Aesthetic restoration of the tooth with wedge-defect: clinical case

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Abstract. Localization of a defect in the cervical region of the tooth requires special attention of a specialist due to the high humidity of this area and the risk of bleeding gums. The choice of means and methods of treatment depends on these factors.

The article describes an alternative method of isolating the gums with teflon tape and filling the defect with a photocurable composite. Compliance with the techniques and stages of working with the material allows us to provide high quality adhesion of the composite to tooth tissues and the optical properties of restoration, characteristic of natural enamel

Performance evaluation has being evaluated using optical systems and digital camera photography.

***Keywords*:** photocurable, composite, ormocer, wedge-shaped, defect, aesthetic, restoration.

Introduction

The phrase «Aesthetic dentistry» has won recognition as a generally accepted branch of medicine, as well as a practical solution for specialists and the general public. At the same time, increased demands on the quality of restorations increase the doctor's responsibility for the work performed. The slightest errors and inaccuracies in reproducing the volume and relief or light-color characteristics of the tooth in the constructions cause patient dissatisfaction.

Knowledge of the anatomy and histology of the tooth allows specialists to develop recommendations for the selection of materials and the subsequent modeling of aesthetic restoration [1, 2].

Light curing materials are widely used in therapeutic dentistry due to their positive properties: sufficient mechanical strength, good adhesion to enamel and dentin. The optical parameters of dental materials correspond to the tooth appearance [6, 7]. The preparation of the cavity and filling with composite in the vast majority of cases carried out in accordance with the indications, as well as instructions for use [5]. In this case, the treatment of teeth with non-

carious lesions requires increased attention, since the existing features of the location of defects can make it difficult to comply with the prescribed rules for performing manipulations [4, 8].

Therefore, localization in the cervical part contributes to increased humidity of the walls of the formed cavity and a significant risk of bleeding gums. Therefore, an important point when working with hydrophobic photopolymers is the high-quality isolation of the work area from the ingress of biologic fluids (saliva, blood and gingival fluid).

Rubber dam (or dental dam) is the most important tool for isolation. In some cases, in particular, when the patient refuses to use rubber dam (or dental dam), dentists use a teflon tape to isolate sound teeth from aggressive agents getting on them, whose positive properties are low friction coefficient, chemical inertness, insolubility in water and in organic liquids [3]. The material easily formes, can be stretched and adapted to a complex surface. For dental purposes, a 0.2 mm thick tape is most suitable. Due to its resistance to acids, the tape uses to protect adjacent teeth when etching of cavity walls. The described technique can use in cases of treatment of defects of the gingival region of the tooth.

Purpose of the study – in accordance with the foregoing, the aim of this study was to analyze the quality evaluation of isolating the working field and filling wedge-defects with a photocurable composite.

Materials and methods

Material and research methods were consistent with indications for the treatment of wedge-defects (stripping). The preparation carried out with diamond burs of New Technology Instruments of medium and fine grain size. Futurabond U (VOCO) used as an adhesive system. The defect was filled with photocurable composite, which is a universal nanohybrid ORMOCER restorative materials of Amira Fusion range (VOCO) and which is indicated for filling cavities of the I-V class when reconstructing of anterior teeth, shape and color correction to improve aesthetics. Thanks to innovative technology, Ormoker is characterized by low polymerization shrinkage (1.25%) and stress compared to other filling composites. High inertness ensures biocompatibility and color tone stability. Admira is universal in application - it meets high requirements for anterior and posterior teeth; optimally matched color scheme provides compatibility when working with several colors. Fluoride varnish Bifluorid 12 used to cover restored teeth.

Isolation of the working field carried out with Teflon tape, which allowed minimizing the negative impact of gingival fluid. In addition, the tape protected adjacent teeth from acid gel and adhesive. Starting from the apex of the distal interdental papilla along the marginal gingival

border to the apex of the mesial papilla, the tape gently pushes the instrument into the gingival sulcus (Fig. 1).

Fig. 1. Gingival retraction with teflon tape

Results and discussion

The results of the study are in a clinical case.

A wedge-defect is localized in the subgingival region of the tooth crown 14 (class V). Dentin pigmentation is noted.

The patient refuses the application of rubber dam. He signed an informed consent to the restoration of the tooth with composite material using Teflon tape as an insulating agent.

Filling of teeth with class V cavities includes the usual stages of working with photopolymers, however, the increased humidity of the cervical region and the possibility of bleeding gums should be taken into account.

Planning the shape and topography requires special attention. It is necessary to assess the severity of root deviation and gingival contour type in accordance with the symmetrical and adjacent teeth. Based on odontoscopy, in this case, it planned to model a rounded gingival dome of the premolar without distal deviation.

