

New Material Options, New Cement Selections

Labs share valuable insight and perspective when it comes to adhesion

Gary Alex, DMD, AAACD | Larry Borman

Due to the upsurge of new and innovative indirect ceramic, zirconia, and composite-based materials, it is understandable that dentists and laboratory technicians are sometimes confused regarding optimal placement protocols. Questions often arise about whether the dentist's current cementation products and protocols are acceptable and compatible with these new materials, or whether an entirely new cementation system and protocol are required.

Understandably, most dentists prefer sticking with materials they already know, have, and trust. No dentist wants to have to purchase another cementation kit just to place a new prosthetic or restorative material they may use only occasionally or even abandon entirely. It is helpful to briefly examine the types of cements and resin adhesives currently in

use and determine their applicability when using these newer materials.

Exploring the Options

Cementation options for indirect restorations usually entail the use of one of three distinct classes of materials: resin-modified glass ionomers (RMGI) (eg, RelyX™ Luting Plus Automix Resin Modified Glass Ionomer Cement, 3M ESPE, www.3mespe.com; FujiCEM™ 2, GC America, www.gcamerica.com); self-etching/priming dual-cure resin cements that are used without a separate dentin bonding agent (DBA) (eg, RelyX™ Unicem Self-Adhesive Universal Resin Cement, 3M ESPE; Maxcem, Kerr Corporation, www.kerrdental.com;

G-CEM™, GC America); and dual-cure resin cements that are used with a separate DBA (eg, RelyX™ Ultimate Adhesive Resin Cement, 3M ESPE; DUO-LINK™, BISCO, Inc., www.bisco.com; Multilink®, Ivoclar Vivadent, www.ivoclarvivadent.com).

It can be argued that the two classes of resin cements have a distinct advantage over RMGI cements when it comes to bonding restorations on or in minimally retentive preparations, because resin cements have the potential to bond more durably to both the tooth structures and the restorative material. They are also generally the best choice when placing porcelain restorations that can be etched with hydrofluoric acid and silane treated, as resin cements bond extremely well to etched porcelain and optimize overall assembly strength. The resin cements are also often the best choice for restorations placed in the esthetic zone, because RMGI cements tend to be opaque and whitish in color and can “show through” many restorations, creating unacceptable esthetics.

Although self-etching/priming resin cements have the obvious advantage of not

TABLE 1

What to Look for in a Dual-Cure Resin Cement

- **Low solubility**
- **Low film thickness**
(the current ISO standard for combined film thickness of the adhesive/cement is $\leq 25 \mu\text{m}$; however, a film thickness $\leq 20 \mu\text{m}$ is much more ideal)
- **High compressive strength**
- **High fracture toughness**
- **High flexural strength**
- **Easy delivery and self-mixing capability**
- **Easy cleanup**
- **No postoperative sensitivity**
- **Predictable self-cure mechanism**
(When light can't reach an area of the restoration, it is still very important for the cement to cure predictably. Some “dual cure” materials actually do not self-cure nearly as well as they light cure. Ideally, a resin-based cement will self-cure as well as it light cures)



GARY ALEX, DMD

Co-director, The Long Island Center for Advanced Dentistry
Huntington, New York



LARRY BORMAN

President, Tetra Dynamics, Inc.
Full-Service Dental Lab
West Babylon, New York

requiring a separate DBA, the highest bond strengths are generally achieved when a dual-cure resin cement is used in conjunction with a separate DBA. In fact, some studies have showed that even the self-etching/priming “Cem” type cements perform better (in terms of bond strength) when a separate DBA is placed first.¹⁻³ This extra bond strength may be important in some clinical situations, such as minimally retentive crown preparations.

Many dentists, when faced with the choice between using a self-etching/priming dual-cure resin cement or a dual-cure resin cement that requires a separate DBA, will be tempted to choose the self-etching product simply because it is easier to use. The elimination of the DBA and the time savings that go with this are very appealing. However, if bond strength is truly a priority, the truth of the matter is that using a separate DBA first will optimize adhesion. As previously mentioned, a separate DBA can even be used with a self-etch/

priming product to increase bond strength, but if a dentist is going to use a separate DBA, then it seems to make sense to pair it with a dual-cure cement for which it is specifically designed. Guidelines for choosing a dual-cure resin cement are found in Table 1.

“Even experienced dentists can gain from communicating closely with their lab.”

Guidance for New Restorative Materials

With the introduction of any new restorative material, dentists and labs should carefully consider placement recommendations of the manufacturer. For example, one recently introduced product—3M™ ESPE™ Lava™ Ultimate Restorative—is a resin nanoceramic, representing a new class of materials. As such, dentists may be unsure about the optimal placement protocol. Labs will often advise dentists to stay within the manufacturer’s product line when placing indirect restorations, and this logic is applicable when using this material. Lava Ultimate restorations can be placed using Scotchbond™ Universal Adhesive (3M ESPE) along with RelyX Ultimate cement (a dual-cure resin cement). These three products are designed to work together. The resin cement has an integrated dark-cure activator that works in conjunction with the adhesive to ensure complete curing even in the absence of light. The cement was developed to work especially well with glass ceramics, but it is also indicated for composite and metal materials.

One additional feature of this cement that labs may find helpful to relay to dentists is that it is offered with try-in pastes in matching shades. These try-in pastes can be very useful during shade selection for final cementation, and their water solubility allows them to be cleaned up easily from both the tooth and the restoration.

This integrated system of cement, adhesive, and restorative material serves as a strong example of the benefits that can be achieved with new material options. To ensure maximum efficiency and optimal results, even experienced dentists can gain from communicating closely with their lab when a new restorative is introduced.

Cementation may not be one of the most frequent topics of conversation between the dentist and the lab, but that doesn’t mean that labs don’t have good advice to offer dentists when it comes to this important step. A lab expert’s advice on general topics, including reliable manufacturers and combinations and specific product recommendations, can help dentists shave time off the cementation procedure and achieve optimal results. Open lines of communication can help both parties keep each other apprised of their own experiences with new cements and materials, as well as news from trade shows and continuing education opportunities.

Reliability and Simplification

Both dentists and labs can appreciate the importance of simplified and time-saving systems, and both partners obviously have a strong interest in providing patients with restorations that will look natural and last for the long term. New material options can throw many established procedures into question, but by recommending and choosing cements from proven and reliable manufacturers, labs and dentists can take much of the guesswork out of the process.

References

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