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Esthetic rehabilitation of congenitally missing laterals and deciduous canines with direct restorative approach: A case report

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Abstract

Congenitally missing lateral incisors and persistent deciduous canines severely compromise esthetic appearance due to their strategic positions in the smile. Several treatment procedures have been proposed to rehabilitate this esthetic deficiency. With the recent improvements in adhesive dentistry and dental resin composites, the material is successfully used to restore anterior teeth in which the esthetic is primarily important. This case report illustrates the dental esthetic rehabilitation of an adolescent patient with diastemata resulted from hypodontia of upper lateral incisors and persistent upper decidious canines via direct composite veneers. In 12-month clinical follow-up, all restorations were preserving their integrity and no notable discoloration was observed.

This article presents that direct composite veneers are the most conservative, low cost, achievable in one-session treatment option for the rehabilitation of dental esthetics disfigured by both diastemata depending on hypodontia of lateral incisors and persistent decidious canines.

Keywords: composite dental resin, dental esthetics

Introduction

Hypodontia is a term used for defining the developmental absence of one or more teeth except third molars in both dentitions [1]. The population studies have revealed that mandibular second premolars and maxillary lateral incisors are the most frequent congenitally absent teeth [2-6]. However, missing maxillary lateral incisors compromise dental esthetics due to their strategic position in the smile [7].Orthodontic movement of canine to its correct position followed by restoring lateral incisor either with a single-tooth implant supported restoration or a fixed crown-bridge restoration is one of the treatment options to overcome this esthetic problem. But the mentioned interdisciplinary approach is invasive, high cost and requires long treatment period. The ideal treatment should be conservative together with corresponding patient's esthetic and functional requirements [8]. Conservative veneer technique is described as the application of resin composite onto the tooth without doing any preparation on tooth surface [9]. Enlargement of maxillary central incisors to close diastemata and reconstruction of maxillary canines in the shape of lateral incisors with direct composite veneers is the most conservative and cheapest treatment option.

This case report represents a direct restorative treatment approach to rehabilitate dental esthetics that was disfigured by diastemata associated with missing maxillary lateral incisors and persistent canines.

Case

A 16-year-old female patient who was complaining of diastemata in both maxillary and mandibular anterior teeth, was referred to the Department of Operative and Restorative Dentistry in Istanbul University to have her dental esthetics rehabilitated.

Prior to clinical oral examination, dental and medical histories of the patient had been obtained. In clinical oral examination, we observed immoderate diastemata between maxillary anterior teeth depending on both missing lateral incisors and narrow sizes of the persistent canines in the position of first premolars. Nevertheless, moderate diastema was observed between mandibular anterior teeth. We predicted that the diastemata between mandibular anterior teeth were resulted from discrepancies between tooth-size and dental arch space in consideration of no tooth was missing [Figure 1].

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Figure 1: Intra-oral view of anterior diastemata before treatment

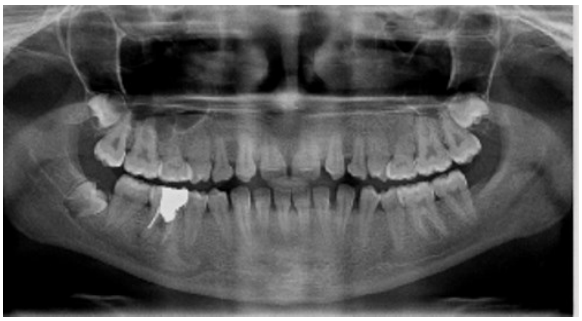

Figure 2: Panoramic radiography. Note that neither maxillary lateral incisors nor maxillary canines are impacted

Figure 3: Intra-oral view of anterior diastemata after treatment

Figure 4: Intra-oral view of the restorations in 12-month follow-up

We confirmed with panoramic radiographs that maxillary lateral incisors and maxillary first premolars were congenitally missing [Figure 2]. The patient was informed about the possible treatment strategies and both advantages and disadvantages of each. We decided to rehabilitate her dental appearance with direct composite restorations considering the periodontal health status, oral hygiene habits, age and economic situation of the patient. Before pre-treatment on enamel surfaces, shade selection of the composite we would use was performed under daylight utilizing the manufacturer's shade scale. In order to confirm if the shade selected matched with the shade of tooth after polymerization of the composite, we put a small amount of composite onto enamel without any pre-treatment and light-cured. We determined that A2 was the most appropriate shade.

