Aesthetic Rehabilitation of the Anterior Region in the Presence of Class III Lesions and Diastema

Oyun Erdene BATGEREL[1], Musa Kazım ÜÇÜNCÜ[2], Oktay YAZICIOĞLU[3]

ABSTRACT

Aim The purpose of this case report is to restore the aesthetic and functional inadequacy of anterior teeth with diastema and class III cavity.

Case Report The patient with diastema and class III caries lesions in the anterior region was to receive esthetic rehabilitation with direct composite restoration material in a single visit. After color-matching, isolation was obtained by using a rubber-dam. Nanofil-based composite material was applied in accordance with the manufacturer's instructions following the usage of two-step self-etch adhesive system. After finishing and polishing, the restorations were finalized. One month later, the patient was called for a control session, and the restorations were evaluated using the USPHS procedure.

Conclusion To achieve effective results in the creation of direct composite restorations that are done in a single visit, it is vital to match the appropriate color, use the proper method, isolate the environment, and have clinical experience.

Keywords Aesthetic rehabilitation, Class III lesions, Dental composite, Diastema, Restorative dentistry

Introduction

Diastema, which refers to the space between two teeth, can occur for a variety of reasons and is common in the front part of the upper jaw (1). Diastemas with several causes, such as size anomalies, congenital tooth loss, atypical swallowing, and hypertrophy of the labial frenulum, can be treated with minimally invasive techniques (2). Class III caries lesions are classified as lesions that develop on the proximal surfaces of the anterior teeth and do not include the cutting edge (3). The composite and indirect restorative materials can be used to treat dental caries with this cavity pattern (4).

Due to the importance of aesthetics in human life, the number of people seeking dental treatment has significantly increased. With this increase, minimal invasive treatment approaches, based on the premise of minimal tissue damage and maximum benefit, have become increasingly widespread (5). In addition, the growth of cosmetic clinical treatments and the increase in patient expectations have led to the emergence of new dental materials (6).

In this case report, a one-shade restorative material is used to restore diastema and class III caries lesions in the anterior region in a single visit.

Correspondence: Musa Kazım ÜÇÜNCÜ, ucuncumusakazim@gmail.com

[1] Private Practice,Istanbul, Turkiye

[2] Altınbaş University, Faculty of Dentistry, Department of Restorative Dentistry, Istanbul, Turkiye

[3] Istanbul University, Faculty of Dentistry, Department of Restorative Dentistry, Istanbul, Turkiye

Received: 07.03.2023 / Accepted: 16.03.2023 / Published: 30.04.2023

Case Report

A 37-year-old male patient with cosmetic issues in the anterior region sought treatment at the restorative dental clinic (Figure 1). According to the anamnesis, there was no evidence of a systemic illness. The intraoral and radiographic examination revealed diastema in the anterior region and caries lesions of class III type on teeth #12, #11, #21, and #22 (Figure 2-3). The patient was informed of alternative treatments. In accordance with the patient's approval, it was determined that direct composite restorations would be applied in a single visit because it was the least invasive, quick, and cost-effective. The button technique was utilized to determine the color, and the restorative material selected (3M ESPE Filtek™ Ultimate A2 Body, ABD). Following color-matching, rubber-dam was applied, and the processes of preparing cavities and beveling were completed (Figure 4). After applying 37% orthophosphoric acid on the enamel surfaces, washing and drying procedures were carried out. Two-step self-etch adhesive (Clearfil SE Bond, Kuraray Europe, Germany) was applied according to the manufacturer's instructions. Nanofil-based composite was utilized as a restorative material. The polymerization procedure was performed using a high-performance LED light unit (3M ESPE Elipar S10). When treating diastemas using a specialized anterior matrix system, the gingival emergence profile was restored to its anatomical state. In the final step of layering, glycerine gel was used prior to polymerization to prevent the formation of an oxygen inhibition layer.

Polishing discs (3M ESPE Sof-Lex™, USA) and spiral polishing materials with two different grain structures (Twist Dia, Kuraray, Japan) were used in combination for finishing and polishing (Figure 5). For the approximate areas, the interdantal strips of varying grain sizes were used from coarsest to finest. The image was captured immediately following the polishing process (Figure 6).

