SELECTING THE RIGHT CEMENT FOR

RESTORATION SUCCESS
Selecting the Right Cement for Restoration Success

The Foundation of Your Restorations

Two key factors affecting the long-term success of indirect dental restorations are choosing the optimum dental cement for a specific clinical situation, and using it correctly.

For a trouble-free procedure and the long-term success of the restoration, the cement used must meet these basic mechanical, biological, and handling requirements:

- It must not harm the tooth or surrounding tissues
- It must allow sufficient working time to place the restoration
- It must offer viscosity and film thickness low enough to allow complete seating of the restoration
- It must quickly form a hard mass strong enough to resist functional forces and thermal effects
- It must not dissolve or wash out, maintaining a sealed, intact restoration

DENTAL CEMENTATION MAY BE DIVIDED INTO TWO CATEGORIES:

- **Adhesive cements**, including the categories of adhesive resin cement and self-adhesive resin cement, rely on both micromechanical retention and chemical bonding.
- **Conventional cements**, also known as non-adhesive cements, principally rely on micromechanical retention provided by a luting agent, including cements that incorporate zinc phosphate, zinc polycarboxylate, glass ionomer, and resin-modified glass ionomer.

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Adhesive resin cements are based on methacrylates modified from composite resin and set through polymerization rather than an acid-base reaction. They are an excellent choice when there are concerns about retention or for esthetic restorations made from glass-ceramic or composite resin. However, adhesive resin cements require isolation from moisture and other contaminants, and may not be appropriate when access or isolation is difficult or for restorations with subgingival finish lines.

These cements require application of a separate dental bonding agent. Many practitioners are reluctant to use the “total etch” technique required with many bonding agents, which requires multiple steps and may increase post-op sensitivity. “Self-etch” bonding agents eliminate the need for separate etching and priming steps, although light curing of the bonding agent may be recommended before seating the restoration to improve bond strength and minimize post-operative sensitivity.3,4

Light-cure, self-cure, and dual-cure options are available.5 Self-cured and dual-cured resin cements can be used for most applications including metal, zirconia, and glass-ceramic restorations. Light-cured cements should only be used for porcelain veneers and glass-ceramic restorations that allow light transmission.

Self-adhesive resin cements are the latest innovation, providing the ease of use associated with glass ionomer and resin-modified glass ionomer cements, but with higher strength, improved esthetics, and dual curing. These cements contain acrylic or diacylate monomers plus specific adhesive monomers that are sufficiently acidic to enable self-adhesion without the need for a separate adhesive bonding agent.\(^6\)

These cements are resin based, so they can be used for cementation of glass-ceramics, such as lithium silicates, where glass ionomer and resin-modified glass ionomer cements are not recommended because they do not offer the same level of support to the non-reinforced ceramic that a bonded solution would provide. As with adhesive resin cements, isolation from moisture and other contaminants is essential to ensure a reliable bond. Self-adhesive resin cements are most effective when bonding to dentin.

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**KEY CONSIDERATIONS**

- No need for a separate adhesive bonding agent
- High bond, compressive and tensile strength
- Multiple shade options offer superior esthetics
- Isolation from moisture and contaminants required
- Dual-cure

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MAKING THE RIGHT CHOICE

When choosing dental cement, the most important factors to consider are the restorative material and whether the preparation is retentive or non-retentive (based on preparation taper and height).

While every type of dental cement has its appropriate uses, the most important factor in the success of any cementation procedure is to fully understand and strictly adhere to the manufacturer’s instructions for use.

### TABLE 1. RETENTIVE PREPARATIONS: RECOMMENDED CEMENTS

<table>
<thead>
<tr>
<th>Type</th>
<th>Glass Ionomer</th>
<th>Resin-Modified Glass Ionomer</th>
<th>Traditional Adhesive Resin</th>
<th>Self-Adhesive Resin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Gold/PFM</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>All Zirconia/ Reinforced Core</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High Strength Glass Ceramics &gt; 250MPa</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Low Strength Glass Ceramics &lt; 250MPa</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Composite</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Acceptable</td>
</tr>
</tbody>
</table>

Indications:
- Endodontic Posts: Yes, Yes, Yes, Yes
- Veneers: No, No, Yes, No
- Crown: Yes, Yes, Yes, Yes
- Maryland Bridge: No, No, Yes, No
- Inlay/Onlay: No, No, Yes, Acceptable

A preparation is defined as retentive when it has adequate axial height (≥ 4mm) and taper (≤ 20).