We didn't make any preparation on the enamel surfaces except acid etching. Since it's necessary to etch the enamel for providing higher bonding strength for the composite resin, a total-etch bonding system was used. Isolation was achieved with OptraGate (IvoclarVivadent, Schaan, Liechtenstein) instead of rubber dam in order to build the gingival margins of the restorations better. All the enamel surfaces to be restored were etched with 35 % phosphoric acid gel (Scotchbond Etchant; 3M ESPE, St. Paul, MN, USA) for 30 seconds prior to the application of the bonding agent. The etched surfaces were rinsed to send etchant gel completely away, and then the teeth were air-dried.

One-bottle bonding agent (Adper Single Bond 2 Adhesive; 3M ESPE, St. Paul, MN, USA) was applied to all etched surfaces with a brush, air blow-dried with air spray and polymerized with a LED curing unit (LEDemetron I; Kerr Manufacturing Inc., Orange, CA, USA) for 10 seconds. The restorations were performed using a light-cure nanofill composite resin (Clearfil Majesty Esthetic; Kuraray, Osaka, Japan) with incremental technique. Composite was placed on both mesial and distal surfaces of maxillary centrals to close diastemata, while only the mesial of maxillary canines were restored in the form of lateral incisors. Considering crown-root proportion of the persistent deciduous canines together with oral and radiographic examinations, the cuspal 1/3 of them were built up with direct composite resins in the form of first premolar. Because there was no missing tooth in the mandibular arch, the diastemata were treated placing the composite on mesial and distal surfaces of laterals and canines. Celluloid bands were used to form both mesial and distal contours of the restorations and to avoid adhering of the neighbouring restorations as well. A2 shade was used primarily to restore the teeth, however, in order to mask darkness of oral space OA2 was placed onto the A2 lingual layer excluding the incisal margins. Labial surfaces of the restorations were finished with placing another layer of A2. Each composite layer was polymerized with the LED curing unit (LEDemetron I; Kerr Manufacturing Inc., Orange, CA, USA) for 20 seconds. After polymerization process, the celluloid bands were moved away and the occlusion was

checked. Premature contacts during lateral and protrusive movements of the mandibular were eliminated with yellow-banded, egg-shaped diamond abrasive (#16). The restorations were contoured and polished with aluminium oxide finishing-polishing discs (Sof-Lex; 3M ESPE, St. Paul, MN, USA) which were used from the coarsest to the finest, respectively. In order to contour gingival margins of the restorations ideally as well as sending residuary of the restorative materials away and removing the oxygen inhibition layer on the composite resin, sandpaper strips were used in contact areas of the restorations [Figure 3]. To prolong the durability of restorations as clinically acceptable, the patient was informed about the importance of oral hygiene and how to protect the restorations from trauma. In 12-month clinical follow-up, no fracture or notable discoloration of the restorations was observed [Figure 4]. Conversely, the patient's oral hygiene deteriorated with build-up of bacterial plaque and associated marginal inflammation. Despite the fact that we had hardly advised her against performing daily oral hygiene procedures, she mentioned that she neglected brushing her teeth in last few weeks because of her changing working hours.

Discussion

Tooth agenesis is one of the most common congenital anomalies occurring in the permanent dentition [10]. If the number of congenitally missing teeth is six or less excluding third molars, the situation is termed hypodontia [10]. whereas the situation that more than six teeth are congenitally missing is termed oligodontia [10-11]. In this case, maxillary lateral incisors and first premolars are congenitally absent, however decidious canines are existing in the positions of permanent first premolars.

