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 considerably 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 rates 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 cavities and others. To prevent such problems during performing restorations with classic 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).

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 inject into the cavity and adapt multiple number 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 dental practices worldwide and daily helps us to do a better job.

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 out. The restoration and the tooth were found (Fig.1). To minimize polymerization stress, save time during the treatment without compromising the strength and the wear resistance of the restoration the adaptive layer was created to make a direct restoration of the teeth with Filtek™ Bulk Fill Posterior Restorative 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 water, then a piece of the composite material is placed on the surface (composite shoulder), which after the polymerization will perform the function of holding the clamp on the tooth. After the placement of the rubber dam all possible leaks are sealed with gingival protector (Fig. 2).

Fig. 1. Initial clinical situation: Teeth 4.6, 4.7 are unsatisfactorily restorations with microleakages, color changes along the tooth-tooth border.

Preparation step

Old restorations were removed with the diamond burs (diamond particle size is 2.5-40 microns), the universal carbide bur (SS-White SSW FG-1702SL) was used for preparation of carious dentin, enamel walls of the remaining of the composite was polished with fine-grain diamond burs (diamond particle size is 120-140 microns), the universal carbide bur during finishing and occlusal adaptation. After preparation, the remaining of the composite was removed with a synthetic fiber brush, and the remaining of the composite was polished with a two-stage polishing system: Sof-Lex™ Spiral Wheels (beige and white).

Fig. 2. Isolation of the working field with the latex curtain

Flowable composite use

Many authors describe the use of flowable composite underneath posterior restorations. Improved adaptation and contribution to lower post-operative sensitivity have been given as reasons for this. Although Filtek™ Bulk Fill Posterior is very flowable upon eutectolding, the author also prefers to apply a layer of flowable composite prior to placing the composite material.

Fig. 3. Old restorations are removed from the tooth. Preparation and etching is performed, cavities are prepared for further restorations

Finishing of the restoration

On the Fig. 16 the restorations before finishing and polishing are shown. After the rubber dam removal, the composite shoulder was removed from the buccal wall of the tooth using an ultrasonic tip for removing dental plaque, and the remaining of the composite was polished with the SS White 1-sided carbide bur during finishing and occlusal adaptation of the tooth. An occlusal surface was made with Filtek™ Bulk Fill Posterior at the entire depth of the cavity.

Conclusions

With this technique using bulk fill nanocomposite materials such as Filtek™ Bulk Fill Posterior the author has less post-operative sensitivity issues than with multi-layer composite placement [3]. In addition, using the material in one layer up to 5 mm allows dentists to significantly reduce the amount of working time without sacrificing the quality of work.

Full list of references is available from the publisher.

Kondaevna, leading specialist in aesthetic dentistry, Hurunwright Dental Practice, the author of EVRICA Project, successful practicing dentist with over 33 years of experience. Owner of the patents in the field of dentistry and developer of ‘one-opacity’ technique of aesthetic anterior teeth restoration with Filtek™ Z550 nanocomposite material. Over the past 5 years conducted more than 150 educational events in Russia and abroad. e-mail: yinova@yandex.ru