Dental PRODUCT SHOPPER

Preventing **Postop Sensitivity**

By following proper techniques during bonding procedures and investing in easy-to-use products that offer extra protection, you can avoid patient discomfort after restorations.

BISCO

Why Are Your **Patients Experiencing Postop Sensitivity?**

If postop sensitivity is a problem in your practice, it might be time to rethink your bonding technique.

Just about every dentist has experienced it. The day after a bonding procedure, the patient calls the office, complaining of postop sensitivity and looking for relief. This patient might even need to come back into the office, an inconvenience on both sides that costs time and money. Regardless, the patient is unhappy with the experience, and that means he or she is less likely to stay loyal and to refer your practice to family and friends.

This frustrating experience could happen with any procedure, no matter how seemingly simple, leaving you wondering what went wrong. Many dentists opt to blame the material when, in fact, the bonding technique is likely what left the tooth vulnerable to sensitivity. The truth is, no matter the materials, if you don't follow the proper steps during the bonding process, you're leaving the door open to problems down the road—including postop sensitivity.

It's Often the Bond that's to Blame

If the clinician does not allow the bonding agent to set for the right amount of time, for example, it can negatively impact the bond and cause sensitivity, said Dr. Gary Radz, a lecturer, author, and practitioner in Denver, CO. Not properly controlling a restorative environment—namely, letting blood and saliva in when the material doesn't tolerate it—is another common mistake dentists make that can lead to postop sensitivity. Decay, high occlusion, over-etching, and composite shrinkage are other factors that can cause sensitivity, but it's easy to tell when a bad bond is the culprit.

"Postop sensitivity is related to product use, technique, and clinical skill," said Dr. Rolando Nuñez,

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—Rolando Nuñez, DDS

BISCO's manager of clinical marketing. "And when postop sensitivity is related to bonding, it's very specific. Patients feel a sharp pain in the tooth recently restored when chewing or biting, and then it goes away immediately after the stimulus has ended. One possible reason for that sensitivity to occur is if the clinician used a total-etch technique."

The total-etch technique is a go-to for many dentists, and while there's nothing wrong with the technique itself, it does need to be adjusted when bonding to dentin. The bonding process is substrate specific; what works best on enamel to generate mechanical retention does not work the same on dentin or zirconia, for example.

"When you think about bonding, you need to think about it as being a very general process that can be applied to almost any surface," Dr. Nuñez said during a webinar on postop sensitivity. "Once you understand the process, then you're able to plug and play the components you need to generate the certain phenomena we want to generate."

TOTAL-ETCH, SELF-ETCH, OR SELECTIVE-ETCH: WHICH TO USE WHEN?

In general, research has shown that the total-etch (etch-and-rinse) technique is ideal for enamel bonding, while the self-etch technique is better for dentin bonding. Therefore, BISCO recommends the selective-etch technique for bonding procedures. Selective-etch is the placement of phosphoric acid on enamel only, indicated when using a self-etch or universal adhesive.

Adjust the Total-Etch Technique

Most clinicians were taught to use the total-etch technique in dental school and, while some prefer it over the other options, they find it leads to problems with postop sensitivity, Dr. Nuñez said. The technique, which is the best way to bond to enamel, calls for etching with phosphoric acid on both enamel and dentin for 10 to 20 seconds, rinsing the surface, and applying a universal bonding agent like All-Bond Universal. Phosphoric acid removes the smear layer, opening up the hundreds of thousands of 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 postop sensitivity when there's a change in pressure or temperature.

You can avoid this with a simple adjustment to your technique, Dr. Nuñez said. Instead of air drying the surface, which can be detrimental to the etched dentin, use high-volume suction or a cotton pellet to remove excess water. That way, you leave the dentin moist and reduce the risk of patients experiencing postoperative pain.

"The main reason to do this technique is to remove the smear layer, but opening up the tubules is a consequence of the procedure," Dr. Nuñez said. "When a clinician applies a bonding agent, the idea is to impregnate the dentin and seal the dental tubule. If the clinician fails at this, it can lead to postop sensitivity."

Consider the Alternatives

There are two other bonding technique options to consider: self-etch and selective-etch. The self-etch technique is more user-friendly. Rather than removing the smear layer and exposing the tubules, the smear layer is dissolved and the adhesive incorporated into it. That means the dentinal tubules stay sealed, reducing the likelihood of postop sensitivity. This also makes the dentin bond more reliable, though the bond to uncut enamel isn't as strong with this technique.

However, Dr. Nuñez recommends selective-etch, which combines total-etch with self-etch, as the most effective option. Phosphoric acid is used to etch the enamel but not dentin, with the self-etch technique used instead. This allows for strong bonds on both enamel and dentin, and reduces the risk of postop sensitivity.

"Selective etch provides a better bond to the enamel, and a universal

"These products from BISCO are proven to be effective in reducing postop sensitivity."

