I graduated from dental school at the University of the Pacific Arthur A. Dugoni School of Dentistry in 1988, and every crown I placed during my time there was a PFM. I had done some cast gold crowns on typodonts, but literally every crown I placed on a patient was a PFM. So you can see why I thought the PFM was the workhorse that would take me through my dental career. I would do an all-ceramic crown in the anterior when aesthetics trumped strength, but I was otherwise living in a PFM world. Most of the doctors I talked to back then felt the same way. Even when I started practicing in a laboratory 11 years ago, it was clear the majority of American dentists felt that way. This held true until 2007.

2007 was the year IPS e.max (Ivoclar Vivadent; Amherst, New York) was introduced to the dental market, and I like to refer to that time as the beginning of the “Monolithic Revolution.” Of the crowns we were fabricating at Glidewell Laboratories in 2007, PFMs made up 65 percent and 22 percent were all-ceramic crowns. Fast-forward to 2011, after the introduction of BruxZir in 2009, and the percentages have flipped. In 2011, 65 percent of the crowns we fabricated were all-ceramic and 22 percent were PFMs. Seeing this type of change in a short, five-year period is nothing short of amazing. The PFM we all came to know and trust is disappearing more quickly than anyone could have imagined.

While IPS e.max ignited this monolithic revolution, BruxZir Solid Zirconia (Glidewell Laboratories; Newport Beach, California) is now carrying the torch as well. We realized that dentists were yearning for a high-strength, cementable all-ceramic crown, even if it wasn’t the most aesthetic crown available.

We assumed dentists were attracted to the strength of BruxZir crowns, as demonstrated by our hammer test. (To view the “Hammer Test: BruxZir vs. PFM” video, visit www.bruxzir.com.) However, most of the comments we were getting from dentists didn’t have anything to do with the strength of the material. The majority of the comments we received were about how well BruxZir crowns and bridges fit compared to the PFMs they were receiving from us. Now we consistently hear from dentists that the margins on their BruxZir crowns and bridges feel better to their explorer than those on the PFMs they used to prescribe. A closer look at the tooth-restoration interface and emergence profile shows why.

Figure 1 shows an ideal PFM prep with 2mm of occlusal reduction, 1.5mm of axial reduction and 1mm of gingival reduction. This ideal reduction provides enough room for the technician to build a natural-looking PFM. This amount of reduction is necessary in order to have enough room for the metal coping, the opaque layer and the porcelain, which have a minimal thickness of about 1mm. If a dentist gives us the ideal 1mm of reduction in the gingival third, the crown can have an acceptable emergence profile, as seen in figure 1. When an explorer is run over the margin, it will feel closed, and there will not be any bulk of material to catch on the explorer. It will have a smooth flow from the contour of the tooth to the contour of the crown.

Figure 2 represents the typical PFM prep we receive with a feather-edge margin. While this type of conservative margin is fine for cast gold or a PFM with a metal margin, it does not work well for a PFM with a disappearing margin. When a PFM is fabricated for this prep, there is a bulky 1mm margin on the PFM that catches on the explorer. Even if the margin is sealed, the emergence profile is unacceptable. In fact, it is often difficult to tell whether the margin is closed because of the way the explorer hangs up on the marginal overhang.

Figure 3 represents the typical PFM prep we receive with a BruxZir crown in place. Because it is a monolithic crown and does not have multiple layers, it can be milled to a feather edge; there is no bulk of material, or “speed bump,” at the margin. Many dentists even tell us their explorer can’t detect where the tooth ends and the BruxZir restoration begins. Rather than being another all-ceramic material that forces you to do a different type of preparation,
BruxZir adapts to the type of prep you prefer to do. If you prefer doing a feather-edge or light chamfer margin, BruxZir handles it with minimal thickness, ensuring the best emergence profile that is attainable with a tooth-colored material.

To dive a little deeper into the production numbers at our laboratory, we took a look at our 30 largest BruxZir accounts, which also happened to be our larger accounts prior to the launch of BruxZir in 2009. We excluded group practices because we wanted to compare the same doctors’ work, before and after the introduction of BruxZir. We compared the total remake rate of these dentists in 2008 (prior to the launch of BruxZir) to their total remake rate in 2011 (after they had become our largest BruxZir accounts). The numbers were staggering. On average, there was a 34.3 percent reduction in their remake rate. This decrease was undoubtedly due to the improvement in fit, as it could be argued that these BruxZir restorations were likely the aesthetic equivalent of the PFMs they were replacing.

The other part of the fit equation stems from the fact that BruxZir is a CAD/CAM-processed material. Unlike restorations built by hand, there is no variability in restorations that are digitally designed and milled. For example, we can set a parameter of 25 microns of die spacer under the crown, and it will always be exactly 25 microns. In the past, we could try to paint one thin layer of die spacer on a die to achieve that same 25-micron layer, but it would certainly vary in thickness from technician to technician. Furthermore, if a technician left the cap off the bottle, the acetone would evaporate and a thin coat of this die spacer might now be 75 microns thick.

Consistency has traditionally been the greatest challenge in our laboratory because it takes constant effort to standardize procedures from one technician to the next. CAD/CAM technology has been the consistency equalizer for us. With BruxZir, we are able to measure that change in the form of reduced remakes. BruxZir was designed for very specific situations – when the dentist wanted to use cast gold or metal and the patient said no to these materials. Even though BruxZir originated as a material intended for a very narrow set of clinical indications, today it makes up nearly 50 percent of the crowns we fabricate. If you haven’t yet prescribed a BruxZir crown, consider trying one the next time you want a high-strength, cementable all-ceramic crown to see the fit difference for yourself.

Author’s Bio

Michael DiTolla, DDS, FAGD, joined Glidewell Laboratories in 2001, after 13 years in private practice. Working in a laboratory setting has given Dr. DiTolla an intimate knowledge of dentists’ crown and bridge habits, and he uses this unique perspective to compile case studies, preparation techniques and clinical videos for dentists. A nationwide lecturer, he serves as editor-in-chief and clinical editor of Chairside magazine, published by Glidewell Laboratories. A 1988 graduate of University of the Pacific Arthur A. Dugoni School of Dentistry, he was awarded Fellowship in the AGD in 1995 and the DrBicuspid Dental Excellence Award for “Most Effective Dentist Educator” in 2011.