Hockey Accident Creates Need for Single Central

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Introduction

A young gentleman 26 years of age was seeking replacement of his anterior tooth #8, having had an accident while playing hockey some time earlier. (In fact, on that day, he was the second patient the author saw who had had a hockey accident!) In the laboratory setting, custom shade matching procedures were carried out, with the author taking the following steps:

- He first checked the after-prep color. All dental professionals have generic and simply made shade tabs in order to double-check stump shades. However, they do not accurately describe any colors other than the ones which are monochromatic in nature. Therefore, he used his own custom made shade tabs with life-like stump shades including gingival and body color. These colors help predict the final case outcome.

- He next checked the translucency/transparency amount with his own specific shade guide tool. He needed to know not only the amount of translucency or transparency to include but also the color – light opal, grey, clear or tan. He would indicate the amount to include and then apply it to his final build-up procedure. The patient presented with heavy translucency. However, the tooth was still a bit protrusive since facial preparation was not heavy. The patient had sensitivity to the preparation, leaving the clinician unable to prepare the tooth as deeply as he would have liked.

- The second and third build-ups were layered onto the restoration in order to create the desired effect. After firing, the shape was re-contoured and the texture was applied. Natural glazing vs. glazing was the next step and the type of glaze depended on the patient’s dentition. Following these steps helped the author to create a predictable restoration based on his custom shade matching procedures and might benefit the reader, as well.

Case Study

The patient’s stump color was measured with custom made stump color shade tabs (fig. 1) and...
found to have an orange–brown subtle to dark tone. Next, the technician checked the enamel amount of translucency and dentin, again using the custom made shade tabs (figs. 2, 3). The shape and incisal edge position were also noted at this time. The shade tabs he used, called Seasons of Life Shade tabs, are created with ceramic porcelain and sized 10.5 mm long, 8.2 mm wide (fig. 4), in order to replicate a true restoration's size and depth. Duplicate material and color variations, white calcification, translucency and transparency as well as internal and exterior mamelon, occlusion 2/3 enamel color, canine enamel, stump color and surface texture are all included within these shade tab assortments. In this particular case, the technician's main focus was on the translucency in the incisal 1/3. In order to arrive at the perfectly matching color, he used a total of 5 shade tabs to capture all the internal and external colors.

The stone model's occlusion view demonstrates the lack of room in the facial prep (fig. 5) as discussed earlier. To ensure proper coloring, the lab ordered a B1 zirconica Aadva ingot with a small amount of translucency from the GC Milling Center. The technician applied his regular dentin build-up (fig. 6). He next layered a porcelain enamel build-up application (figs. 7, 8). In the next series of images (figs. 9, 10 and 11) the
Figs. 9, 10, 11: Multiple colors of enamel and dentin in a trans-neutral color

Fig. 12: First firing appearance

Figs. 13, 14: Mesial corner illusion

Figs. 15, 16: Height of contour appearance

Figs. 17, 18: Mamelon appearance
technician applied multiple colors of enamel and dentin in a trans-neutral color in order to create the desired effect. After the first firing at 810°C the restoration had this appearance (fig. 12) and then again, after the second bake the porcelain application provided the illusion of a mesial corner (figs. 13, 14). Height of contour was created using EOP1 (figs. 15, 16). Next, IN41 Mamelon color was utilized (figs. 17, 18). Enamel Opal 3 color was used in (figs 19, 20) with Opal Translucency following (figs. 21, 22). Enamel Effective 14 provided a light tan color facially – but was not applied evenly or in the same thickness (figs. 23, 24). For baking, the lab used a Summit oven in order to ensure excellent translucency within the

Figs. 19, 20: Enamel Opal

Figs. 21, 22: Opal Translucency

Figs. 23, 24: Enamel Effective
Fig. 25: Summit oven for best translucency
Fig. 26: Appearance after second firing
Figs. 27, 28, 29, 30: Finalized build-up with Enamel Opal 4 and Cervical Translucency 22
Fig. 31: After third bake
Fig. 32: Surface texture markings
Fig. 33, 34: Lustre paste glazing
restorations (fig. 25). After the second firing, the restoration had this appearance (fig. 26). In (figs. 27, 28, 29 and 30) the build-up was finalized with Enamel Opal 4 and Cervical Translucency 22. After the 3rd build-up the restoration could be finalized (fig. 31) and followed with the texture application to match that of the adjacent teeth (fig. 32).

In the lustre paste glazing stage, (figs. 33, 34 and 35) after water was added to the glaze, we can distinguish the color variations. Porcelain particles within the lustre paste add to the subtle application color of the restoration (fig. 36). The lustre paste was applied to the restoration (fig. 37). On the stone model, the restoration was examined for natural color effect (fig. 38). In the mirrored image, (fig. 39) and in another view (fig. 40) the technician checked for texture and color. Immediately tried in, the technician applied lustre paste in order to create more detailed effects and better match with the patient’s natural dentition (figs. 41, 42, 43, 44). After insertion, immediate shots were taken (figs. 45 – 54), checking for proper angulation, coloring, consistency and harmony.

Fig. 31: After third bake
Fig. 32: Surface texture markings
Fig. 37: Stain application using a Renfert brush
Fig. 38: View of the restoration on the cast model
Fig. 39: Mirrored image for texture and color check
Fig. 40: Texture and color check
Fig. 41-44: Lustre paste application to create natural effects and match dentition
Fig. 45-54: After insertion, angulation, color matching and harmony were checked.
Conclusion

Technicians should take a look at all aspects of a patient's teeth when recording a custom shade—the color of the surrounding dentition and the best way to blend the color in order to achieve harmony. If we continue to improve our eyes and our skill at detecting color variations and modifications, we will grow as technicians. It's not easy to become an expert at color matching, but the first steps begin with us and the training we give ourselves.

The author

Luke S. Kahng, CDT is the owner of LSK121 Oral Prosthetics, a dental laboratory in Naperville, Illinois. In addition to being a board member for several dental publications, he has published more than 100 articles with major dental journals. He also lectures internationally, offering hands-on seminars to dental technicians and clinicians alike.

The first and second editions of his highly successful Chairside Shade Selection Guide were launched in 2009 and 2010, with international sales worldwide. The third edition, produced in 2012, encompasses the same concept but as a ceramic shade tab. Hand-made, the shade tabs are grouped according to natural dentition as dictated by the aging process, and sold in sets of twenty as: 3.0 (Young, Cosmetic), 4.0 (Middle Years), 5.0 (Later Years), 6.0 (Molars, Premolars and Canines) and 7.0 (Surface Texture, Tissue Color and After Prep Color), for clinicians and technicians alike.