—Gary Radz, DDS

3 TIPS TO HELP AVOID POSTOP SENSITIVITY

1. **Use proper bonding techniques:** No matter which bonding technique or material you use, be sure to follow proper protocols and read manufacturer's instructions.
2. **Use a universal bonding agent.** Universal bonding agents, such as All-Bond Universal, offer versatility in compatibility as well as with bonding technique.
3. **Use liner and base materials that help protect the dentin.** In deep preps, it may be beneficial to use additional materials that help protect the pulp.

bonding agent can work really well on etched enamel and unetched dentin," Dr. Nuñez said. "It will generate a good seal on the enamel, and you'll have a sensitivity-free treatment. In my mind, this is the way we should approach bonding."

Dr. Alex Vasserman, who uses various BISCO products in his Manhattan practice, never etches dentin, he said, because of the sensitivity and the decreased bond strength that can result.

"Instead of etching dentin, I particle abrade it, so I only etch the enamel," Dr. Vasserman said. "I then use All-Bond Universal. I scrub the dental floor according to manufacturer instructions to seal the tubules, and the material then penetrates deep inside the dentin."

THWARTING SENSITIVITY: DOCTOR'S PICKS

All-Bond Universal features an ultra-mild acidity (pH > 3) that allows for compatibility with all dual-cured and self-cured materials. The hydrophobic, resin-friendly formula provides improved bond durability. It has a low film thickness that allows the adhesive to easily flow into etched surfaces while also leading to chemical and mechanical sealing. It can be used with any etching technique, and because everything is included in one bottle, fewer steps are required. The material also contains MDP, a functional, adhesion-promoting monomer that makes it possible for the material to bond to tooth structure, zirconia, metal, and composite substrates, as well as other resin cements on the market.
Dr. Vasserman's take: ***"All-Bond Universal comes in one bottle so there's no mixing or guesswork. It works on all surfaces and it's really thin, so there's less chance of creating those stress forces that cause sensitivity. And it's compatible with all resins."***

TheraCal LC is a light-cured, resin-modified calcium silicate filled liner designed for direct and indirect pulp capping and as a protective liner under composites, amalgams, cements, and other base materials. It can be used as an alternative to calcium hydroxide, glass ionomer, RMGI, IRM/ZOE, and other restorative materials. It works as a barrier and protects the dental pulpal complex. TheraCal LC's precise placement allows its use in all deep cavity preparations.
Dr. Radz' take: ***"I use products like TheraCal LC when I'm restoring a tooth and see the potential for postop sensitivity. It allows me to get ahead of it."***

TheraBase is a strong, dual-cure, calcium- and fluoride-releasing, self-adhesive base/liner. Using THERA technology, TheraBase chemically bonds to tooth structure, and releases and recharges calcium and fluoride ions.* TheraBase's calcium release generates an alkaline pH*, which promotes pulp vitality.[1] It is a dual-cured material that will polymerize even in deep restorations where light cannot reach. TheraBase can be placed on its own or layered on top of TheraCal LC.
Dr. Vasserman's take: ***"For really deep restorations, I'll use BISCO's TheraBase. That's my go-to. It's a dual-cure liner that's also alkaline in pH, and that helps decrease postop sensitivity as well."***

For Best Results

No matter which technique you prefer, adding a base layer using BISCO's TheraCal LC and/or TheraBase before placing All-Bond Universal or other universal bonding agents can provide added protection in deep restorations. Of course, following manufacturer instructions is crucial, as is selecting products that work well together to get the job done.

"These products from BISCO are proven to be effective in reducing postop sensitivity," Dr. Radz said. "However, there's not a 100% guarantee that by using these products, all of a sudden your patients are no longer experiencing postop sensitivity. You have to follow the directions. If you don't, you'll still have problems."

REFERENCES

* Bisco has, on file, the calcium and fluoride release data for TheraBase.
1. T. Okabe, M. Sakamoto, H. Takeuchi, K. Matsushima. Effects of pH on Mineralization Ability of Human Dental Pulp Cells. Journal of Endodontics. Volume 32, Number 3, March 2006.

BISCO: Your Partner in the Fight Against Sensitivity

All-Bond Universal, TheraCal LC, and TheraBase are easy-to-use products that can help reduce the discomfort so many patients experience after a bonding procedure.

If you've noticed that postop sensitivity is a problem for your patients, you might want to consider investing in products that are designed to avoid this problem. Universal bonding agents and liners are among them, and BISCO offers various proven materials that, if used properly, will help keep patients free of sensitivity after their procedure.

The Benefit of Universal Bonding Agents

All-Bond Universal's chemical balance makes it an ideal option for both total- and self-etch techniques. The single-bottle material is compatible with all resin composites and cement materials, providing you with flexibility, and it can be used on wet, dry, or moist tooth structure. That means it's less technique sensitive than other materials, which is an advantage during bonding procedures.

