In this unique case, I was working with a patient who had not, in the past, been particularly concerned about the appearance of his teeth. They displayed a multitude of colors, with some tissue concerns, as well. However, he had an implant placed on central tooth No. 9 which needed a custom shade match before the case could be completed. Right away, I noticed that because of the angulation of the teeth, the patient would have an open embrasure after the crown was fabricated. There were also multiple crack lines and discolorations to consider, as well as the above-mentioned gingival recession. Because of the dark stump shade, a zirconium abutment was created in order to mask the tone, and a cement retained crown would be fabricated.
This article will demonstrate how to match color and create matching crack lines. Dental technicians can use this step by step process for mimicking dentin and enamel compensation.

In Figure 1 we can see the pre-operative view of the surgically placed zirconia abutment. I was assigned the task of matching the color and his approach was to concentrate on teeth Nos. 7 and 8 in order to create a harmonious match. Teeth Nos. 10 and 11 are so dark that I did not feel that would be the best approach for harmony of color.

I chose an A2 base but noted that the gingival's root color is ochre and brown which would require extensive staining to mimic. The incisal 1/3 has a little orange stain within the crack line but enamel opal color overall.

After pouring up the model, the implant zirconia abutment design could be chosen (Figure 2).

I placed from left to right three copings in various stages of porcelain layering (Figure 3). On the far left, we have deep dentin color, in the middle white build-up with dentin application as well as one-half pink and regular dentin color, and on the far right enamel overlay applied over the dentin. This behind-the-scenes look at dentin and enamel application demonstrates my technique for creating harmony of color and natural esthetics.

Next, I applied a white stain with a thin brush to fabricate a crack line with natural appearance (Figure 4). A brown color was applied over the white at the gingival 1/3 or the neck of the crown (Figure 5) in order to match the patient’s natural
dentition. In the fourth image from the left we can visually see the subtle brown effect his brush is creating. A deep, thin crack line can be formed using a very thin blade and moving it quickly down through the porcelain (Figure 6). You can see the extremely deep lines created using this technique in (Figures 7 and 8). It should be noted that for easier blending the porcelain must be very moist while working with this type of knife. The stain will not penetrate effectively if the surface is dry – it will stay on the surface.

After shaping the crack line the way I wanted it to look, I applied white stain over the top (Figures 9 and 10). Filling in with enamel allowed me to close the gap slightly but still leave it somewhat open. For maximum color effect, I utilized a variety of two to three colors in my final approach. Figure 11 demonstrates the hot stage after firing at 810° C. The colors appear to be extremely vivid at this particular point. Figure 12 notes the color effect after the restorations have had time to cool off.

Blending of color, from brown to white, is maximized in overall effect due to the care the technician took with his application process for
the finished crown and abutment (Figure 13). In the post-cementation view, we note that the crown tilts to the mesial for path of draw (Figure 14). With a close-up view of the restoration, we can appreciate the fit and centric bite and the way in which the crown is in color harmony with central No. 8, as well as blended with No. 7's opacity, crack line and agreement with the lobe. Everything I set out to accomplish was completed within the final restoration (Figure 15). A smile view is presented in Figure 16.

Sometimes when a technician is examining a case, he or she has to take a closer look at his or her approach to see the clear answer. At first glance, it may seem to be a mystery as to how he or she will match a patient’s shade, shape, opacity, translucency, etc., but looking at the area in segments can help. After segmenting the tooth and noting all the various characteristics, it's still important to consider the patient's smile and the big picture effect we will be creating. In this case, the patient was very happy with the end result of this case. The dentist, for his part, was pleased as well because a difficult color match was accomplished which gave
him confidence in his abilities. This process often leads to further discussion about treatment planning and future work that could be undertaken when the patient is ready to proceed.

**About the Author:**

Kahng owns LSK121 Oral Prosthetics in Naperville, Ill. He created the Chairside Shade Guide. Originally comprised of Volumes 1 and 2, it was later expanded into a unique ceramic shade guide system, the Seasons of Life Selection. These valuable tools are used daily on a worldwide basis. As an active contributor to the dental community, he has also held positions on several major dental journal boards, and is frequently a keynote speaker at numerous conventions, labs or his own lab-hosted seminars. His books include Anatomy from Nature, The Aesthetic Guide Book, Smile Selection Plus CS3 Clinical Cases, The Kaleidoscope Wax-Up Book and his latest hardcover, Replicating Naturalism: Tooth Design.

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**Figure 14**

Post cementation

**Figure 15**

Frt, centric bite check

**Figure 16**

Smile view

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