Figure 1: Initial

Figure 2: The application of rubber-dam & isolation from vestibul side

Figure 3: The application of rubber-dam & isolation from palatinal side

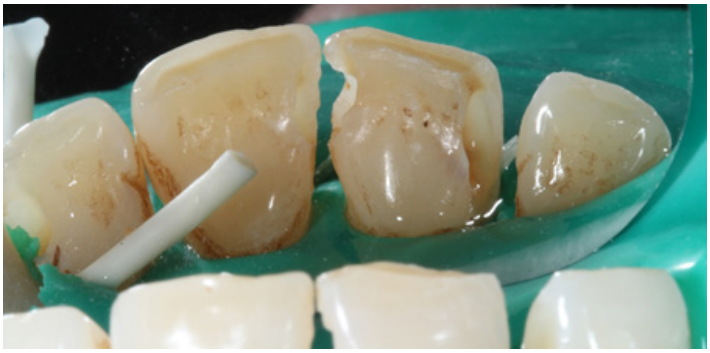

Figure 4: The stage of cavity preparation

Figure 5: The stage of finishing operations with the coarsest grain finishing disc

1 month later, an oral and radiological assessment of the patient was undertaken. According to United States Public Health Service (USPHS) guidelines, the restorations were measured. All restored teeth were assessed as "Alpha" for restoration, marginal integrity, anatomical form, secondary caries, surface texture, shade match, marginal discoloration and postoperative sensitivity (Figure 7).

Discussion

The long-term success of direct composite restorations in the treatment of class III deformations is due to the patient's cooperation with the physician and high oral motivation. The long-term success is also associated with the correct indication and material selection (7). Midline diastema is a non-carious lesion that can be found at a much higher rate in the maxilla than in the mandible and harms the aesthetic (8). The size and quantification of the gap play a key role in diastemas that can be treated with orthodontic or restorative methods (9).

Figure 6: After the finishing & polishing

Figure 7: 1 month recall

By actually analyzing social and economic expectations and treatment needs, it is possible to select the suitable diagnostic and treatment technique. This ensures the success of the therapy and the durability of the restorations (7). Because direct composite restorative materials are generally characterized as cheaper, more minimally invasive, easy to apply, and repairable than indirect veneers (6). Since the optical (color stability) and physical properties of the direct composites have improved (10), the treatment method with

direct composite restorative material in a single visit was preferred in this study. In direct composite restoration, restorative procedures can be performed in a short time with one-shaded composite materials and errors in color-matching are minimized. Since it is claimed that the optical behavior of one-shaded restorative materials is not similar to that of traditional group-shaded composites (11), one of the group-shaded composite types was used in this study. Given the fact that one-shade composites have significant translucency owing to their structure, they cannot be utilized effectively in cases with high aesthetic demands, such as diastema, due to the dark background effect of the oral cavity. In such cases, "opaque" should be applied according to the manufacturer's instructions prior to application of the one-shaded composite (12).

During diastema closure, in addition to occlusal relations, the dental midline and esthetic proportion of each tooth must be examined (13). All of these goals may be attained using, metal-ceramic restorations, all-ceramic crowns, porcelain laminate veneers, and resin-based composite materials. Porcelain laminate veneers are distinguished by their durability and color uniformity (14). Specifically, their color, form, surface, and individual characterization, as well as the fact that these restorations may be further color-corrected during cementation using distinct cement colors, make them an attractive but expensive treatment option (15,16). For the following reasons, the direct esthetic bonding with resin-based composites may be the most conservative method for achieving this objective: the sound tooth structure is prevented, the treatment requires no local anesthesia, the treatment can be completed in a single visit, in a matter of hours, and it is comparatively affordable (17). Also, the direct esthetic bonding technique allows full authority of each restorative phase in the chair side (17). Free-hand direct resin-based composite build-ups can be hard for a clinician to do. Therefore, this method could facilitate a beneficial therapeutic outcome (18).

Nanofil-based composites are the most aesthetically pleasing and appropriate restorative materials. A microhybrid composite is more susceptible to color change and opacity loss than nanofillers (19). It is also observed that the nanofil composites show superior performance in bond strength studies (20,21). In the light of this information, a nanofil-based composite material was selected in this case report.

The limitation of this study is the need for longer follow-up, apart from the 1-month recall period. With the nanofil-based composite, high-quality restorations can produce favorable outcomes. In instances where a non-invasive clinical approach is not indicated, direct composite restorations offer a near-ideal therapeutic alternative for the cosmetic rehabilitation of anterior teeth.

Declarations

Author Contributions: *Conception/Design of Study- O.E.B., M.K.Ü.; Data Acquisition- O.E.B., M.K.Ü.; Data Analysis/Interpretation- O.E.B., M.K.Ü.; Drafting Manuscript- O.E.B., M.K.Ü.; Critical Revision of Manuscript- O.Y.; Final Approval and Accountability- O.Y.; Material and Technical Support- O.Y.; Supervision- O.Y.*

Conflict of Interest: *Authors declared no conflict of interest.*

Financial Disclosure: *Authors declared no financial support.*

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