



Restorative Dentistry:

COMMON CHALLENGES, BETTER SOLUTIONS

BISCO has 40+ year's experience developing restorative products to proactively address common issues and deliver lasting smiles.



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GREAT DENTISTRY STARTS WITH GREAT CHEMISTRY

BISCO's commitment to creating high-quality restorative materials is trumped only by its commitment to providing the dentists with products that solve common clinical challenges.

Rather than overcomplicate the process and increase the potential for negative outcomes, look for science-backed solutions that make it simple to perform your best dentistry, without adding to your costs or chair time.

In this guide, we'll review three common restorative challenges and the science behind simple, proven solutions.

Post-Op Sensitivity



Bonding to Zirconia



Excess Cement Cleanup



Challenge:

POST-OP SENSITIVITY



Post-op sensitivity presents as pain in the tooth after a restoration. Causes can include malocclusion, exposed dentin tubules, periodontal disease, and improper bonding techniques. Some commonly used etching techniques if not administered correctly can contribute to post-op sensitivity:



Total-etch will remove the dentinal smear layer opening the dental tubules on the tooth and exposing the collagen fibers. If the collagen dries out, it collapses and the adhesive cannot penetrate the tubules, leading to post-op sensitivity.



Self-etch dissolves the smear layer and incorporates the adhesive into the dentin. This also makes the dentin bond more reliable, though the bond to uncut enamel isn't as strong with this technique.

POST-OP SENSITIVITY SOLUTIONS

Minimize the risk of post-op sensitivity by using a selective-etch technique together with a single bottle bonding solution, such as **All-Bond Universal**[®]. The combination of phosphoric acid etch on enamel with self-etch on dentin provides a stronger bond to enamel and a safer bond to dentin.

Materials like TheraCal LC are designed to protect the pulp and form a protective barrier that insulates the pulp^{1,2}, resulting in virtually no post-op sensitivity.

For deep restorations or protection against occlusal trauma, layer a calcium- and fluoride-releasing base material, such as **TheraBase**[®], to build a stronger foundation.

1. Sangwan P; Sangwan A; Duhan J; Rohilla A. Tertiary dentinogenesis with calcium hydroxide: a review of proposed mechanisms. *Int Endod J.* 2013; 46(1):3-19

2. Selcuk SAVAS, Murat S. BOTSALI, Ebru KUCUKYILMAZ, Tugrul SARI. Evaluation of temperature changes in the pulp chamber during polymerization of light-cured pulp-capping materials by using a VALO LED light curing unit at different curing distances. *Dent Mater J.* 2014;33(6):764-9.



Challenge:

BONDING TO ZIRCONIA

Improper bonding occurs across materials, but bonding to zirconia has been the most challenging. For a long time, the dental community simply accepted that it couldn't be done. Zirconia has some key differences to metal that impact common bonding agents:

- ✘ Hydrofluoric acid is ineffective on zirconia due to its non-etchable nature.
- ✘ Silane primers are ineffective as zirconia does not contain silica.
- ✘ Saliva's phosphates form ionic bonds with zirconia, reducing available bonding sites.³

3. Yang B, Lange-Jansen HC, Scharnberg M, et al. Influence of saliva contamination on zirconia ceramic bonding. Dent Mater. 2008;24(4):508-513.

ZIRCONIA BONDING SOLUTIONS

Researchers have found that the MDP monomer creates chemical bonds with zirconia (and metal) surfaces.⁴ Based on these findings, BISCO developed **Z-Prime™ Plus**, a blend of MDP, a phosphate monomer, and BPDM, a carboxylate monomer that significantly enhances bond strengths to zirconia, alumina, and metal substrates.

Zirconia must be cleaned with an alkaline solution to counteract phosphate contamination from saliva.^{5,6} **ZirClean®**, an extraoral cleaning gel containing potassium hydroxide (KOH) with a pH of 13, serves this purpose. **ZirClean** is specifically formulated for the gentle cleaning of bonding surfaces on zirconia (and other prosthetic restorations) following intraoral try-in.

For deep restorations or protection against occlusal trauma, layer a calcium- and fluoride-releasing base material, such as **TheraBase®**, to build a stronger restoration foundation.

4. Chen L, Suh B, Brown D, Chen X. Bonding of primed zirconia ceramics: evidence of chemical bonding and improved bond strengths. *Am J Dent.* 2012;25(2):103-108
5. Attia MA, Ebeid KK. Effect of decontamination methods on shear bond strength of resin cement to translucent monolithic zirconia. *Brazilian Dental Science.* 2020;23(4).
6. Feitosa SA, Patel D, Borges ALS, et al. Effect of cleansing methods on saliva-contaminated zirconia—an evaluation of resin bond durability. *Oper Dent.* 2015;40(2):163-171.



Challenge:

EXCESS CEMENT CLEANUP



Cleaning dental cement after tack-curing can present a challenge because tack-curing leaves the cement in a semi-hardened state. This stabilizes the restoration, but excess or residual cement can be difficult to remove from the tooth structure or the restoration itself.

If the cement is not adequately cleaned, it can lead to esthetic issues or gingival irritation – and even compromise the restoration's overall integrity.



CEMENT CLEANUP SOLUTIONS

Look for products formulated to facilitate post-tack-curing cleanup, so that the removal of excess cement is quick and effortless. All BISCO cements are optimized for seamless and efficient removal of excess cement after the initial tack-curing stage.

These include:

TheraCem®:

Self-adhesive cement for zirconia bonding

Duo-Link Universal™:

Adhesive resin cement for indirect restorations

Choice™ 2:

Light-cured luting veneer cement



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SIMPLE SOLUTIONS? THAT'S SCIENCE.

Whatever your challenge or protocol, choose products formulated to address potential issues before they happen. The BISCO products highlighted here are designed to be simple and powerful solutions – easy to use, often across multiple applications, and compatible with competitor products.

Perform at Your Best

Get in touch to try science-backed solutions made to help you deliver an effective treatment plan.

Let's Talk



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