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Aesthetic Restoration of the Tooth with Non-carious Cervical Lesion: Clinical Case

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Abstract

Introduction. 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.

Purpose. The aim of this study was to analyze the quality evaluation of isolating the working field and filling non-carious cervical lesion with light-cure composites.

Materials and methods. Research methods were consistent with indications for the treatment of non-carious cervical lesion (abrasion and abfraction). The choice of means and methods of treatment depends on these factors.

Results. An article describes an alternative method of isolating the gums with polytetrafluoroethylene tape and filling the defect with a light-cure resin-based composite. Performance assessment has been evaluated using optical systems and digital camera photography.

Conclusion. 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

Keywords: light-cure resin-based composite, ormocer, non-carious cervical lesion, aesthetic restoration

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Эстетическое реставрирование зуба при некариозном дефекте в пришеечной области: клинический случай

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Резюме

Введение. Локализация дефекта в пришеечной области зуба требует особого внимания специалиста в силу высокой влажности данного участка и десны.

Цель. Анализ качества лечения дефекта некариозной природы в придесневой области зуба.

Материалы и методы. Выбор метода лечения зависел от названных факторов. Изолирование рабочего поля осуществлялось с помощью тефлоновой ленты.

Результаты. В статье описан альтернативный способ изолирования десны тефлоновой лентой и пломбирования дефекта фотоотверждаемым композиционным материалом. Оценка эффективности работы производилась при помощи оптических систем и фотосъемки цифровой камерой.

Заключение. Соблюдение техники и этапов работы позволяет обеспечить высокое качество адгезии композита к тканям зуба и оптические свойства реставрации, характерные для естественной эмали.

Ключевые слова: фотоотверждаемый композит, ормокер, некариозное поражение в пришеечной области, эстетическая реставрация

■ 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 defect 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 polytetrafluoroethylene 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 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 applied to protect adjacent teeth during etching of cavity walls. The described technique can be applied in case of treatment of defects of the gingival region of the tooth.

■ PURPOSE

In accordance with the foregoing, the aim of this study was to analyze the quality evaluation of isolating the working field and filling non-carious cervical lesion with light-cure resin-based composites.

■ MATERIALS AND METHODS

Research methods were consistent with indications for the treatment of non-carious cervical lesion (abrasion and abfraction). The preparation was performed by diamond burs with medium and fine grain size. Futurabond U (VOCO) used as an adhesive system. The defect was filled with light-cure resin-based composite, which is a universal nanohybrid restorative material 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, is nanohybrid 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 performed with polytetrafluoroethylene 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 and operative field isolation of the polytetrafluoroethylene tape

■ RESULTS AND DISCUSSION

The results of the study are presented in a clinical case.

A non-carious cervical lesion 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 polytetrafluoroethylene 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.



Fig. 2. Preparation of tooth enamel with a diamond bur

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 is planned to modeling a rounded gingival dome of the premolar without distal deviation.

The tooth mechanically cleaned with Clint fluoride-free paste and a brush rotating at low revolutions. The paste washed off with a stream of water. The choice of shades of the composite made in accordance with the optimal requirements: the reference colors 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 polytetrafluoroethylene tape, as the patient refuses to impose a rubber dam. For effective use, the tape carefully laid along the surface for protection and placed in the interdental spaces. Polytetrafluoroethylene has been autoclaved at 121 °C.

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

Enamel bevel 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. In consequence 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 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 washed off with a stream of water, the surface dried with an air gun, and the dentin was not overdried.

Gel-etched areas treated with adhesive using a special brush: the resin applied to the surface and rubbed in with light movements. Then it 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 introduced at the bottom of the cavity, making up for the lost dentin. A part of the material 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 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 modeling instrument positioned at an angle of 30 ° in regards to the vestibular site. The enamel layer 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 carried out.

The surface layer of the restoration is porous due to interaction with atmospheric oxygen. This layer removed by 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 removed by moving the burr through the restoration surface in the mesio-distal direction. The subgingival region emphasized with a thin bur (mosquito bite).

The vestibular surface polished with disks, rubber heads, a brush and special pastes. Processing, shaping, and polishing of the restoration 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. Which 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 made after elimination of polytetrafluoroethylene 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. Examination of the vestibular surface of the tooth after restoration and polishing

■ 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 polytetrafluoroethylene tape allows ensuring cleanliness and dryness in the cervical region of the tooth in the treatment of non-carious cervical lesion. The light-cure resin-based composites have good adhesion to hard tissues, high strength, and optical parameters like enamel. This kind of dental materials provides the ability to mimic the natural appearance of a tooth.

An alternative method of limiting the operative field using polytetrafluoroethylene 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.

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