Introduction

Clinician Viewpoint

The patient in our case study is a woman in her 50’s. Her husband is a dentist and as an employee in his office, her smile is an important part of his practice - for obvious reasons. She presented with a slight misalignment of the maxillary anteriors and her teeth color lacked brightness. The consensus was that the appearance of her teeth could have been better. However, as they considered whether to change the teeth in question, # 7-10, they were concerned about the fact that they had been previously untouched. They really could not decide whether it was necessary to proceed with any preparation - knowing the teeth were healthy in structure, and just cosmetically challenged.

The patient took a small first step toward improving her smile by whitening her teeth and then developed a bigger interest in improving their misalignment when she saw the transformation that color brightening provided. The question always remains how can one effectively communicate color so that it is natural looking in the final restoration? A traditional shade tab, such as A1, will not translate to that appearance because the color will be too opaque. With the Chair Side Shade Selection Guide, incisal 1/3 communication is improved because the amount of enamel overlay applied will decrease the value of the color, but will increase the translucency.

The next change they undertook was a no-prep veneer on tooth #9, a fairly conservative approach but not one that provided any long-lasting satisfaction. However, she was content to leave it at that for a year or so.

The subject was discussed on and off and finally several consultations between the client, her husband and the author were scheduled. They both had a good idea of what treatment plan they wanted to follow, but needed verification from the lab’s side.

Technician Viewpoint

Most technicians would find this particular situation to be somewhat challenging. After all, a clinician looks at his wife each day and his eyes have been trained to notice everything about teeth. Different light sources can change the appearance of the color, which could lead him to wish he’d done something differently. Clearly, the doctor must be just as happy with the completed work as his wife!

Several times the doctor and the author of this article met to discuss the case to iron out any discrepancies or concerns each of us might have. They especially talked about preparation design as well as details about color in the gingival, body, incisal, mesial and distal 1/3 areas along with material selection. The concern at that point was about esthetics and function. Trust in the author’s vision and artistic abilities was important to the outcome of the case.

The doctor had already fabricated his own wax-up stent and would create the temporaries based on that design. He presented photos, mounted models and patient objectives during these consultations. The patient’s X-rays showed good bone support and her tissue condition was excellent so both were a non-issue. In fact, she had no restorations on any of her teeth!

A major part of the discussion revolved around how much room the preparation would provide however, because both function and esthetics were ultimately being addressed. It was decided that the doctor would conservatively prepare the teeth for full all-porcelain crowns. Consideration was then given to color details, specifically incisal, enamel modification along with mamelon for natural appearance.

During the final preoperative consultation and custom shading appointment, the patient’s anterior translucency was checked against the Chair Side Shade Selection Guide (Fig.1) and found to be AT6 (which is a blend of opal enamel and white dentin). This color is popular but difficult, if not impossible, to describe with a traditional shade tab. To create a natural appearance the author’s porcelain recipe would have to take the incisal 1/3 enamel and translucency colors into consideration. To that end, the author created common incisal translucency colors by duplicating natural teeth - using all zirconia restorations (Fig. 2) and 2 years of custom shade research, shown here in his communication piece for patients.

Transforming the Undecided Smile

David Schubert, DDS and Luke Kahng, CDT
Prior to fabricating the pressed ceramic crowns for the patient, the author took an occlusion view photo (Fig. 3). His evaluation notes included the following information: teeth numbers 7 and 8 faced lingually, #9 had been given a no-prep veneer one year earlier, which was not a great color match, and #10 was tipped in a facial direction.

**Case Preparation**

The maxillary anterior teeth numbers 7-10 were conservatively prepared, as discussed. Final impressions were taken using a vinyl polysiloxane (VPS) putty material. The doctor then fabricated provisionals using GC America’s Unifast TRAD material. The case was then sent to the lab for fabrication.

