The Direct Bulk-Fill Restorative Option

INTRODUCTION

For a long period of time, direct posterior composite restorations have enabled clinicians to provide patients with minimally invasive and aesthetic restorations as an alternative to amalgam fillings. However, since the introduction of direct composites, clinicians have faced a variety of challenges associated with the placement of these materials in handling, wear, longevity, and aesthetics. Direct posterior composite placement has typically required strict attention to one’s individual operative techniques to ensure complete polymerization, great marginal seal, and no postoperative sensitivity. Due to their polymerization properties and limited depth of cure, light-cured composites are generally used in a layering technique with individual increments that are up to 2.0 mm in thickness. Each increment is polymerized separately, with light exposure times ranging from 10 to 40 seconds per surface, depending on the power of the curing light and the color/translucency of the composite material. With the materials available up until recently, thicker composite layers resulted in insufficient polymerization of the composite resin, which resulted in inferior mechanical and biological properties.

Today’s practitioners must be able to effectively carry out all the required operative steps to successfully complete direct composite resin restorations. If these steps (eg, isolation, adhesion, composite placement, and light curing) are done correctly, the risk of premature composite resin failure is a moot point. In addition, these steps must be completed as efficiently as possible to contend with issues such as practice overhead or low insurance reimbursement. Efficiency in an everyday dental practice should be considered as not only the ability of the operator to work quickly but also competently. Overhead costs in most practices require that material and technology advancements are introduced so that posterior composites can be placed faster, easier, and more profitably without any compromise in the clinical procedures.

The Bulk-Fill Option

Understanding the needs of clinicians, a number of composite manufacturers have focused on material development to simplify composite-based restoration techniques in the posterior region. In these new fast-track systems, low-shrinkage, mechanically stable composite materials that can be applied directly into the cavities in larger increments have been developed. One product in this arena that I am now using on a daily basis is Bulk EZ (Zest Dental Solutions). Bulk EZ is a dual-cure, bulk-fill restorative composite designed for direct restorations. It is versatile and can be used as a direct restorative and also as a flowable base/liner. When allowed to self-cure (with no light curing), this bulk-fill composite has excellent physical properties for posterior restorations with an unlimited depth of cure. Light curing is only needed to harden the air-inhibited layer after self-curing. With no layering required, the time saved over other light-cured bulk-composite systems can be as much as 60% per procedure. Unlike other dual-cure composites, Bulk EZ is compatible with all other bonding agents on the market. The directed shrinkage in this self-curing composite offers the solution to the common concern of complete polymerization in the deepest portions of box preparations. When properly placed, voids or gap formation at the bottom of the restoration are virtually eliminated due to the low viscosity and exceptional marginal adaptation of the material, resulting in a decreased risk of post-op sensitivity or recurrent decay. Unlike many other bulk-fill composites, Bulk EZ is available in 3 VITA shades: A1, A2, and A3.

CASE REPORT

Diagnosis and Treatment Planning

A 28-year-old female, in good overall health, presented for a routine periodical oral examination and radiographs. It was determined visually and radiographically (Figure 1) that interproximal decay was present on her upper first molar and second premolar. Having been informed of the possible treatment alternatives and their costs, the patient elected to have direct restorative composite restorations placed.

Clinical Protocol

The patient was anesthetized with one carpool of 4% Articaine (Septodont) with 1:100,000 epinephrine. Isolation under a rubber dam setting would have been preferable; however, due to...
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Due to the inherent lower pH of the universal adhesives in comparison to phosphoric acid, it is always advisable, in my opinion, to apply phosphoric acid to the enamel cavosurface margin to maximize micromechanical interlocking of the composite material at the enamel surface. A 35% phosphoric acid gel (Ultra-etch [Ultradent Products]) was placed on the enamel margins of both teeth for 15 seconds. The acid was then thoroughly rinsed off with the air/water syringe for approximately 10 seconds. Excess water was carefully removed from the cavity preparations using air without desiccating the dentinal surfaces. A generous amount of the Prelude One universal adhesive was applied to each preparation using an agitation/scrubbing motion for 20 seconds (Figure 3). The solvent was then gently air dried with oil-free air for 10 seconds or until the film of solvent could no longer be seen moving along the preparation surface. The adhesive was then light-cured for 10 seconds with a light source greater than 800 mW/cm². The result should be a shiny cavosurface area, evenly covered with adhesive. This should be carefully checked, as any areas of the cavity that appear matte in appearance are an indication that insufficient adhesive was applied to those sites. In the worst case, this could result in reduced bonding of the restoration in these areas and, at the same time, in reduced dentin sealing, which may lead to post-op sensitivity. If such areas are found upon visual inspection, additional bonding agent is again selectively applied and light cured as described previously.

The Bulk EZ composite was introduced into each preparation, starting from the deepest portion of the preparation and working my way out toward the occlusal (Figure 4). An important technique point here is the need to keep the applicator tip embedded into the material at all times to help eliminate voids. Once the cavosurface was reached with the proper amount of material, the timer was set for 90 seconds (Figure 5). It is important to not utilize a curing light at all during this 90-second time frame. Simply sit and wait at this point, allowing the material to self-cure; as it sets, the polymerization will occur in 90 seconds. With Bulk EZ in place, full polymerization will occur in 90 seconds. The final restorations in place, showing proper finish and ideal contacts.