Direct Resin VENEERS

Case Type V for AACD Accreditation

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INTRODUCTION

Clinicians undertake the American Academy of Cosmetic Dentistry (AACD) Accreditation process to achieve excellence and more sophisticated dentistry for their patients. The process itself is one of advanced education, discovery, and professional enhancement that can be attempted only after many years of learning from others.

Fortunately, the AACD provides many avenues through which to pursue collaborative learning and skills development, whether through the *jCD* or the annual scientific session, through regional meetings or collegial interactions with peers. The authors of this article, Frank Milnar, DDS, AAACD; and Jenifer Wohlberg, MDT, AAACD, have long availed themselves of such opportunities.

We have formed a partnership wherein we each have learned the major characteristics and subtle nuances of each other's respective professions. For more than eight years, we have taught one another the concepts, tools, and processes we use to design restorations. Through this partnership, we both have gained a greater understanding of our own art, as well as a greater breadth of knowledge in cosmetic dentistry as a whole.

KEY WORDS: Accreditation, direct composite veneers, shade matching, layering

"Lifelike representation of color is among the most important characteristics of an esthetic direct restoration and is necessary to achieve Accreditation."

For example, when undertaking Accreditation Case Type IV or Case Type V restorations, it is by first performing an esthetic mock-up—similar to the techniques performed by ceramists prior to fabricating indirect restorations—that the ultimate treatment can be visualized for execution. Placing composites to evaluate their effect on the treatment outcome simulates the ceramic-layering shade-mapping strategies employed by ceramic artists when recreating lost tooth structure.

Such talents, knowledge, and skill are required for successful completion of Accreditation Case Type IV, for which Class IV direct resin restorations are placed on the maxillary incisors to replace at least 10% of the facial surface; this aspect is structurally compromised, and the structural compromise should involve the mesial and/or facial, lingual, and incisal aspects. Diastema closures should have a 1 mm or greater diastema, requiring composite placement on two adjacent teeth. Likewise, for Case Type V, six or more direct resin veneers are placed to demonstrate the technique performed to restore the maxillary incisors and canines.

When such cases are submitted for Accreditation, several factors are evaluated to assess the restorations' success. Drawing from one's education, skill development, and interdisciplinary knowledge enhances the ability to approach the clinical challenge with an armamentarium of options for accurately and appropriately recreating lifelike color, morphology, texture, internal characterization, and shape.[1-3]

This article demonstrates how the approaches for planning direct composite layering and ceramic fabrication cross interdisciplinary boundaries and lend themselves to achieving a mutual objective: providing patients with excellent options for predictable, lifelike restorations. The perspectives of two AACD Accredited members and former Accreditation chairs are presented.

Figure 1

Figure 2

Figure 3

FACETS OF COLOR DESIGN

There are six facets of color design to consider when conceptualizing a composite restoration:

- **form**
- **surface texture**
- **hue**
- **chromacity**
- **translucency**
- **luminosity.[3]**

These factors determine the optical characteristics of the restoration.

CASE PRESENTATION

STEP 1: TREATMENT PLANNING

A 46-year-old male patient presented with an esthetically displeasing composite veneer on tooth #8 that another dentist had attempted to place unsuccessfully on five separate occasions **(Fig 1)**. The previously placed composite veneer lacked luminosity and was visibly dull compared to the adjacent teeth **(Fig 2)**. The veneer also did not mimic the anatomic form of the natural tooth, lacking proper incisal margin characterizations. The restoration did not demonstrate appropriate surface structure or internal intensities (i.e., striations/staining), and failed to match the hue, translucency, and value of the patient's natural dentition **(Fig 3)**. Essentially, the old veneer did not meet any of the esthetic requirements of AACD Accreditation standards. This is why dentists must possess a comprehensive understanding of the materials and techniques required to place an esthetic restoration before attempting to perform the procedure.

Two options for restoring the tooth were discussed with the patient:

- A direct composite veneer, the benefits of which would include easy repair and conservation of more of the natural tooth structure.
- An indirect restoration fabricated by a ceramist, which would provide greater color homogeneity and custom staining.

At this time the patient was more interested in an indirect procedure.

STEP 2: CERAMIST SHADE MATCHING

With the patient present at the dental laboratory, the ceramist used the VITA 3D-Master shade guide tabs (Vident; Brea, CA) to shade match the patient and "map" his color plan. This was accomplished by taking a number of photographs at the incisal edge with varying shades, as the camera picks up characterizations and luster the eye may miss **(Figs 4 & 5)**.