**Laboratory Procedures**

The case preparation groundwork was checked (Fig. 4) and determined to be a 3/4 inch crown prep. The interproximal contact had been opened, otherwise known as “breaking the wall” in layman’s terms. The end result was that the author could shift the position of the teeth through his restoration design by moving tooth #7 out slightly and #8 and #10 slightly down in comparison to #9, in order to align them all correctly. The patient’s After – Prep (stump shade) color was checked (Fig. 5). When a dark stump color is indicated, the technician has to utilize a moderate opacity ingot to control the final shade of the restoration. Our patient’s after–prep
color was determined to be AP-16. The LSK Simple Enamel and After Prep Color Guide offers sixteen possible stump shade colors, from gingival to incisal edge (Fig. 6), providing more detail than a traditional shade tab. The patient offered a smile for the camera after the provisionals were placed (Fig. 7).

With Renfert’s GEO Aesthetics Chart (Fig. 8) the technician can depend on easy wax-up processing and excellent anterior esthetics. By comparing their choices to the GEO Dimensional model, technicians select the preferred tooth wax-ups (Fig. 9).

The facing for tooth #8 was adjusted and fixed to the die using a small amount of the GEO positioning wax (Fig. 10). Next, the facing for #9 was aligned with tooth #8 and they were both fixed to the dies (Fig. 11). All of the facings were then aligned to the dies (Fig. 12) for predictable tooth positioning. The unwanted wax in the gingival area was marked for removal (Fig. 13). The facings were then fixed.
Fig. 11: Tooth #9 was aligned to #8 and then fixed to the dies.

Fig. 12: All the facings were easily aligned on the dies for all predictable tooth positions.

Fig. 13: Unwanted gingival area’s wax-ups were marked for removal.

Fig. 14: The facings were firmly fixed using GEO Aesthetic Add Wax (Fig. 14). The facings need to be able to withstand the pressure of the next step, when the thick, kneadable silicone press material will be (Fig. 15) applied to the facings. Care has to be taken to make sure the silicone only slightly overlaps the lingual side of the incisal edge.

The material was then removed for the precious work (Fig. 16) with the height of the maximum incisal edges reduced, as well as in the area of the adjacent teeth, to between 5 and 10 mm. After that step was completed, the facings were removed from the dies (Fig. 17) and the silicone mold checked on the dies for fit (Fig. 18). The cleaned dies were then isolated using a wax separating agent (Fig. 19).

The wax pontic is best positioned on the model with positioning wax before fixing to the wax copings (Fig. 20). The availability of space can then be checked with the silicone index for the next press steps (Fig. 21). Reduction or build-up of the frame should be conducted at that time, as necessary. Once that is accomplished, the finished wax-up copings should be aligned on the dies (Fig. 22).

The copings (Fig. 23) were poured up with a thin layer of investment material (white stone and wax), which was mixed and spread over the copings. After one press and divesting procedure, the fit was checked for tooth #8, created from GC America’s Initial System Pressable Ceramic BO ingot material (Fig. 24). After the sprue was cut, the author performed a solid cast model check (Fig. 25). Prior to processing tooth #9, the porcelain layering build-up was applied for #9 for different layering color (Fig. 26).

After firing, the restoration’s coloring appearance was multi-layered (Fig. 27). In the bisque bake stage, the restorations were tried on one cast model (Fig. 28) for a
Fig. 16: For the GC Initial Porcelain work, silicone wall reduced the height of maximum incisal edges and in the area of adjacent teeth to between 5 and 10 mm.

Fig. 17: All facings were completely removed.

Fig. 18: The silicone was checked on the dies.

Fig. 19: Dies were isolated using a wax separating agent.
Fig. 20: The wax-ups were added according to silicone index position.

Fig. 21: The coping wax checked the available space for next press steps.

Fig. 22: All finished wax-up coping works were aligned on the dies.

Fig. 23: The copings were covered with investment material.

Fig. 24: After Press and Divesting Procedure, the fit for #8 was checked on the model.

