor teeth particularly seen on the anterior region in adolescence is an esthetically and functionally challenging situation for the clinician and the patient. As far as the ages of patients are concerned, the restoration should be applied with a minimally invasive approach. Glass fiber-reinforced composite resin applications, which have recently become increasingly popular, can be considered as the treatment of choice in these cases as they offer a minimally invasive fixed treatment option. A 15 year-old male patient with a congenitally missing upper right lateral incisor tooth and a conical upper left lateral incisor tooth was referred to our clinic following a one-year orthodontic therapy because of crowding and malocclusion. The space for the missing upper right lateral incisor tooth was re-gained as well as an adequate space for the construction of conical upper left lateral incisor tooth without making any preparation on the teeth. The patient has been under a six-month follow-up for a year and the relationship of the restorations with adjacent and opposite dentition is under control. Glass fiber-reinforced composite resin fixed partial dentures applied with minimally invasive approach protect the supporting teeth and provide an aesthetic, functional and psychological rehabilitation for adolescent patients.

KEYWORDS

Conical laterals, Fiber reinforced composite restoration

ÖZET

INTRODUCTION

Congenitally missing teeth and conical lateral incisor teeth particularly seen on the anterior region in adolescence is an esthetically and functionally challenging situation for the clinician and the patient. As far as the relatively young ages of these patients are concerned, the restoration should be applied with a minimally invasive approach. Glass fiber-reinforced composite resin (FRC) applications, which have recently become increasingly popular, can be considered as the treatment of choice in these cases as they offer a minimally invasive fixed treatment option.

The rehabilitation of a young patient with fixed partial denture by using glass fiber-reinforced composite resin, who congenitally had a missing lateral incisor tooth and a conical lateral incisor tooth, is described in this study.

CASE REPORT

A fifteen-year-old male patient with a congenitally missing upper right lateral incisor tooth and a conical upper left lateral incisor tooth was referred to our clinic due to crowding and malocclusion.

The treatment objectives were (1) to re-gain the space for the missing upper right lateral incisor tooth, to achieve an adequate space for the construction of conical upper left lateral incisor tooth and to correct the malocclusion by orthodontic rehabilitation; (2) to replace the missing tooth and reconstruct the conical tooth with fixed partial dentures by using glass fiber-reinforced composite resin and (3) to achieve the most ideal level of esthetics and occlusion possible.

Orthodontic treatment plan included alignment of the teeth using fixed orthodontic treatment and opening up of the necessary spaces for the conical laterals.

Taking relatively young age of the patient into consideration, prosthodontic treatment plan consisted of a rehabilitation with a laboratory-fabricated, surface-retained bridge, which involved upper right central incisor and canine teeth with a minimally invasive approach to replace the missing upper right lateral incisor tooth, and a crown restoration to restore the conical upper left lateral incisor tooth by using glass fiber-reinforced composite resin, which similarly did not necessitate any preparations on the abutment tooth.

Before starting prosthodontic treatment, the patient received an orthodontic rehabilitation for 12 months. Orthodontic treatment involved leveling of the upper arch with straightwire appliances. The spaces required for the prosthodontic restoration of the conical laterals were prepared with stainless steel archwires of 0.016X 0.016 inch and niti coilsprings. Orthodontic treatment was finished using a 0.016 X 0.022 archwire.

Two months later than the conclusion of orthodontic treatment (Figure 1, 2), maxillary and mandibular impressions were made with a silicone-based impression material and working casts were prepared in the laboratory (Figure 3, 4). A surface-retained bridge from upper right central incisor to upper right canine teeth and a crown restoration for the upper left lateral incisor tooth were fabricated with a laboratory composite resin (Dialog, Schütz Dental, Germany). A thin layer of flowable composite resin (Filtek Flow, 3M ESPE, USA), together with the polymer resin-impregnated uni-directional glass fiber reinforcement material (everStick C&B, Stick Tech, Finland) was applied to the palatinal surfaces of the adjacent teeth. The restoration was intraorally tried-in and it was continued with cementation procedures. Bonding surfaces of the retainer parts of FRC FPD were roughened using a green stone finishing bur (Diatech, LLC, USA) with

FIGURE 1
Preoperative labial view
low-speed handpiece, followed by application of bonding agent (Scotchbond, 3M-ESPE, USA) and storage in a dark place for 5 min. Meanwhile, the abutment teeth were cleaned with pumice using a prophylaxy brush on a low-speed handpiece. Enamel surfaces were etched with 37% orthophosphoric acid for 60 sec, the restoration was cemented with dual-cure composite resin luting cement (RelyX ARC, 3M-ESPE, USA) according to manufacturer’s directions and light-cured from every aspect for 40 sec (Elipar Freelight, 3M ESPE, USA). After occlusal adjustments, self-assessment of oral hygiene was described and the patient was recalled on a six-month periodical basis (Figure 5, 6, 7).

DISCUSSION

The patient was very pleased with the treatment outcome on the basis that the restorations were esthetic, comfortable, functional and retentive. Their relationships with the opposing and adjacent dentition have been under control for 1.5 years (Figure 8).

Based on scientific research studies, numerous treatment options are available to address the esthetic and functional discomfort of spaces on the dental arch, resulting from missing teeth. The material and technique of choice should be the most appropriate and pleasing option for both the clinician and patient. It has been reported that a clinical success rate of %93 was obtained after 63 months with glass fiber-reinforced composite resin restorations.

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 good outcomes. With the construction of more and more direct resin-bonded bridges, its advantages of minimal tooth preparation, little or no tissue removal and low laboratory costs have attracted extensive attention.

FIGURE 2
Preoperative palatinal view

FIGURE 3
Palatinal view of restoration on master model

FIGURE 4
Labial view of restoration on master model

FIGURE 5
Preoperative occlusal view
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. The procedure can be completed in a single visit, and thus no temporization is required. The clinician has complete control over the shade and shape of the pontic, and because the prosthesis is metal-free, there is no esthetic problem with metal showing through thin abutment teeth. Material costs are low, and there is no laboratory fee. Repairs, additions and color changes are easily performed.

Clinicians are expected to satisfy the expectations of patients who seek safe, biocompatible, affordable, and esthetic restorations. However, clinicians are restricted by factors such as type of preparation, fiber frame design, span length, and the resin composite or luting agent. The few reports of successful use of FRC restorations in the peer-reviewed literature include clinical reports and a study with short-term follow-up. The long-term behavior of glass fiber restorations must be evaluated in clinical studies.

REFERENCES


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