The ceramist then created a hand-drawn map of the values of the proposed restoration **(Fig 6)**. This map included color characteristics such as value, hue, and chroma. This patient required VITA shade 2M1 for gingival color, shade 2M1 for dentin body, shade 1M1 for enamel color, and shade EE9 for translucence intensities. After completing the shade match with the ceramist, the patient returned to the dentist's practice.

" The hallmark of a clinician's knowledge in cosmetic dentistry is their ability to properly identify and reliably replicate the features inside—and on the surface of—natural teeth. "

Figure 4

Figure 5

Figure 6

STEP 3: DENTIST SHADE MATCHING

Although he previously had preferred an indirect procedure, the patient ultimately chose to proceed with the direct composite veneer restoration. He came to this decision because, after careful consideration, he wanted a restoration that was repairable and reversible, and to save his tooth structure in the hope that future products will improve for better results. A universal supra-nanohybrid composite (Estelite Omega, Tokuyama Dental America; Encinitas, CA) was selected based upon its handling capabilities and enhanced optical properties.[4,5]

The first esthetic preview (i.e., shade match) was the dentin layer. Dentin denotes the basic hue of the tooth and adds to the fluorescence and chromatic interpretation of restorations. This was accomplished by placing small amounts of dentin shades of composite on the enamel surface of tooth #9. DA1 was placed on the left side of the tooth, and DA2 was placed on the right side (Tokuyama) **(Fig 7)**.

Next, the esthetic previews for the enamel layers were established. The cervical portion of the tooth exhibited a lighter color, with Type 2[6] intensities (i.e., small cloud-like milky white stains), so Milky White (MW) (Estelite Omega) was previewed **(Fig 8)**.

Toward the incisal edge, Enamel B1 (EB1, Estelite Omega) was previewed **(Fig 8)**. The incisal edge is a very important area of color design; this is the area of enamel where the patient's window-like Type 4[6] opalescence and Type 1[6] characterization features would be built up.

STEP 4: TOOTH PREPARATION

Using a diagnostic model that was made prior to the restorative procedure, a putty stent was fabricated (Aquasil EasyPutty, Dentsply Caulk; Milford, DE) for volumetric determination of incisal/lingual width, incisal edge, and incisal embrasure **(Fig 9)**. Because the incisal edges seemed consistent, no mock-up was made.

The patient was anesthetized (Septocaine, Septodont, Novocol Pharmaceutical of Canada; Cambridge, ONT) and no retraction cord was placed. The existing composite restoration on #8 was carefully removed with the intention of keeping the enamel intact, as enamel is a much better bonding substrate.[7] The tooth was prepared with the New Horizon Composite Polishing System #K0097 (Brasseler USA; Savannah, GA). The preparation left sufficient room for creating incisal characteristics and opalescence **(Fig 10)**.

Figure 7

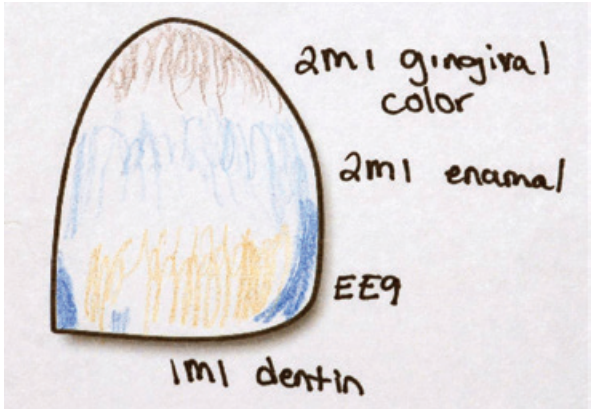


Figure 8

Figure 9

Figure 10

A disposable retainer and matrix (Omni-Matrix, Ultradent; South Jordan, UT) was cut to 15/1000ths or "dead soft." An acid etch phosphoric acid (Tokuyama) was applied to the enamel and left to penetrate for 15 seconds, then rinsed. The etchant was then applied to the dentin, left to penetrate for 10 seconds, and rinsed **(Fig 11)**. After etching, the frosty appearance of the exposed dentin was visible on the distal/gingival surface **(Fig 12)**.

A dentin bonding agent (Bond Force, Tokuyama) was carefully applied, air-thinned, and polymerized, completing the preparation **(Fig 13)**.