Dr. Radz, who describes All-Bond Universal as fool-proof, said he has used it for almost every procedure he's done since the product was first released.

"All-Bond Universal is the first line of defense against postop sensitivity," Dr. Radz said. "Because when you place it on the tooth, you in effect are promoting the sealing of the dental tubules, and if they're properly sealed the chances of postop sensitivity are significantly decreased."

Another 'Line' of Defense

Dr. Radz relies on BISCO's THERA family of products as his second line of defense against postop sensitivity. He uses products such as TheraCal LC and TheraBase as liners when he's restoring deeper preps or working with teeth that he knows are prone to sensitivity, placing these materials before the bonding agent.

TheraCal LC helps to protect the pulp while also stimulating hydroxyapatite[1*] and secondary dentin bridge formation.[2,3] TheraBase, which releases calcium and fluoride,* contains MDP and can be used alone or layered on top of TheraCal LC for added protection.

"Applying products that interact positively with the dentin, that provide calcium release and have an alkaline pH, all of that benefits the tooth and avoids sensitivity."

—Rolando Nuñez, DDS

With TheraCal LC, clinicians can place a thin layer of less than 1 mm on top of the dentin before completing the bonding procedure, Dr. Nuñez said. This material is typically used for deep restorations with pulp exposure. TheraBase should be applied in a thicker layer of 2 or 3 mm to provide protection to the dentin and serve as the foundation for the composite restoration. Both materials are compatible with any bonding agent and can be added to any technique.

"When you layer TheraCal LC and TheraBase and then do the bonding procedure on top of that with All-Bond Universal, you are building a great defense against postop sensitivity," Dr. Nuñez said. "Applying products that interact positively with the dentin, that provide calcium release and have an alkaline pH, all of that benefits the tooth and avoids sensitivity."

REFERENCES

*BISCO has, on file, the calcium release data for TheraCal LC and the calcium and fluoride release data for TheraBase.
1. Gandolfi MG, Siboni F, Prati C. Chemical-physical properties of TheraCal, a novel light-curable MTA-like material for pulp capping . International Endodontic Journal. 2012 Jun;45(6):571–9.
2. ADA definitions for direct and indirect pulp capping at: www.ada.org/en/publications/cdt/glossary-of-dental-clinical-and-administrative-ter
3. Apatite-forming Ability of TheraCal Pulp-Capping Material, M.G. GANDOLFI, F. SIBONI, P. TADDEI, E. MODENA, and C. PRATI J Dent Res 90 (Spec Iss A):abstract number 2520, 2011 (www.dentalresearch.org)

Additional Resources

WATCH A WEBINAR

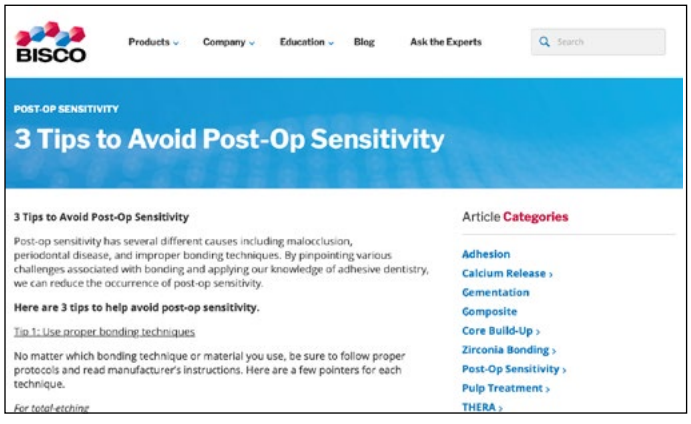
Learn more about what causes postop sensitivity after bonding and how BISCO products can help.

LISTEN TO A PODCAST

Sensitivity is among the many topics Dr. Nuñez explores in these informational podcasts.

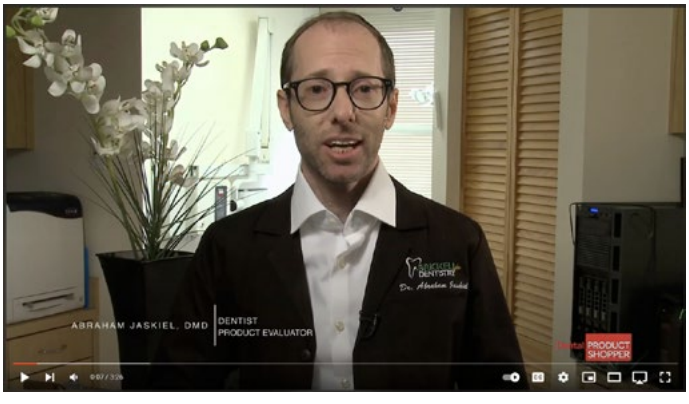
READ A BLOG POST

More tips on how to avoid bonding-related sensitivity.



CHECK OUT AN EVALUATION

Find out what DPS evaluators had to say about BISCO's All-Bond Universal.



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