Overcoming the myths of bulk fill composite materials

Bulk fill composite materials were introduced for restorations more than a decade ago; however, many dentists were reluctant to try them due to the limitations and performance of earlier bulk filling materials.

By 3M Oral Care

In addition, most dentists were trained to use incremental filling materials that require a layering technique in order to minimize stress/shrinkage, achieve proper adaptation and eliminate voids, and achieve proper depth of cure. Because of this, many dentists find it difficult to trust or incorporate bulk fill materials that seemingly contradict their training.

Oder composite resin chemistries feature monomers that need to be layered in 2 mm increments to minimize shrinkage. This traditional layering technique requires multiple steps of packing, layering, and curing, which could increase the potential for voids and/or poor adaptation with each layer. The amount of time that this layering technique requires could also increase the potential to introduce contamination from blood or saliva.

Since the introduction of bulk fill materials, a significant amount of technology has been dedicated to addressing shrinkage stress, but depth of cure issues persisted for some time. “Significant advances in materials science and chemistry in the past decade enable more translucent composites that allow curing light to penetrate to a greater degree,” says Senior Technical Service Engineer for Trubyte, Ph.D. “Significant advances in materials science and chemistry in the past decade enable more translucent composites that allow curing light to penetrate to a greater degree.”

The unique feature of this resin is that, during polymerization, the central group can fragment to relieve stress. The fragments then re-polymerize in a lower stress state.

The other resin component is aromatic urethane dimethacrylate (AUDMA). Because it’s a larger monomer than found in traditional dimethacrylates, it limits the number of shrinkage zones. That helps reduce the amount of shrinkage and stress that occurs during polymerization.

Despite its stiffness, 3M Filtek One Bulk Fill Restorative has a higher opacity than other restorative materials. The unique feature of this resin is that, during polymerization, the central group can fragment to relieve stress. This traditional layering technique requires multiple steps of packing, layering, and curing, which could increase the potential for voids and/or poor adaptation with each layer. The amount of time that this layering technique requires could also increase the potential to introduce contamination from blood or saliva.

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In an in-vitro simulated operatory test with 79 dentists, restorations placed with Filtek One Bulk Fill Restorative in 3 mm increments had fewer defects compared to Filtek Z250 restorations. “With fewer defects, fewer voids, less chance of contamination, and less time than universal composites, dentists can make quality restorations with 3M bulk fill composites,” adds Dunbar. For more information, contact your 3M Oral Care sales representative.

For many decades, the incremental placement of composite has been the prevailing technique. In part because this was thought to minimize the potential for introducing voids. However, studies have shown that the opposite is true when compared to using an effective bulk fill composite.

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3M™ Filtek™ One Bulk Fill Restorative is designed for the posterior so dentists don’t need to sacrifice esthetics while working quickly and efficiently.

Unfortunately, despite the great advances made over the last few years, myths about bulk fill materials continue to persist. Let’s take a closer look at the science of Filtek One Bulk Fill Restorative—and break down the myths of bulk fill.

In the past, bulk fill materials needed a relatively high amount of transmittance (low opacity) in order to fully cure in a 4-5 mm increment. The concept is quite simple— if the composite needs to cure all the way through 4-5 mm of material, then it needs to allow the light to penetrate to a greater degree.

In the decade or so since the introduction of the first bulk fill composites, the field of materials science has exploded. Research and development efforts in the past 5-10 years have yielded bulk fill composites that no longer require a choice between fast and effective depth of cure and esthetics. 3M designed Filtek One Bulk Fill Restorative with unique optical properties and improved opacity to provide the simplicity of one-step placement up to 5 mm, without compromising esthetic results.

3M leveraged its nanotechnology expertise to increase opacity without reducing depth of cure. Its innovative design resulted in a bulk fill restorative with a higher opacity than other leading bulk fill restoratives, resulting in improved esthetics. 3M’s nanotechnology also provides superior wear resistance and excellent polish retention.

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