STEP 5: COMPOSITE LAYERING PROCESS

The first increment of composite was layered onto the preparation. Dentin DA2 (Estelite Omega) was applied to the gingival third and striations were created to diffuse the light, consistent with the anatomy of tooth #9 **(Fig 14)**.[8] Dentin shade DA1 (Tokuyama) was added, then Translucent (TRANS) (Tokuyama) was used to build an incisal frame on which the second dentin shade DA2 would be placed. Characteristics of these composites would generate in the mamelon area a chromatic interpretation of the substructure of the tooth consistent with #9, especially the striations and light-reflective properties **(Fig 15)**.[9]

Next, on the mesial portion of #8, an increment of high-value translucent MW was placed to raise the value and create characterizations similar to those observed in #9, and light-cured **(Fig 16)**. The entire substructure was applied freehand in the gingival margin using a gold-grip esthetic contouring instrument (Clinician's Choice; New Milford, CT), creating chromatic interpretation and opalescence **(Fig 17)**.[10]

With the dead soft matrix (Omni-Matrix) back in place, the final enamel layer was applied. Enamel B1 (EB1) (Tokuyama) was placed on the gingival third of #8, MW was placed in the center of the tooth, and TRANS was placed on the incisal third. All three shades were blended into a homogenous mixture and light-cured. This enamel blend reflected the value observed in the natural tooth **(Fig 18)**.[11]

STEP 6: CREATING LIFELIKE ANATOMY

Using a series of discs (Super-Snap SuperBuff, Shofu Dental; San Marcos, CA), a light sanding was performed to create basic outlaying geometric shape of the tooth consistent with the adjacent tooth, and nonporous, smooth surface free of imperfections. Shape was then verified in the putty stent **(Fig 19)**.

Figure 11

Figure 12

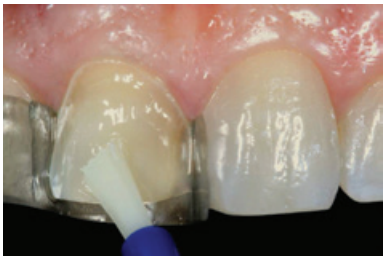


Figure 13

Figure 14

Figure 15

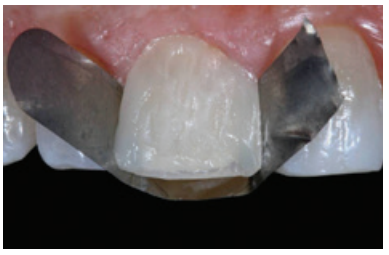


Figure 16

Figure 17

Figure 18

Figure 19

Transitional line angles were drawn on the mesial and distal aspects of #9 and replicated on the composite veneer. Using Super-Snap discs, the angles were modified on the veneer, then redrawn to verify illusory symmetry **(Fig 20)**.

The micro-morphology of the cervical third of the tooth was created using green stones (Dura-Green, Shofu).[12] A #8850-31-014 diamond bur (Brasseler) was used to create the surface texture and micro-architecture of the tooth **(Fig 21)**.[13] Before finishing and polishing, it was imperative to ensure mimicry of light transmission of the natural tooth, so the facial surface and micro-morphology of the structure were refined using carbide finishers (Robot shank carbide CTF-FG yellow and white, Shofu) **(Fig 22)**.

The final polish was completed using polishers, paste, and discs (OneGloss polisher, Super-Snap Mini Buff discs, and Direct Dia polishing paste, Shofu) **(Fig 23)**.[14]

STEP 7: DELIVERING ESTHETIC IDEALS

Upon inspection of the natural smile and completed veneer, it was determined that the adjacent tooth was mimicked both in color and shape **(Fig 24)**. The retracted intercuspal view verified a good illusion of natural smile design according to light transmission and chromatic values **(Fig 25)**.

The patient presented an open embrasure between #8 and #9; as this feature is more graceful and less masculine, it was suggested that his smile could be further enhanced by freehand bonding a small amount of composite to close the embrasure, and adding a small amount to the mesial aspect of #10. This was accomplished using acid etching and applying MW composite alone. The result of modifying the incisal edges and embrasure from a gender standpoint actually made his smile look stronger and more masculine **(Fig 26)**. The retracted view demonstrates the dramatic effect of the small modification **(Fig 27)**. When the original build-out is viewed with the modified build-out image superimposed over it, it is easily visible that just a small surface differential created a different smile concept **(Fig 28)**.

The incisal edges and widths are symmetrical, the embrasures are symmetrical, and the mesial and distal transition angles were created successfully **(Fig 29)**. The anterior teeth, photographed in black and white, illustrate that appropriate values were recreated as well **(Fig 30)**.

