Five Things You Need to Know About Bulk Fill Composite Resins
THE EVOLUTION OF BULK FILLS

Filling a large, deep preparation used to be a hassle. In order to do so, doctors had to lay down multiple layers of composite material. In addition to the obvious inconvenience of having to place it incrementally, it also presented quality issues. But since their introduction, the materials have continued to improve. The current generation of bulk fill composite resins are easier to handle, more durable and better looking than ever before.

Dr. Tim Bizga, DDS, is a general dentist from Cleveland, Ohio, and observes that the latest formulations of bulk fills have come a long way from their initial incarnation.

“They seem to have really enhanced all the physical properties,” Dr. Bizga says. “From where we started off, you really had just a couple of companies coming out with a product, and the first big advancement was depth of cure. You’re going to be able to place more material in larger increments, and that was going to be about time savings.”

Shrinkage seems also to have been lessened with current bulk fill composite formulations.

“When a composite polymerizes there’s always going to be shrinkage,” Dr. Thomas Dudney, DMD, a cosmetic dentist in Alabaster, Alabama says. “When it shrinks, it creates interfacial stress. In other words, stresses are created at the restorative bonding interfaces. These stresses can lead to problems down the road, like bond-age degradation. Minimizing not only the shrinkage, but also the stress, has always been a problem with composites.”
BULK FILL’S USAGE HAS EXPANDED

Bulk fill composites were initially intended to serve one function — filling voids with just one placement. However, as the materials have improved, the indications have increased. Now, doctors can use bulk fills in different locations and for different purposes.

INDICATIONS

“The indications continue to expand,” Dr. Bizga observes. “In the initial launch of the products, it seems that they were all indicated for bases or to be used in posterior restorations. Now, we’re seeing changes to physical properties, and as they fine-tune these to meet the consumer needs, they’re starting to be indicated for more uses, like core build-up materials and class V restorations. So, they’re expanding and becoming more versatile, which is good.”

For example, BISCO’s REVEAL HD Bulk is used for indications including:

- Direct anterior and posterior restorations (including occlusal surfaces)
- Base/liner under direct restorations
- Core build-ups
- Splinting
- Indirect restorations including inlays, onlays and veneers
- Restorations of deciduous teeth
- Extended fissure sealing in molars and premolars
- Repair of defects in porcelain restorations, enamel, and temporaries

“I have been using bulk fill technology for nine years,” Dr. Bizga adds. “I have found it to be a time savings. I have found it to be easier for my workflow and what I’m doing. As they have started to expand the indications for use, I’ve gone ahead and used those bulk fills for Class Vs and other scenarios, based on what I’m trying to do that day. I’ve integrated it and I’ve continued to expand my uses for the technology.”
DEPTH OF CURE
“Curing lights have come a long way,” Dr. Bizga says. “There are some really fantastic curing lights where what we’ve done is we’ve not only increased the output of energy, but we’ve done it in shorter time spans. So, we now have lights that can cure thicknesses of material of four to five millimeters with a three to five-second cure, because of the intensity that comes out of these curing lights.”

Doctors’ technique has a direct influence on the bulk fill’s performance.
“[Manufacturer’s] studies are all done in laboratory settings with a really good, high-intensity lights that are shining right on the material,” Dr. Dudney observes. “As opposed to operator error that’s introduced when we work in an oral environment. And there are a couple of things that can happen: Most dentists don’t check their curing lights. They don’t know what kind of output they’re getting from their curing light. The quality of the light output is critical. The time you cure is critical. It’s usually recommended to cure for at least 20 seconds, or sometimes even longer, if you have an area that is hard-to-reach. The closer the light is to where you’re curing, the more intensity you’ll have, because as you move the light away or change the angle of light, it affects depth of cure. It affects polymerization and conversion. So, these things can be affected by operator error. Sometimes the material might be blamed, or depth of cure might be blamed in a bulk fill when, in reality, it could have been operator error or it could’ve been the quality of the light or it could have been curing time.”

HANDLING
In addition to performance, the materials are easier to handle, and doctors
can find a material that best suits both their working style and specific need. Bulk fills tend to be a thinner, less viscous material, called a ‘flowable’, or a thicker, more viscous product.

“They’ll be called a ‘sculptable composite,’” Dr. Dudney says. “They shrink less, but they don’t adapt to the cavity walls as well. The flowables are beneficial to the deeper part of a restoration, because they flow better and they adapt better, but because their physical properties aren’t as good, they need to be capped with a two-millimeter layer of a denser, more highly viscous composite. On the other hand, if you use a highly viscous material first, it doesn’t adapt to, say, deep cavity preparations; it doesn’t adapt to walls as well. So, if you’re going to use a sculptable or highly viscous bulk fill, you start with the base or liner or something flowable at the depth of your preparation, cure that, and then come back with your four-millimeter bulk fill on top of that and sculpt it.”

