COMMENTARY

Color Management of the Cervical Region Using Different Framework Materials

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The in vitro study by Salameh and colleagues objectively evaluated the color of the cervical region of crowns produced with five framework materials to that of an extracted natural tooth and to each other. The study assessed opaque core materials, such as metal copings and possible surface treatments, in addition to the highly opacified core material of zirconia oxide in its original white and tinted forms. These core materials terminated at the preparation finish line. The methodology was well performed with regard to controlling the thickness of the materials. However, only one manufacturer's ceramic system was tested. The results of the study indicate that none of the core or framework materials tested in combination with Noritake's veneer ceramic system had the ability to match a natural tooth in color when measured with a colorimeter (ShadeVision, X-Rite, Grand Rapids, MI, USA).

The focus of the study was on the gingival one-third of the restoration, which has always been the most problematic area to achieve an acceptable esthetic match to natural dentition. With the use of a colorimeter, subjective opinions were eliminated. Although the clinician expects the dental laboratory ceramist to match the natural tooth predictably, there are many variables that need to be considered. These include the amount of tooth reduction in the gingival third, the subsequent thickness of the restorative material that includes the core and overlay of translucent ceramic, the material selected for the restoration, and the skill of the ceramist.

In order to more accurately evaluate the framework materials, I would suggest an expanded study to include several different manufacturers' ceramic systems, as each has their own proprietary formula that develops proper color, saturation, and value. The use of five commercial dental technicians has introduced a human variable. A better control may be to have the study conducted with only one technician doing all the restorations. In addition, it would be important to expand this analysis to evaluate more translucent core materials, such as leucite-reinforced glass ceramics and lithium discilicate. Both of these systems allow the technician to vary the relative translucency of the core, in addition to the color saturation and subsequent value. Studying altered coping designs, either in metal or zirconia, could make a significant difference in the ease and predictability of matching the color of natural teeth. Ceramic margin techniques were introduced in 1960 and modified coping designs such as shortening the core up the axial wall on the facial aspect in 1989. When using more translucent ceramic materials, two additional factors have to be considered that will influence the final outcome of the restoration. They are the color and value of the prepared tooth and the cement or bonding resin that is utilized.

Our goal as a clinician or technician is to predictably match the natural dentition from an esthetic perspective. Research such as that conducted in this study can help the profession objectively assess current techniques and materials and can stimulate us to find new and better alternatives.

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