CASE STUDY

Experience in the Application of Hybrid Ceramic Restorations in the Cervical Region

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Abstract

A variety of diseases in the cervical region of the teeth forcing dentists to move to the selection of material for treatment based on the leading etiological factor in the defeat. Manufacturers offer for the restoration of this group of diseases of SIC, composites and hybrid ceramics (VITA), which combines the positive properties of traditional ceramics and composites for computer-aided design/computer-aided manufacturing (CAD/CAM). VITA ENAMIC is a middle ground: A natural elasticity as dentin, as well as abrasive properties similar to the natural enamel. In this clinical case, successful restoration of the cervical defect of the tooth is presented 2.4, using VITA ENAMIK and CAD/CAM technology. The tooth was isolate by the cofferdam system. Treatment of the tooth was carry out with the help of aluminum oxide. The fixation was carried out by adhesive technology using the Variolink II Professional Set (Ivoclar Vivadent). After that, the final treatment was carry out using a special kit.

Key words: Abfraction, cervical region, hybrid ceramics, restoration

INTRODUCTION

In the cervical region, distinguish several types of the lesions: Caries and non-carious lesions, among which there are erosions, wedge-shaped defects, and abfractions. According to the International Classification of Dental Diseases (ICD-10), caries of enamel, caries of dentin, and caries of cement could be diagnose in the cervical area of the tooth. In the cervical area of the tooth can be diagnosed non-carious lesions of the teeth such as erosion of the enamel (K03.2) and a wedge-shaped defect (K03.10) in a section of the tooth abrasion. Abfraction lesions, which were also localize in the cervical region, are not distinguished in the other group of diseases in the ICD-10, which makes it difficult to classify them, distinguish them into a separate nosological form, and makes it difficult to develop specific pathogenetically oriented methods for their prevention and treatment.[1,2] If in the etiology of the carious process the main role assigns to demineralization against the background of violations of oral hygiene or factors of common diseases (somatic pathology and radiation exposure), then, in addition to restorative technologies, introduce elements that prevent the development of the carious process. In the treatment of non-carious lesions such as erosion, abrasion (tooth powder, professional, and ritual), and abfractions, it is necessary to identify the leading etiological lesion factor. Often these lesions are multifactorial, i.e., on erosion due to the action of organic acids, can combine occlusion loads and can form an abfractive defect. To restore the lost hard tissues of teeth more often apply the method of direct filling. This method is not effective enough, as may be observed the development of secondary caries: In half a year - in 30% of clinical situations; a year later - in 50%; and in 2 years - in 70%. The use of composite restorations on exposed occlusal surfaces is limited due to the low physical-mechanical characteristics of these materials. It was found that the enamel in the cervical region at the dentinoenamel junction is first involves in the process of destruction of hard tissues during abfraction. Dentin is much easier to withstand the non-axial loads compare with enamel.[3] This is because dentin has a much smaller modulus of elasticity than enamel and, consequently, is more malleable. According to the data of many authors, it is possible to detect abfraction usually on those teeth that have super contacts with antagonist teeth. It is very commonly seen in patients with an open bite in small molars and a lack

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of canines undoubtedly, the structure, mineral composition, features of teeth anatomy, and exogenous factors are additional determinants of the dental lesions formation. The author also points out that one of the etiological factors is the effect of traumatic lateral pressure, which arises from the malocclusion and/or ejection of the tongue.[4] Thus, all of the above indicates that the abfractive defect of hard tissues of the teeth is a disease with an etiology of a polyfactorial nature and a complex mechanism of pathogenesis, which until now have been poorly study. There are conflicting opinions of the authors on the treatment of this disease, which requires further detailed study in experimental and clinical researchers.[5,6] The high demands of patients to the esthetics of the frontal group restorations require manufacturers to search for new highly esthetic materials. This goal allows achieving the computer-aided design/computer-aided manufacturing (CAD/CAM) technology. In addition, CAD/CAM allows using new materials whose properties are better than other materials used in direct restorative procedures. VITA ENAMIC combines the positive properties of traditional ceramics and polymer for CAD/CAM, which is associated with significant advantages in prosthetics.[7,8] The elasticity of VITA ENAMIC is close to dentin, and the abrasive properties are identical to natural enamel. This allows it was use in regions of increased occlusal load and the cervical region. The material was seamlessly integrate with the patient's natural teeth according to color and optical characteristics.[9,10]

The purpose of our study was to evaluate the effectiveness of hybrid ceramics for tooth restoration in the cervical region.