### TABLE 2. NON-RETENTIVE PREPARATIONS: RECOMMENDED CEMENTS

<table>
<thead>
<tr>
<th>Type</th>
<th>Glass Ionomer</th>
<th>Resin-Modified Glass Ionomer</th>
<th>Traditional Adhesive Resin</th>
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<tbody>
<tr>
<td>Materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Gold/PFM</td>
<td>Acceptable</td>
<td>Acceptable</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>All Zirconia/ Reinforced Core</td>
<td>Acceptable</td>
<td>Acceptable</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High Strength Glass Ceramics &gt; 250MPa</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Low Strength Glass Ceramics &lt; 250MPa</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Composite</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Indications:
- Endodontic Posts: Acceptable, Acceptable, Yes, Yes
- Veneers: No, No, Yes, No
- Crown: Acceptable, Acceptable, Yes, Acceptable
- Maryland Bridge: No, No, Yes, No
- Inlay/Onlay: No, No, Yes, No

A preparation is defined as non-retentive when it has insufficient axial height (< 4mm) and taper (> 20).
ALL-CERAMIC TIPS

All-ceramic restorations require additional considerations based on the specific material used, including silica-based and non-silica-based ceramics.

Preparation design is a critical component in creating a successful restoration. An all-ceramic preparation requires a minimum of 1.0 mm of axial reduction, 1.5 mm across the occlusal surface and a full 2.0 mm in the central fossa. An ideal preparation should have at least 3-4 mm of axial wall height and an occlusal convergence (taper) of between 8-10 deg to create inherent retention.

TABLE 3. ALL-CERAMIC RESTORATIONS: RECOMMENDED DENTAL CEMENTS AND CLINICAL TIPS

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Recommended Cement</th>
<th>Clinical Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feldspathic Porcelain</td>
<td>Adhesive resin</td>
<td>Etch with hydrofluoric acid</td>
</tr>
<tr>
<td>Leucite-Reinforced Ceramic</td>
<td>Self-adhesive resin</td>
<td>Use a silane coupling agent or appropriate ceramic primer</td>
</tr>
<tr>
<td>Lithium Disilicate Ceramic</td>
<td>Adhesive resin</td>
<td>Use a silane coupling agent or appropriate ceramic primer when bonding adhesively</td>
</tr>
<tr>
<td>Zirconia-Reinforced Lithium Silicate</td>
<td>Self-adhesive resin</td>
<td>Use non-adhesive cement only for retentive preparations and with sufficient occlusal clearance and material thickness</td>
</tr>
<tr>
<td>Aluminum Oxide and Zirconia-Based Ceramics</td>
<td>Non-adhesive</td>
<td>Use conventional non-adhesive cement if retention is good; otherwise use a resin cement</td>
</tr>
<tr>
<td></td>
<td>Adhesive resin</td>
<td>Abrade the intaglio with aluminum oxide; some restorations require a primer</td>
</tr>
<tr>
<td></td>
<td>Self-adhesive resin</td>
<td>No silane, no hydrofluoric acid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To clean the intaglio, ultrasonic cleaning in alcohol is recommended</td>
</tr>
</tbody>
</table>

Please refer to the manufacturer’s directions for use.

NEW CEMENTS FOR BETTER RESTORATIONS

**CALIBRA® UNIVERSAL**
The routine, self-adhesive cement for nearly any indication

- Wide tack cure window and extended gel phase for easy cleanup
- One-step cementation means no additional etchant or adhesive
- High immediate 6-minute bond strength for a strong initial bond
- 5 esthetic shade options with Shade Stable™ technology virtually eliminates color shift over time

**CALIBRA® CERAM**
The maximum strength adhesive cement with immediate and long-term bonding for all-ceramics and CAD/CAM restorations

- Wide tack cure window and extended gel phase for easy cleanup
- Simple system for superior clinical performance. No need for a self-cure activator, and no mixing of primers when used with Prime&Bond elect® adhesive
- Immediate and long-term high retentive bond strength on ceramics
- Low film thickness
- 5 esthetic shade options with Shade Stable™ technology virtually eliminate color shift over time

**CALIBRA® VENEER**
The enduring, esthetic veneer cement with 12 years of proven clinical performance

- Wide tack cure window for easy cleanup
- 12 years of proven clinical performance
- A visible light cured cement with virtually unlimited cleanup time
- Thixotropic nature allows for favorable handling
- Try-in pastes offer superior matching
- 5 esthetic shade options with Shade Stable™ technology virtually eliminate color shift over time
Dentsply Sirona is the world’s largest manufacturer of professional dental products and technologies, empowering dental professionals to provide better, safer and faster dental care. Our products and solutions include leading positions and platforms across consumables, equipment, technology, and specialty products. As The Dental Solutions Company™, Dentsply Sirona provides dental professionals a comprehensive end-to-end solutions offering. This offering includes some of the best-known and established brands in the industry. We are proud to be a preferred partner for dental practices, clinics, dental laboratories, and authorized distributors worldwide.

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