As this point in planning the case's cosmetic design, the bisque bake crowns were tried in the patient's mouth (Fig. 30) for an incisal edge check. The vertical lines drawn on the restorations in the photo demonstrate the long axis, the horizontal and the mid-line, all part of creating the natural beauty for the case. The vertical lines were, in turn, drawn straight across with no compromise for natural cosmetic design. For a distinct view of the mesial distal lobe outline, transition line angles and lobes were drawn, demonstrating cervical convergence (Fig. 31). The incisal edge is wide and slightly curved, as demonstrated in the photo. A halo effect was then created using GC Lustre Paste N.F. (Fig. 32).

The final restorations were checked on a mirrored surface for color and shape before final cementation (Fig. 33) and then again in the mouth (Fig. 34). The color of the upper teeth was noted to be slightly brighter but the variation works because the coloring is of the same tone. In the next side view (Fig. 35) photo, with lipstick applied, note the harmonious effect of the contrasting colors. An opposite angle produces the same results (Fig. 36). Note
Fig. 25: After the sprue was cut, the author performed a solid cast model check. Material using by GC PC Pressible System.

Fig. 26: Porcelain was layered onto the coping for tooth #9.

Fig. 27: After firing, the tooth’s appearance was multi-layered in color.

Fig. 28: Protruding aspects of the teeth were checked on the cast model with the bisque bake restorations.

Fig. 30: The long axis, horizontal and mid-line were checked with the bisque bake crowns in the patient’s mouth.

Fig. 31: Mesial distal lobe outline and transitional line angles were drawn to show cervical convergence.

Fig. 32: Using GC Lustre Paste NF, a halo effect was created.

Fig. 33: All four finished restorations were placed on a mirrored surface for a final check.
the detailed texture, translucency and shape of the smile view (Fig. 37). In the final photograph, the patient and her husband were happy with the outstanding case results (Fig. 38).

Conclusion

This case took a while to be completed, partly because of the clinician's reluctance to prepare his wife's untouched teeth. However, the main work also had to be scheduled around the couple's frequent trips to Haiti for the donated dental services they offer at their clinic on a quarterly basis. As part of a two-person team working in that area of the world since 1996, their productive time on-site is limited but meaningful. Their schedule is tightly booked and in fact, they hardly stop seeing patients while they are there.

When considering their own good fortune that enables them to in turn help those less fortunate, it is a double blessing for the clinician to be able to provide the kind of care to his patients that transforms a smile from just ok to brilliant, juxtaposed against those in Haiti who, without his services, would never see a dentist. In fact, most will never have need of his cosmetic services. The work he performs in the USA is very different in nature from that which is handled in Haiti.

However, there is a cause and effect at work in this scenario. The author is indebted to the clinician because he has, over the years, provided 1,000+ extracted natural teeth, brought back from Haiti, to the author for continuing self-taught study and research. Through this ongoing education, the author has developed advanced techniques for designing and implementing his cosmetic work.

In this way, the clinician's generosity to the people of Haiti, and to the author's desire for knowledge, benefited
his wife. Her cosmetic work was accomplished with excellent treatment planning, case consideration and long-term function all deliberated and decided in a thoughtful manner beforehand. The good work that the clinician carries out in Haiti was, therefore brought back to him in the United States because the study and consideration the author has given to natural teeth helped him to complete the case with excellent results.

References


About the author

Luke S. Kahng, CDT, is the owner of LSK121 Oral Prosthetics, a dental laboratory. He has published over 35 articles in major dental publications. He is the author of the recently published Anatomy from Nature, with 50 illustrated pages of full contour wax-ups, stone models and porcelain teeth, all re-created using natural teeth as a guide.

His new Esthetic Guide Book features 31 patient cases from a single anterior tooth to a full mouth reconstruction. He invented the Chair Side Shade Selection Guide featuring over 150 zirconia fabricated restorations based on patient enamel and translucency research, with patent pending.