MATERIALS AND METHODS

Consider the clinical presentation of the material on the example of the treatment of the patient K. 32 years old, who notes complaints of an esthetic defect in the tooth region 2.4 [Figure 1].

With the help of the VITA color scheme, the tooth color is determined, which in this case corresponds to the color A3 [Figure 2].

After tooth isolating with a cofferdam, the surface of the defect was treat with aluminum oxide of 27 microns [Figure 3].

To digitize the results of the preparation on the teeth with a special spray system VITA CEREC Propellant, apply contrasting powder with a uniform layer (both VITA Zahnfabrik), which makes it possible to form the glare-free surface required for making an optical impression. Modus Veneer software module was use for further modeling.

Figure 4 presents a ready-made virtual model of a cervical veneer. Restorations are made of billets of 3M2 color.

Figure 1: Initial situation – DS: K03.18 Other specified abrasion of teeth

Figure 2: Color definition

Figure 3: After the treatment of the cavity with aluminum oxide

Fixation was carry out by adhesive technology with using the Variolink II Professional Set (Ivoclar Vivadent) [Figure 5].

After curing, the final polishing of the restorations was carry out using fine-grained diamond tools and a polishing kit designed special for VITA ENAMIC.

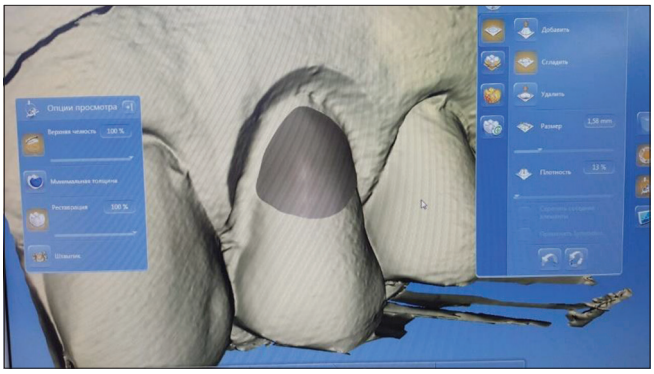

Figure 4: Virtual veneer model

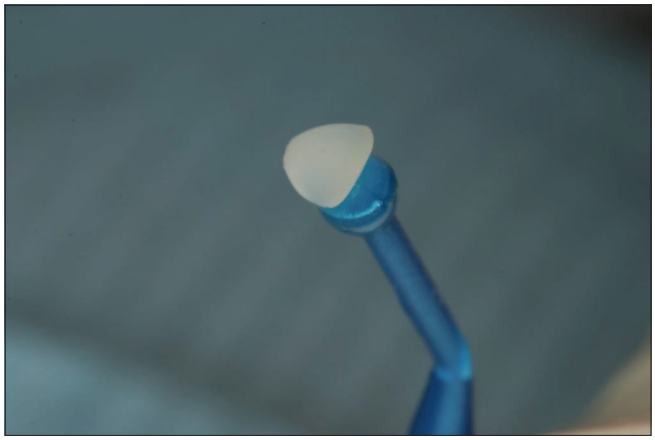

Figure 5: Veneer before fixation

Figure 6: Result after fixation, grinding and polishing

RESULTS AND DISCUSSION

Figure 6 shows the result of treatment immediately after fixation and final processing of the restoration and Figure 7 the final situation at the control visit 1 week after fixation.

CONCLUSION

Using CEREC technology in combination with VITA ENAMIC allows restoring the missing hard tissues optimally in the cervical area of the tooth. Treatment was carry out with minimally invasive technology at one appointment and provides maximum achievement of a natural esthetic result. A good adaptation of restoration with surrounding hard tissues was also determine by the good spread of light in the material, which is very close to natural teeth in this indicator. Due to the specific physical and mechanical properties of the material, which include a balanced combination of high resistance to loads and elasticity, we can count on good durability of the manufactured veneers in the cervical region of the teeth.

Figure 7: Control visit 1 week after fixation

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