COMMENTARY

COMPARISON OF VARIOUS RESIN COMPOSITE SHADES AND LAYERING TECHNIQUE WITH A SHADE GUIDE

André V. Ritter, DDS, MS*

Composite layering has been widely advocated for extensive anterior composite restorations such as incisal angle restorations and partial composite veneers. Layering of different shades of an esthetic restorative material is not a new concept, as laboratory technicians have used layering when making ceramic crowns for many decades. Composite layering basically consists of using composite shades that correspond to the shade of the part of the tooth being restored, such as cervical dentin, body dentin, facial enamel, translucent incisal edge, etc. The goal is to create a natural optical result (i.e., a restoration that cannot be distinguished from the surrounding tooth structures).

It should be noted that composite layering is not a "one size fits all" approach. Not all teeth (or, more precisely, tooth crowns) are the same when it comes to their natural layering. Whereas some tooth crowns are relatively monochromatic, others have very rich characterizations including translucent incisal edges, opalescent halos, mamelons or dentin lobes, white and/or yellow/brown spots, etc. In addition, tooth crowns change over time. While young crowns tend to have more pronounced incisal translucency and obvious fluorescent effects, older crowns reveal more of the dentin color characteristics, as a result of the natural wear of the enamel layer, and have more opalescence effects.

Although composite layering has the potential to result in highly esthetic restorations, the use of multiple composite shades in a single composite restoration can pose challenges. The thickness, shade, and opacity of each composite layer need to match the characteristics of the anatomic structures being replaced. Historically, clinicians have used commercial shade guides (the most popular being the Vita Classic Shade guide [Vita Zahnfabrik, Bad Sackingen, Germany]) as reference points for the selection of composite shades. Hence, the expectation exists that the shade tabs from commercial shade guides match the shade designation of commercially available composite resins.

The goal of the laboratory research presented in this article by Dr. Juliana da Costa and colleagues was to find out how well (or how poorly) composite shades used with and without layering match the tabs of a commercially available shade guide. The authors used sophisticated and precise measuring methods to compare both enamel and dentin shades of three different composite brands with the Vita Classic Shade guide. Their main findings were that most composite shades do not match well with the designated shade guide tab and that layering did not substantially improve shade matching.

These results are not entirely surprising, as other studies had already indicated that composite shades do not match well with shade guides (Kamishima et al., 2005; Paravina et al., 2006). The authors' findings add to our understanding of color matching in restorative dentistry and reveal that layering of enamel and dentin composite shades do not substantially improve the chances of a good match. Dr. da Costa and colleagues also found that only one of the three composite brands seemed to result in an adequate match when the layering technique was used (enamel over dentin), which indicates that there is great variability even in between composites when it comes to shade matching.

As is often the case with laboratory studies, findings from this study should be interpreted with caution. For example, digital colorimeters detect shade differences below what is clinically detectable by the naked eye, so the results may not be entirely applicable to the clinical reality (although the authors do indicate what the "clinically perceptible limit" is when discussing their findings). Additionally, layering composites using an incremental technique may result

DOI 10.1111/j.1708-8240.2010.00323.x

in a different overall shade than simply stacking precured enamel and dentin composite specimens without any unity between layers. Despite these and other limitations, the study is elegantly designed and done, and it should contribute to our understanding of shade-matching in restorative dentistry.

REFERENCES

1. Kamishima N, Ikeda T, Sano H. Color and translucency of resin composites. Dental Materials 2005;24(3):428–32.

2. Paravina RD, Kimura M, Powers JM. Color compatibility of resin composites of identical shade designation. Quintessence International 2006;37(9):713–8.

*Associate Professor, UNC School of Dentistry, 441 Brauer Hall, Chapel Hill, NC 27599-7450, USA

This commentary is accompanied by article, "Comparison of Various Resin Composite Shades and Layering Technique with a Shade Guide," Juliana Da Costa, DDS, MS, Paul Fox, DMD, Jack Ferracane, PhD, DOI 10.1111/j.1708-8240.2010.00322.x.