Some practitioners might prefer a bulk fill composite viscosity, simply because of personal preference.

“Categorically, they’re very different, by manufacturer,” Dr. Bizga says. “Some manufacturers have a bulk fill that has a flowable consistency and has self-leveling properties to it. Other companies have more of a filled-type material that places similarly to a universal composite. There’s a lot of variation in terms of handling across the industry. And you sort of pick based off the way you feel most comfortable using the material.”

Those improved handling capabilities allow for more precise, accurate placement.

“If you’re looking for something that can flow into nooks and crannies, you can choose a flowable material, something that requires less manipulation and will adapt to the cavity preparation,” Dr. Bizga says. “In other situations, that might not be as much of a priority. You may use something else. Dentists have always been picky when it comes to handling, and we choose based on what we like to do or how we like to use it in our own hands. There are really no two dentists alike, and companies have done a good job of giving that variety.”

Dr. Dudney highlights the features of BISCO’s REVEAL HD bulk fill and how it improves restorative dentistry.

“One of the things they were working with was ease of handling and polish-ability,” Dr. Dudney says. “Most companies are agreeing that they’ve gotten down to about two percent shrinkage, and that’s about the limit where they feel like they can go. Because it’s considered to be within tolerable limits, now you’re looking at shades that match, chameleon effects, handling properties, polishability, and trying to improve upon some of these handling characteristics.”
PRODUCT IMPROVEMENTS MEAN BENEFITS FOR DOCTORS AND PATIENTS.

Bulk fill technology has come a long way since it was first introduced. Those improvements have meant advances that are beneficial to the doctor and, ultimately, the patient.

TIME SAVINGS
Time, as they say, is of the essence. Patients don’t want to be in the chair any longer than they have to be, and the doctor doesn’t want them there any longer than necessary, either. While improved curing times may shave just a few seconds off the overall restoration process, that saved time is important and those seconds matter. The longer a restoration remains uncured, the greater chance for contamination from blood or saliva. Additionally, the ability to place the material in one large bulk lessens the chance for voids. The end result of contamination or a void could be the restoration’s failure.

ESTHETICS
Ideally, when the patient looks in the mirror, they would not even know that a tooth has been repaired, and that was one composites’ first appealing features — but they weren’t perfect. While they were more esthetic than amalgam fillings, they were still somewhat lacking. That, too, is changing.

“There’s only so much you can do, because they need to be translucent,” Dr. Dudney says. “Because the more translucent they are, the easier it is for light to penetrate to depth. You can take a regular, sculptable composite, let’s say a non-bulk fill, and you might have 10 or 15 different shades. Most
bulk fills, you have about three shades – an A1, a B1, an A2 and, maybe, a B3. What I’m seeing, in my own practice, is ‘acceptable esthetics.’ Sometimes, even though they’re a little more translucent, you are in the posterior segment of the mouth and you’re going to get a little bit of blending, what we call a ‘chameleon effect’, where it’s going to absorb a little bit of the color of the surrounding tooth structure.”

As bulk fills tend to be used in posterior teeth — historically the home of amalgam fillings — patients tend to think that anything tooth-colored is better.

“What are we comparing this to?” Dr. Dudney asks. “Our alternative has always been an amalgam restoration, so anything that’s tooth-colored, at all, is a huge improvement over the precursor.”

The biggest area for esthetic improvement comes from the characteristic that makes them ideal for bulk fills.

“They’re usually too translucent,” Dr. Bizga says. “The reason is you want to get this bulk of material to cure in one thickness. You need to have light easily be able to penetrate the material. I always use the analogy that light can always pass through a clean swimming pool more easily than it does a lake. If you put your hand in the water of a lake, it disappears after about two feet. There’s sediment and discoloration, as compared to a clean backyard swimming pool. They’ve had to make materials, in order to fit the bulk fill, and having the polymerization and conversion, it has historically been very translucent, which means when you put them inside of teeth, if you’re asking the material to replace more tooth structure then is remaining, they don’t look very good.”

Bulk fills have come a long way, on all fronts, and Dr. Dudney observes that clinicians are better off for all their improvements.

“A lot of the materials are not as time-consuming, so that translates into cost savings, because you’re not having to spend as much time in the chair,” Dr. Dudney says. “But I think that most companies are serious about not just saving time, but also having a quality product, too. I believe we’ve reached the point where we are seeing that bulk fills are quality products, because of how many dentists are using them without a lot of reported problems. I think they’re here to stay. I think they are a product that dentists that have switched over to and have been happy with. I think manufacturers will continue to work and try to develop and see what they can come up with.”