Figure 20

Figure 21

Figure 22

Figure 23

Figure 24

Figure 25

Figure 26

Figure 27

Figure 28

Figure 29

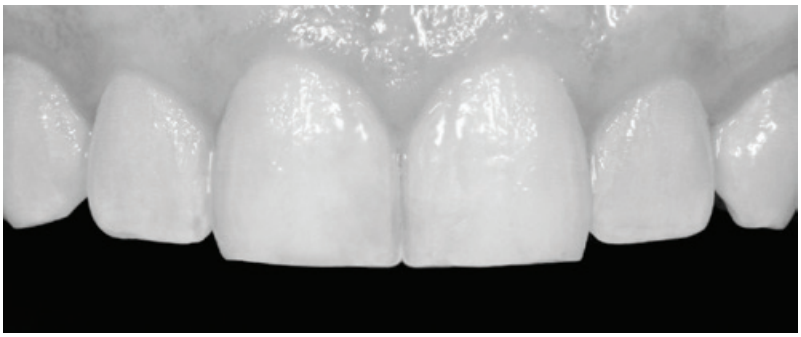


Figure 30

CONCLUSION

The patient was extremely satisfied with his new composite veneer and smile enhancement, which is the requisite effect when placing an esthetic restoration. To an AACD Accreditation Examiner, the hallmark of a clinician's knowledge in cosmetic dentistry is their ability to properly identify and reliably replicate the features inside—and on the surface of—natural teeth.[15] The restoration detailed here expertly mimicked the adjacent tooth in form, light transmission, and chromatic interpretation. It also demonstrated excellent incisal width and symmetry, meeting all of the AACD standards; and excellent, artistically crafted esthetics.[16] Additionally, it was completed using direct composite, which means lower cost to the patient.

As noted earlier, this article was written with Accreditation standards in mind. However, anyone who wishes to achieve lifelike composite resins would benefit from following the strategies described.

References

1. Touati B, Miara P, Nathanson D. Esthetic dentistry and ceramic restorations. London: Martin Dunitz; 1993.

2. Winter R. Visualizing the natural dentition. J Esthet Dent. 1993;5(3):102-17.

3. Vanini L, Magubu F. Determination and communication of color using the five color dimensions of teeth. Pract Periodontics Aesthet Dent. 2001;13(1):19-26.

4. Paravina R, Westland S, Johnston W, Powers J. Color adjustment potential of resin composites. J Dent Res. 2008;87(5):499-503.

5. Hirata K, Yamagawa J, Qian F, Armstrong S. Color stability of the experimental resin based composite UBC. Paper presented at: IADR 89th General Session & Exhibition; 2011 Mar 16-19; San Diego, CA.

6. Vanini L. Conservative composite restorations that mimic nature. J Cosmetic Dent. 2010 Fall;26(3):80-98.

7. Hikita K, Van Meerbeek B, De Munck J, Ikeda T, Van Landuyt K, Maida T, Lambrechts P, Peumans M. Bonding effectiveness of adhesive luting agents to enamel and dentin. Dent Mater. 2007;23(1):71-80.

8. Ubassy G. Shape and color: the key to Successful ceramic restorations. Hanover Park (IL): Quintessence Pub.; 1993.

9. Magne P, Magne M, Belser U. Natural and restorative oral esthetics. Part 1: rationale and basic strategies for successful esthetic rehabilitations. J Esthet Dent. 1993;5(4):161-73.

10. Dietschi D. Free-hand composite resin restorations: a key to anterior aesthetics. Pract Periodontics Aesthet Dent. 1995;7(7):15-25.

11. Vanini L. Light and color in anterior composite restorations. Pract Periodontics Aesthet Dent. 1996;8(7):673-82.

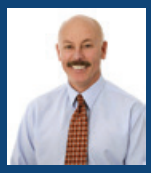
12. Vanini L, Mangini F, Klimovskaia O. Conservative restoration of anterior teeth. Viterbo (IT): Acme; 2005.

13. Vanini L. Anatomic stratification technique. Paper presented at: 26th Annual AACD Scientific Session; 2010 Apr 27; Grapevine, TX.

14. Peyton JH. Finishing and polishing techniques: direct composite resin restorations. Pract Proced Aesthet Dent. 2004;16(4):293-8.

15. Radz GM. Creating natural vitality with direct-bonded composite veneers. Compend Contin Educ Dent. 1999;20(1):62-5, 67, 69-70.

16. Christensen GJ. What is a veneer. J Am Dent Assoc. 2004;135:1574-6. **jCD**



Dr. Milnar is an Accredited member of the AACD. He also is an Accreditation Examiner and AACD Professional Education Committee co-chair. Dr. Milnar practices in St. Paul, Minnesota.

Disclosures: Dr. Milnar developed the New Horizon Composite Polishing System #K0097 mentioned in this article.

Ms. Wohlberg is an Accredited member of the AACD and was the AACD Laboratory Technician Accreditation Chair (2003-2005). She is the president of Valley Dental Arts in Stillwater, Minnesota.

Ms. Wohlberg did not report any disclosures.