Solving the problem of postoperative complications of Class I restorations

By Dr. Valentina Kondratieva, Russia

Introduction

In the recent years there has been a rapid improvement in the physical properties of the composite materials and adhesive systems that certainly helped dentists to improve the quality of their work. Shrinkage of composite materials today is lower than before, their strength and wear resistance have increased, and aesthetic properties are comparable to the aesthetics of natural teeth. But, unfortunately, the problem of the polymerization stress has remained to the present time. Shrinkage of the composite material during polymerization causes stress in the composite, the adhesive layer and the tooth tissues. The intensity of the stress depends on such factors as cavity configuration (C-factor), the physical properties and composition of the composite material. The result of the polymerization stress is a number of complications - micro leakage, post-operative sensitivity, cracks in the tooth, subsequent secondary caries and others. To prevent such problems during performing restorations with class II composite materials it is recommended to use flowable composites as an adaptive layer (creating the ‘elastic cavity wall’), as well as perform placement of the composite in small portions during filling the cavity (incremental technique) [1]. Such approach is familiar to the dentists but require a lot of time for restoration of each tooth as during the work the clinician has to insert into the cavity and adapt multiple numbers of layers of the composite material. That is why bulk fill materials are increasingly popular. They help solve the problem of polymerization stress and reduce the amount of time spent on the restoration of the tooth. One of such materials, Filtek™ Bulk Fill Posterior Restorative, is used in both dental practices world-wide and daily helps us to do a job better.

Clinical case

The patient came to the dental office with complaints about increased sensitivity of the posterior teeth of the lower jaw on the right while eating sweets. During the examination the poor quality restorations of teeth 4.6.4.7 were found (Fig. 1). Following the placement of temporary occlusal adaptation, it was decided to make a direct restoration of the teeth with Filtek™ Bulk Fill Posterior composite material.

Isolation of the working field

When working with composite materials the use of the isolation will help to make the adhesive procedure more predictable and will provide a dry working field and retraction of the soft tissues surrounding the tooth. But in this case the application of a clamp for fixing the rubber dam material has certain difficulties—a tooth 4.7 has a low clinical crown and there is no possibility to rigidly fix the clamp on it. There is a simple solution to this problem: 36% phosphoric acid is applied on the area near the gingiva on the buccal wall of the tooth in two places and after 5 seconds washed out with the plenty of water, then a piece of the composite material is placed on the surface (composite shoulder), which after the polymerization will function as a barrier between the tooth and the adhesive. The patients were informed about the possibility of slight discomfort during and after the preparation. The composite material was made of thin LM-Applica and LM-Fissura tools using the technique of direct carving (Fig. 10-13).

Preparation step

Old restorations were removed with the diamond burs (diamond particle size 1-2x10 microns, the universal carbide bur (SS-White SSW FG-1702SL) was used for preparation of carious dentin, enamel walls of the cavities were treated with fine-grain diamond burs (diamond particle size 25-50 microns) and polished with Phosphoric acid was applied on the areas near the gingiva on the buccal wall of the tooth in two places and after 5 seconds washed out with the plenty of water, then a piece of the composite material was made for preparation of carious dentin, enamel walls of the cavities were treated with fine-grain diamond burs (diamond particle size 25 microns) and polished with phosphoric acid for 10 seconds. The X-Ray showed that the material was made for the entire depth of the cavity.

Flowable composite use

Many authors describe the use of flowable composite underneath posterior restorations. Improved adaption and contribution to lower post-operative sensitivity have been given as reasons for this. Although Filtek™ Bulk Fill Posteriorrestorative has excellent radiopacity and adaptation to the cavity walls (Fig. 18), the material in one layer up to 5 mm height has an excellent radiopacity and adaptation to the cavity walls. The X-Ray showed that the material in one layer up to 5 mm height has an excellent radiopacity and adaptation to the cavity walls. The X-Ray showed that the material in one layer up to 5 mm height has an excellent radiopacity and adaptation to the cavity walls.

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Final result

The X-Ray showed that the material has an excellent radiopacity and adhesion to the cavity walls (Fig. 18). The amount of time consumed on the restoration of two teeth with Filtek™ Bulk Fill Posterior Restorative was equivalent to the amount of time which is usually taken to treat one tooth with Filtek™ Bulk Fill Posterior Restorative. The time is sufficient for the full polymerization of composite material in the tooth-restoration border was removed with a synthetic fiber brush, slightly moistened with the model wetting agent. Polymerization of the composite material was made for 20 seconds (Fig. 15). With the power of curing light of 1000 mW/cm2 this time is sufficient for the full polymerization of composite material in the tooth-restoration border was removed with a synthetic fiber brush, slightly moistened with the model wetting agent. Polymerization of the composite material was made for 20 seconds (Fig. 15). 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