Either congenitally missing teeth or discrepancies between tooth-size and dental arch space or both can cause diastemata that disfigure dental appearance of the patient [12]. In cases with diastemata due to congenitally missing teeth, the interdisciplinary approaches including prosthetic and orthodontic treatments can be the best choice for long-term durability of the restorations as well as for the satisfaction of the patient [13-14]. Following the extraction of persistent decidious canines, permanent canines can be moved distally into the correct positions in dental arch with orthodontic treatment while missing lateral incisors and first premolars can be restored prosthodontically either with fixed crown-bridges or dental implants. Nevertheless, this treatment option is costly and requires long treatment period. Correspondingly, in patients with insufficient space for prosthodontic treatment or dental implants, anterior diastemata can be rehabilitated either with indirect restorative techniques like full-porcelain crown restorations and porcelain veneers or direct composite veneers. In such cases, the diastemata can be closed directly with direct or indirect restorations without the need of orthodontic treatment. However, all these techniques have both advantages and disadvantages. Since both full-porcelain crown restorations and porcelain veneers require tooth preparation that can damage gingival tissues, they are not appropriate restorative options especially for teenagers. Long duration of treatment, high cost, abrasion of antagonistic teeth and technical sensitivity requirement for intra-oral repairmentare considered as disadvantages [12]. On the other hand, optimum esthetic properties like colour stability, minimal surface roughness associated with high surface abrasion resistance are considered as advantages of these restorative treatment techniques compared to direct composite veneers [15]. In the case of non or minimal tooth preparation limited to enamel tissue, local anesthesia is not needed in direct composite veneers [9-12]. In this case, the diastemata in maxillary anterior teeth were resulted from congenitally missing lateral incisors and persistent decidious canines instead of first premolars while the diastemata in mandibular anterior teeth were as the result of discrepancies between tooth-size and dental arch space. As the patient in this case refused rehabilitation of maxillary anterior esthetics via interdisciplinary approach including orthodontic treatment followed by dental implants because of high cost and long duration of treatment, we used conservative direct composite veneers to eliminate the diastemata both in maxillary and mandibular anterior teeth. The maxillary diastemata could also be treated with fiber-reinforced composite bridges. As this technique requires to make preparations on centrals and canines we preferred the direct composite veneers considering the patient's age and reversible nature of this procedure that allows other treatments in the future.

In cases where estheticapperance of the patient is rehabilitated with direct composite veneers, type of composite and bonding system used affects long-term clinical performances of the restorations as well as satisfaction of the patient [16]. Over the years, several changes have been made in the filler particles of dental composites to enhance the colour stability, surface characteristics and wear resistance [17].One of the recent composites introduced contains nano-sized fillers in the inorganic part of resin. It's reported that nanofill composites can be used to restore high-stress bearing areas due to their excellent mechanical properties as well as in the restorations of anterior teeth due to the excellent optical properties and high initial polish [17-18]. Polishability is of importance not only for esthetics but also for marginal consistency of the restorations and health of the oral soft tissues [18]. As the aesthetics was primarily important in this case, direct composite veneers were performed using a nanofill composite resin. Even though most manufacturers of dental

adhesives offer both a total-etch adhesive and a self-etch adhesive for the direct composite veneers [19], it was reported that the highest mean bond strengths to enamel were obtained with total-etch adhesives [20]. Thus we preferred to use a total-etch bonding system instead of a self-etch one in order to obtain high strength to enamel and to achieve clinical durability of the restorations.

In conclusion, this case report describes esthetic rehabilitation of a teenager, who was complaining about diastemata with direct composite veneer technique. Although such cases could be managed with several treatment options, especially in young patients conservative veneer technique is more advantageous compared to indirect restorative techniques such as fixed crown-bridge restorations and porcelain veneers. However direct composite veneers might not be as durable as porcelain veneers. Last but not least, if composite restoration procedures are strictly followed and the patient performs oral hygiene procedures properly, satisfying long-term clinical results can be achieved.

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