Contemporary Dental Cements

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In the entire area of restorative dental materials, cements may just be the single most confusing topic. Several categories and many specific products are available, so for any given clinical case, the dentist must choose from a vast array of materials. He or she must ask which type of cement is appropriate for the case and then select the "best" product for that case. Complicating an already confusing situation is the fact that many different types of indirect restorations are now available. Each type has certain requirements for support and retention to the natural tooth, foundation, or implant abutment. The purpose of this short Contemporary Issues article is to describe the various classes of contemporary dental cements and where they can be used appropriately.

The primary cements in use today are resin-modified glass ionomers (RMGIs), self-adhesive resins, resin cements using a separate self-etch primer, and resin cements using an etch-and-rinse adhesive system. This article describes the basic characteristics and uses of each type.

RMGIs such as RelyX Luting Plus (3M ESPE, St. Paul, MN, USA) and FujiCEM (GC America, Alsip, IL, USA) are the most popular cements for routine cementation of metal-based restorations such as porcelain fused to metal (PFM) crowns. They bond chemically to tooth structure, release fluoride ions, have very little postoperative sensitivity, and are easy to use. The "automix" version of RelyX Luting Plus can be light-activated to facilitate removal of cement excess. RMGI can be used to cement high strength (e.g., zirconia) restorations, although the author often prefers the option described in the next paragraph. Some clinicians also use them to cement medium strength (e.max, Ivoclar Vivadent, Amherst, NY, USA) restorations, but there are better options for those.

Many self-adhesive resin cements are currently available, including RelyX Unicem (3M ESPE), G-Cem (GC America), Clearfil SA (Kuraray, Houston, TX, USA), and Maxcem Elite (Kerr, Orange, CA, USA). Their bond to tooth structure generally is less than that of resin cements that use a separate self-etch primer or adhesive system. However, they are easy to use and have little or no postoperative sensitivity. They bond to zirconia, and thus are an excellent choice for cementing high-strength all-ceramic crowns. They are also a good option for cementation of fiber posts. There is some evidence that self-adhesive resins can be used to cement ceramic inlays and onlays, but for those partial coverage restorations, selective etching of enamel margins is a good idea because the self-adhesive resins have relatively weak enamel bonds.

When greater retention or support is required for an all-ceramic or metal-based restoration, resin cements with self-etch primers are a good option. Examples include Panavia (Kuraray), Clearfil Esthetic (Kuraray), and Multilink (Ivoclar Vivadent). Although it is a more complex system, C&B Metabond (Parkell, Edgewood, NY, USA) also could be included in this category and is an extremely retentive cement.

Resin cements that require an etch-and-rinse adhesive represent another category and are typically used when enamel bonding, translucency, or color is an important consideration for a ceramic restoration. These cements can be dual-cure only with limited shades and intended for posterior use (e.g., Dual Cement, Ivoclar Vivadent), light-cure only with multiple shades and intended for anterior use (RelyX Veneer, 3M ESPE; Variolink Veneer, Ivoclar Vivadent), or light-cure with a dual-cure option for more universal anterior and posterior use (Calibra,

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Dentsply Caulk, Milford, DE, USA; Variolink II, Ivoclar Vivadent).

A recent trend in resin cements has been the introduction of materials that can be used to bond ceramic restorations using either a self-etch or an etch-and-rinse adhesive. For example, NX3 (Kerr) can be used with OptiBond XTR, an all-in-one adhesive, or with OptiBond Solo Plus, a two-step etch-and-rinse adhesive. Similarly, DuoLink (Bisco, Inc., Schaumburg, IL, USA) can be used with any of several adhesives made by its manufacturer. Most recently, RelyX Ultimate (3M ESPE) is used with the company's Scotchbond Universal Adhesive in an etch-and-rinse, self-etch, or selective etch mode.

The contemporary cements market is a dynamic one, as historically popular materials such as zinc phosphate, polycarboxylate, and conventional glass ionomer lose popularity and new technologies are developed. In regard to the latter, a "bioceramic" cement (Ceramir Crown & Bridge) was recently introduced by Doxa Dental USA (Newport Beach, CA, USA). Described by its manufacturer as containing "hydroxyapatite-like nano-crystals that completely and permanently seal the restoration in place," this cement is marketed as an alternative to RMGI. Early studies have shown good results for crown retention and postoperative sensitivity.

In summary, RMGIs are a good choice for routine cementation of most indirect restorations. For zirconia restorations, fiber posts or conventional restorations requiring more than average retention, self-adhesive resin cements are a good option. Resin cements using self-etch primers or adhesives are appropriate when even greater retention or support is required, and postoperative sensitivity is a concern. These can be used with both metal-based and all-ceramic restorations. For ceramic restorations relying on an enamel bond or when concerned with translucency and color, resin cements using etch-and-rinse adhesives are the best option.

SUGGESTED READING

Ferracane JL, Stansbury JW, Burke FJ. Self-adhesive resin cements—chemistry, properties and clinical considerations. J Oral Rehabil 2011;38:295–314.

Heintze SD. Crown pull-off test (crown retention test) to evaluate the bonding effectiveness of luting agents. Dent Mater 2010;26:193–206.

Hill EE, Lott J. A clinically focused discussion of luting materials. Aust Dent J 2011;56 Suppl 1:67–76.

Sarr M, Mine A, De Munck J, et al. Immediate bonding effectiveness of contemporary composite cements to dentin. Clin Oral Investig 2010;14:569–77.

Vargas MA, Bergeron C, Diaz-Arnold A. Cementing all-ceramic restorations: recommendations for success. J Am Dent Assoc 2011;142 Suppl 2:20S–4S.

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