Finally, One Adhesive that Can Do It All

by Jeffrey B. Dalin, DDS, FACD, FAGD, FICD, FADI

Second opinions are common in health care, whether a doctor is sorting out a difficult case or a patient is not sure what to do next. In the context of our magazine, the first opinion will always belong to the reader. This feature will allow fellow dental professionals to share their opinions on various topics, providing you with a "second opinion." Perhaps some of these observations will change your mind, while others will solidify your position. In the end, our goal is to create discussion and debate to enrich our profession. – Thomas Giacobbi, DDS, FAGD, Editorial Director, *Dentaltown Magazine*

Many dentists today are confused about adhesives, and rightly so. First, second, third, fourth generations, self-etch, total-etch… a lot of us have reached a point where we're saying, "enough!" Over the years, I personally have used them all – bonding agents with resin kits, light-cured total-etch, self-etch – you name it. For some time I stuck with the fourth generation, as the consensus seemed to be that fifth-, sixth- and seventh-generation adhesives came with drawbacks in strength and longevity. Of course, these later generations were developed to help address problems with post-operative sensitivity, which they did, but as we learned, they too required sacrifices.

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After a time, I decided to stick with the fourth generation due to the fact that it offered good strength and longevity, and was well supported by research. I used a careful technique to avoid sensitivity, and by following all the rules and adhering to the multiple steps required for this generation, used it successfully. As stated, however, this required stringent adherence to technique and allowed little room for errors.

Many other clinicians have adapted to the adhesive overload situation by keeping multiple adhesive systems stocked in the practice. By doing this, the dentist can have an adhesive on hand for each of the various clinical situations they might encounter. Perhaps a fourth generation would be used for certain types of cases, but a self-etch system is also stocked for cases where it is easier to apply. While this at least gives dentists some flexibility in their materials, it can also be a hassle to stock the multiple materials in multiple operatories, not to mention keeping each of the various techniques straight for each product.

A New Alternative

It almost seems too good to be true, but the fact is that now we finally have an adhesive system that is truly universal and delivers strength with no sensitivity – regardless of the surface it is used on and the etching mode utilized. This new adhesive is 3M ESPE Scotchbond Universal Adhesive, and for dentists who give it a chance, it is going to do away with the eeny-meeny-miny-moe of adhesive selection.

Scotchbond Universal adhesive eradicates the generation confusion by providing a truly universal solution. It's a single-bottle system that can be used for direct and indirect restorations. It can be used on both dentin and enamel, in total-etch, self-etch or selective-etch modes. It also has a combined primer/adhesive capability that allows it to bond to indirect substrates, including metals, zirconia, alumina and glass ceramics without a separate primer.

To use, the adhesive is applied to the tooth surface and scrubbed for 20 seconds. The tooth should then be air dried for five seconds, followed by a 10 second light cure. For the total-etch or selective-etch technique, dentists can simply etch the proper areas with phosphoric acid for 15 seconds before placing the adhesive. That's it. There are no complicated instructions or techniques to master.

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This adhesive has quickly become my go-to product in the operatory and I use it on a daily basis, not only as a standard bonding agent, but for a variety of other uses as well. To help demonstrate its versatility, the following clinical cases illustrate how Scotchbond Universal adhesive can be used for a variety of indications including some that may be considered unconventional. For example, figures 1 and 2 show the adhesive being applied before use of a sealant. In this case, Scotchbond Universal adhesive was applied to the clean tooth surface and rubbed in for 20 seconds, then briefly air dried. 3M ESPE Clinpro Sealant was then applied and the sealant and adhesive were light cured together for 20 seconds.

Another unique way to utilize Scotchbond Universal adhesive is for root surface desensitization, which is demonstrated in figure 3. The adhesion to dentin surfaces and the ability to seal the dentin is also the mechanism for providing desensitizing properties for the adhesive. This can be done directly on patients that are experiencing sensitivity due to open tubules and for tooth surfaces that have been prepared for amalgam placement and for indirect restorations. In this case, the surface was simply cleaned and dried, followed by a normal application and light curing of Scotchbond Universal adhesive. A second coat of the adhesive was then applied, dried and light cured for optimal results.

