

## COMMENTARY

## A New Approach to Compare the Esthetic Properties of Different Composite Materials

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This manuscript addresses an important issue that is the evaluation of the esthetic properties of different composites.

I believe the authors should be congratulated for both the meticulous study design and the overall contribution to the knowledge on this subject. They evaluated four differing resin-bonded composite (RBC) materials from different manufacturers using the remaining tooth structure as a control. In the "Materials and Methods" section, the authors reported that "shade selection was made according to the guidelines supplied by the manufacturers and using the shade guide supplied by the manufacturers." Color guides are often unrealistic because they are made of a different material than composite (plastic, paper). This may account for the different rating reported for the four composite resin systems beyond the specific material optical characteristics (fluorescence). However, the authors concluded that restorations esthetically acceptable were performed in 91 to 96% of the cases using the four composite resin systems.

Dentists may replicate the design of this study to test a composite system before using it in the patient's mouth. However, clinicians should be aware of the significant difference in the application of composite resins in a laboratory setting and in the mouth. Clinical final shade evaluation may be influenced by the interaction of the restoration with the gingival tissues, the darkness coming from the back of the mouth, tooth alignment, and the contact of the RBC with saliva. As a general rule, the final esthetic outcome of anterior RBC restorations depends on the combination of the final form of the restoration with the color selection and the thickness of each composite shade.

Clinicians should have a precise idea of the form of the final restoration in their mind before starting color selection and composite layering. They may use the existing restoration (either undercountered or overcountered), a mock, and a wax-up as a guide to determine the final shape of the restoration. This is particularly useful when performing multiple restorations at the same time and when teeth are not perfectly aligned. Tooth rotation, facial and palatal inclination may be responsible for a different interaction of the light on different areas of the tooth surface resulting in an even more challenging tooth–composite resin match. The use of both palatal and facial silicone stents may be recommended in a similar clinical scenario to give precise spatial references.<sup>1</sup>

Once the correct final form has been determined, the clinician should proceed with an accurate shade selection. Shade selection starts with dentin shade selection. Dentin represents the most important layer for the integration of the restoration with the surrounding tooth structure. The color of the tooth is derived from the dentin, whereas enamel only works as modifier of the dentin color.

Depending on the patient's age, differences in tooth anatomy are found in young, adult, and old teeth. These differences influence the optical characteristic of the teeth.<sup>2</sup> Human enamel of young teeth presents a thickness bigger than those of adult and old teeth because of the progressive wear of both the incisal and facial enamels. The opalescence effect is more pronounced in young teeth and minimally noticed in old teeth; the incisal enamel halo is always present in young teeth, it may still be present in adult teeth, but it is absent in old teeth. Facial texture is also more accentuated in young teeth. Conversely, the fluorescence effect coming from human dentin is more accentuated in adult and old teeth compared with young teeth.

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Regardless of the tooth age, clinicians need to evaluate the thickness of the tooth (thin versus thick). The darkness coming from the back of the mouth is more accentuated in thinner teeth and may be used in an attempt to reproduce the incisal translucency once the incisal halo has been reproduced. Conversely, the incisal translucency of thicker teeth may be less pronounced, and the use of opaque shades may be required to mask the darkness coming from the back of the mouth. Either special effect masses or super-color may be selected to better reproduce the shade of the tooth in the incisal third.

Once tooth form has been determined and shade has been selected, clinicians need to manage the three-dimensional thickness of dentin and enamel shades. This last step may be the most difficult. By managing the quantity of composite dentin and enamel shades, it is possible to reproduce the fluorescence and opalescence of natural teeth at the three different dental ages. This goal can be achieved using few dentin shades and only one enamel shade most of the time. However, the correct placement of the composite shades in the three dimensions of the space is not an easy task. Either over- or underapplication of dentin and enamel materials may result in esthetic failure and require partial or total replacement of the restoration. Meticulous choice of the quantity of composite shade applied and placement of small increments may help to overcome this issue.

By joining data from *in vitro* studies<sup>3,4</sup> and precisely following clinical protocols,<sup>5,6</sup> clinicians can perform predictable direct anterior RBC restorations whose function and esthetic may last for many years (Figures 1–4).<sup>7</sup>



**FIGURE 1.** Preoperative picture showing multiple incongruous restorations in the anterior teeth.



**FIGURE 2.** Postoperative view after replacing the existing restorations; the new resin-bonded composite restorations do match the surrounding tooth structure.



**FIGURE 3.** The same restorations at the 4-year follow-up.



**FIGURE 4.** The restorations still integrate very well with the surrounding tooth structure for form, shade, and texture at the 7-year follow-up.

## REFERENCES

1. Devoto W, Saracinelli M, Manauta J. Composite in everyday practice: how to choose the right material and simplify application techniques in the anterior teeth. *Eur J Esthet Dent* 2010;5(1):102–24.
2. Dietschi D. Layering concepts in anterior composite restorations. *J Adhes Dent* 2001;3(1):71–80.
3. Magne P, So WS. Optical integration of incisoproximal restorations using the natural layering concept. *Quintessence Int* 2008;39(8):633–43.
4. Østervemb N, Jørgensen JN, Hørsted-Bindslev P. A new approach to compare the esthetic properties of different composite materials. *J Esthet Restor Dent* 2011;23(4):238–46.
5. Deliperi S, Bardwell DN, Congiu MD. Reconstruction of severely damaged endodontically treated and bleached teeth using a microhybrid composite resin: two-year case report. *Pract Proced Aesthet Dent* 2003;15(3):221–6.
6. Deliperi S, Bardwell DN, Congiu MD, Kugel G. Layering and curing techniques for class III restorations: a two-year case report. *Pract Proced Aesthet Dent* 2005;17(3):221–8.
7. Deliperi S. Clinical evaluation of nonvital tooth whitening and composite resin restorations: five-year results. *Eur J Esthet Dent* 2008;3(2):148–59.

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