The tooth was mechanically cleaned with Klint fluoride-free paste and a brush rotating at low revolutions. The paste was washed off with a stream of water. The choice of shades of the composite was made in accordance with the optimal requirements: the reference colors are compared with the cervical region of the teeth, standing next to and symmetrically, to complete

coincidence. The inscriptions on the standards correspond to the marking of the photopolymer. The dentin corresponds to the color OA2, enamel – A2. Transparent layer – I.

The working field is isolated with Teflon tape, as the patient refuses to impose a rubber dam. For effective use, the tape was carefully laid along the surface to be protected and placed in the interdental spaces. Teflon is autoclaved at 121° C.

The preparation of the cavity was carried out in compliance with the following rules. The gingival wall was formed at an acute angle to the bottom of the cavity. All edges and corners of the cavity are rounded. Enamel processing is carried out with diamond burs of medium and then fine size (Fig. 2). Dentin necrotomy was performed with a round carbide bur.

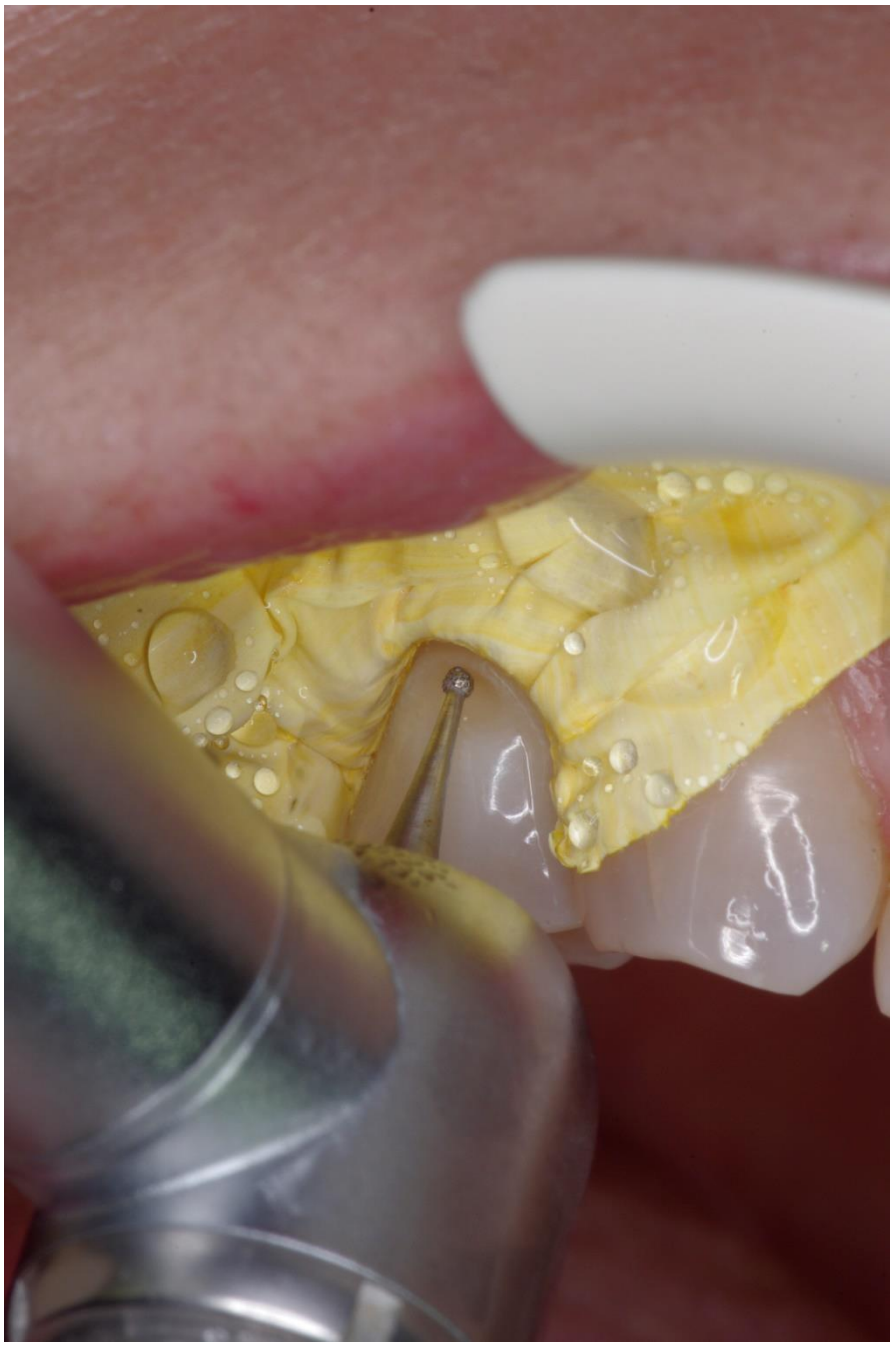

Fig. 2. Dissection of defect walls

Enamel bevel is created towards the equator, for which cylindrical and cone-shaped burs of decreasing grain size are used. The bevel width is equal to the size of the defect. As a result of the preparation, a ledge is formed along the gingival margin, which helps to improve the adhesion of the filling, and in the direction of the equator - a smoothed surface, leveling the «filling-to-tooth» border.