Scotchbond Universal adhesive can also be used for a variety indirect restorations. One example is its use as a primer for PFM crowns, which is demonstrated in figures 4-6. In this case, the inside surface of the crown was roughened and then cleaned, and Scotchbond Universal adhesive was then applied to the crown and lightly dried with a stream of air to evaporate the solvent. The adhesive was then applied

Applying Sealant Case Study

Fig. 1: The adhesive was applied for 20 seconds
Fig. 2: The sealant was applied and the adhesive and sealant were light cured together

Desensitizing Agent Case Study

Fig. 3: Application of adhesive to the root surface of No. 11 to desensitize the area

Bonding in a Crown Case Study

Fig. 4: Application of adhesive to the inside of the crown

Fig. 5: Application of adhesive to the prepared tooth

Fig. 6: Light curing 3M ESPE Scotchband Universal Adhesive

Porcelain Veneer Case Study

Fig. 7: Pre-operative view prior to placement of porcalain veneers

Fig. 8: Painting adhesive on veneer

Fig. 9: Post-operative result

to the prepared tooth and similarly dried, followed with light curing. 3M ESPE RelyX Ultimate Adhesive Resin Cement was used to cement the crown.

The adhesive also works well with the highly esthetic demands for placing porcelain veneers, which is shown in figures 7-9. In this case, the inside surfaces of the veneers were etched with hydrofluoric acid, and the adhesive was then applied to the etched veneers. Phosphoric acid etchant was used to prepare the teeth. The etchant was rinsed away and the teeth were dried with cotton pellets. Scotchbond Universal adhesive was then applied to the entire surface of the enamel and dentin and rubbed in for 20 seconds. After the adhesive was air dried, 3M ESPE RelyX Veneer Cement was applied to the veneers and they were seated. Spot curing was performed and excess cement was then cleaned away, followed by a final light cure.

To reiterate, the clinical cases featured are a few examples of the different ways that I use the adhesive in my practice for more than just my standard bonding needs.

Believe in the Science

If you're like me, you receive news of a product like this with some wariness. Particularly with adhesives, dentists have been through so many waves of new generations, each with their new claims and promises, that it's hard to believe any one adhesive can do it all. Most of us are tired of the shifting opinions about generations. First this one is the best, a year later it's another. In my opinion, this is why it's so nice to have a product that you don't really have to think that hard about.

The product's moisture tolerance is one of the attributes that makes it so versatile. This moisture tolerance is due to the presence of 3M ESPE Vitrebond Copolymer, which is what gives the material consistent bond values in the presence of moisture. The technical explanation is that the copolymer's high number of carboxylic acid groups bond strongly to tooth surfaces, especially to dentin, and can also absorb moisture. On top of this, the copolymer has a high number of double bonds that allow it to copolymerize with the resin of the adhesive.

As those of us who have watched the circus of adhesive generations recall, moisture levels are particularly important in a total-etch application, due to the fact that etching with phosphoric acid exposes the collagen fiber network of the dentin. These collagen fibers must be kept moist after etching in order to prevent their collapse. If adhesive is applied when the fibers are in a collapsed state, the adhesive does not form a hybrid layer, and this is what later leads to post-operative sensitivity. Fifth-generation adhesive formulas have little water included, which makes them particularly susceptible to over-drying the dentin, and therefore sensitivity. However, Scotchbond Universal adhesive not only has the Vitrebond copolymer to bring moisture tolerance, but also includes HEMA and water. This combination gives it the ability to provide strong bonds to etched dentin, even when dentin is dried. As for self-etching, it is acidic enough – with a pH level of 2.7 – to create a strong bond to dentin and cut enamel without phosphoric acid etching.

A Track Record that Instills Confidence

One final consideration that gives me extra faith in this product and its universal nature is that 3M has made its name in adhesives, and not just in dentistry. I have seen from the inside, the research and development that 3M ESPE puts into a product, and I've been impressed with how thoroughly materials are vetted before they ever get near wide release to the dental community. In this case, we have both a good company and strong scientific evidence in support of the product.

A lot of promises have been made to dentists over the years about adhesive performance, with the result that now many of us find new claims hard to believe. It is my true experience, however, that this material is different. We finally have a truly universal adhesive that can be used with the utmost confidence. ■

Author's Bio

Dr. Jeffrey B. Dalin, a St. Louis native, has been in private practice in St. Louis for the past 33 years. Dr. Dalin is a 1980 graduate of Indiana University School of Dentistry. He was a former clinical instructor in the Department of Operative Dentistry at Washington University School of Dental Medicine. He has earned several fellowships. Over the years, Dr. Dalin has published numerous articles and lectured on various subjects. In the fall of 2001, Jeff along with a committee of dentists from the Greater St. Louis Dental Society, planned and implemented Give Kids A Smile.