Glass Ionomer Linings: A Novel Approach to a Traditional Technique

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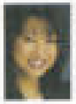

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Posterior composite restorations have become increasingly popular with both patients and dentists for several reasons. During the past decade, composite resin materials and dentin bonding agents have improved dramatically. In addition, patients are more appearance conscious and request tooth-colored, invisible fillings instead of the less appealing black amalgam fillings. Placing composite resins, however, is highly technique sensitive. Great care must be taken to avoid problems common with inadequate composite restorations such as uncontrolled polymerization shrinkage leading to secondary caries and postoperative sensitivity.[1]

Postoperative sensitivity is in part a result of unsealed dentin tubules and uncontrolled polymerization shrinkage. Basically, as the cured restoration composite shrinks and pulls the bonding agent away from the dentin, voids may occur between the tooth and the restoration. If these voids leave open dentinal tubules, the pressure on odontoblasts may be perceived as pain.[2]

Conditioning with phosphoric acid removes the smear layer and exposes the dentin tubules. Proper dentin hybridization using a fourth or fifth generation dentin bonding agent will seal the exposed tubules and prevent sensitivity; however, the bonding sequence is extremely technique sensitive and many clinicians who practice meticulous technique will still admit to occasional postoperative sensitivity of unknown origin.[3]

Before the advent of the total-etch technique, all exposed dentin was covered with a liner before etching the enamel.[4] When the total-etch technique became popular, many dentists abandoned the separate step of placing a liner. Today, most lecturers and authors advocate total etch and the creation of a hybrid layer using a dentin-bonding agent.[5] A novel alternative using a resin-reinforced glass ionomer restorative material before placing a composite resin in a sandwich technique has a long history of success in the posterior region.[6,7]

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GC Fuji Lining™ LC paste (GC America, Inc) is a radiopaque resin-reinforced light-cured glass ionomer restorative material that satisfies all of the requirements for sealing and protecting the pulp under composites on posterior teeth to limit postoperative sensitivity.[8] The case in this article presents a technique for using GC Fuji Lining™ LC material in combination with composite resin for a posterior sandwich restoration to avoid the problem of postoperative sensitivity.

Glass Ionomer Restorative Material

A patient presented with a failing amalgam restoration with a crack through the mesial marginal ridge on tooth No. 13. The adjacent tooth No. 12 had a 15-year-old gold foil restoration (Figure 1). Anesthesia was obtained and the teeth were isolated with a rubber dam. After prewedging the teeth, the old restorations and recurrent decay were removed using high-speed diamonds from the Contemporary Shofu® Cutting Kit (Shofu® Dental Corporation) (Figure 2). Air abrasion was used to remove the recurrent decay in deeper areas and underneath the cusps, and complete caries excavation was verified using Seek® & Sable™ Seek® decay detector (Ultradent Products, Inc) (Figure 3).[9,10] A mesial box was prepared for tooth No. 13 where the enamel fractured off from the existing crack (Figure 4).

Figure 1—A patient presented with a failing amalgam restoration with a crack through the mesial marginal ridge on tooth No. 13. The adjacent tooth No. 12 had a [illegible] restoration.

Figure 2—The old restorations and recurrent decay were removed using high-speed diamonds from the Contemporary Shofu® Cutting Kit.

Figure 3—Decay detector used to assure complete caries excavation.

Figure 4—A mesial box was prepared for tooth No. 13 where the enamel fractured off from the existing crack.

Figure 5—The GC Fuji Lining™ LC material was dispensed from the autodispenser onto a mixing pad, thoroughly spatula-mixed, and dispensed into the deeper areas of the preparations using a syringe.

Figure 6—The liner was light-cured with a plasma arc light for 10 seconds, and the preparation was refined.

Figure 7—The rubber dam was removed, the occlusion adjusted, and the restoration was polished using Ceramiste® polishing points from the Contemporary Shofu® Finishing Kit and Diamond Polishing Paste.

After initial preparation, the preparation was treated with Hemostat de Cide Desensitizer (Advantage Dental Products, Inc) and lightly air-dried. The GC Fuji Lining™ LC material was dispensed from the autodispenser onto a mixing pad, thoroughly spatula-mixed, and placed into the deeper areas of the preparations using a syringe (Figure 5). The Fuji material mixes easily into a good viscosity that flows smoothly into the cavity preparation. The material was placed in a uniform layer to a maximum depth of 1 mm along the floor, covering all of the exposed dentin. An explorer tip was also used to drag some of the flowable material up to block out undercuts, while taking great care to not contact the cavosurface margin. The liner was then light-cured with a plasma arc light for 10 seconds, and the preparation was refined (Figure 6).

Using glass ionomer restorative material offers numerous benefits when placing posterior composite restorations.

In preparation for restoring with composite resin, a matrix band and wedge were placed for the mesio-occlusal preparation of tooth No. 13. Phosphoric acid (37%) was placed on the light-cured restorative material and enamel margins of both preparations for 15 seconds, thoroughly rinsed, and lightly air-dried