Total acid etching of cavity walls was carried out. The effect of the gel on the enamel is 30 seconds and not more than 15-20 seconds on the dentin of the tooth. The gel was washed off with a stream of water, the surface is dried with an air gun, and the dentin is not overdried.

Gel-etched areas were treated with adhesive using a special brush: the resin is applied to the surface and rubbed in with light movements. Then it was distributed by an air stream, polymerized by the action of an LED lamp. Immediately after curing the adhesive bond, the cavity begins to fill with the composite in accordance with the selected shades.

When filling the gingival region serves as a guideline for modeling the «clinical neck» of restoration. An opaque layer of the OA2 composite was introduced at the bottom of the cavity, making up for the lost dentin. A part of the material was placed in the middle of the area close to the border with the gum, and then gently smoothed. The opaque layer cures within 40 seconds.

An enamel shade of the material forms a rounded periodontal contour and cervical bulge. To do this, a portion of the enamel composite was applied to the central gingival region of the tooth and smoothed from the center to the periphery, carefully rubbing to the borders of this zone.

When modeling the cervical bulge, the burnisher was positioned at an angle of 30° in regards to the vestibular site. The enamel layer was polymerized under the influence of an LED lamp.

As a result, the opaque layer fills the volume of the cavity corresponding to the lost dentin, the main enamel tone covers the entire opaque material. The transparent layer is evenly distributed with a layer of 0.5 mm, moreover, the gingival «filling-tooth» border is overlapped by the composite with some excess (in thickness), which is ground during processing. Polymerization is carried out.

Immediately after inserting filling, it was processed: removal of the surface layer, porous due to its interaction with atmospheric oxygen; shaping and polishing the surface to a shine similar to a tooth.

Preparation of the restoration begins with a fine- diamond burr of cylindrical shape with a pointed end, a thin layer of filling material is removed by moving the burr through the restoration

surface in the mesio-distal direction. The subgingival region was emphasized with a thin bur (mosquito bite).

The vestibular surface was polished with disks, rubber heads, a brush and special pastes. Processing, shaping, polishing of the restoration was carried out in a humid environment in order to avoid heating the fillings and teeth.

The final stage of restoration is the processing of enamel around the filling with Bifluorid-12 varnish containing fluorine. The latter was applied with a brush in a thin layer, dried with an air stream. This measure improves the marginal fit of the filling, increasing the mineralization of enamel. (It was carried out after elimination of Teflon protection).

Examination of the vestibular surface of the tooth and the border with the filling using optical systems (magnifier, digital camera) shows the high quality of the restoration (Fig. 3). Long-term results indicate the effective work of the dentist with the rational isolation of the working field and the optimal choice of filling material.

Fig. 3. The work has been completed

Conclusion

Aesthetic restoration of permanent teeth requires not only knowledge of the technique of working with composite materials, but also the proper use of auxiliary means, in particular, for isolating the working field. The use of Teflon tape allows ensuring cleanliness and dryness in the cervical region of the tooth in the treatment of wedge defects. A lightcurable composite having good adhesion to hard tissues, high strength, and optical parameters like enamel provides the ability to mimic the natural appearance of a tooth.

An alternative method of limiting the operative field using Teflon tape, as well as filling the cavity with a modified composite with minimal shrinkage and low polymerization stress, allows expanding the possibilities of restoration of teeth with defects localized in the gum region.

References

1. Kodratyeva V.S. Esthetics of direct composite restoration of front teeth in old and aged patients. Clinical case // New in Dentistry.- 2017.- №1.- P. 56-60.
2. Kostin K. Using of digital tools in single restoration of esthetic important area // Esthetic dentistry.- 2016.- №1-2.- P. 108-111.
3. Lutskaya I.K., Beloivanenko I.O., Lopatin O.A. Alternative methods of the work area protection in dentistry // Journal for Dentists. – 2018. - №3. – P. 5-11
4. Lutskaya I.K. Problem of the method selection in present-day dentistry // Present-day dentistry.- 2017.- №1.- P. 5-11.
5. Dental program 2017-2018 VOCO.- 85p.
6. Yalyshev R.K. Esthetic rehabilitation of the front teeth with the help of nanocomposite material // New in dentistry. – 2018.- №8(236).- P.58-61.
7. Flury P., Schnellbacher. Like a natural tooth // New in Dentistry.- 2017.- №1.- P. 52-55.
8. Frankenberger R. Esthetics of the front teeth with composite restorations / R.Frankenberger // New in dentistry.- 2007.- №3.- P. 1-8.