

## Clinical Case Report, Accreditation Case Type V: Six or More Direct Resin Veneers



by Emil Hawary, D.D.S., F.A.G.D.  
Irvine, CA

### INTRODUCTION

Enhancing or rehabilitating a smile using directly sculpted and polished composite resin veneers can be one of the most challenging—yet rewarding—procedures in cosmetic dentistry. Placing direct composite veneers requires an exceptionally high level of skill from the clinician, in both the science and the art of dentistry. Although composite bonding has been used for years to correct small defects, today's materials and techniques have improved enough to allow complete tooth restoration. The use of composite resin often is the most conservative approach, due to the minimal amount of preparation required. The range of colors, translucencies, and opacities available enables the clinician to mimic nature.<sup>1</sup> In addition, the ease of handling and the strength of microhybrids, combined with the high polishability of the microfills in the final layers, result in restorations that not only are strong but also are highly esthetic.<sup>2</sup>

### CHIEF COMPLAINT AND HISTORY

The patient was a 32-year-old female with no significant medical history other than smoking. She took no medications, was in good health, and had seen a dentist regularly since childhood. She had received orthodontic treatment as a teenager, but had discontinued wearing her retainer. She wanted her teeth to look healthier and more attractive, but finances were a concern. She disliked her smile due to staining of the bonding on her anterior teeth. She also was unhappy with the decalcification that occurred after orthodontic treatment and the wear facets and chips on her central incisors.



*Figure 1: Before; the midline is canted and gingival asymmetries are adding to lack of facial symmetry. After; the midline is parallel and the gingival line is symmetrical, creating more facial balance.*

## CLINICAL DATA

Clinically, all soft and hard tissues were within normal limits. Radiographs indicated sound bone support, and visual inspection detected no recession. Examination revealed failing bonding on the upper anterior six teeth. There also was an asymmetrical gingival line, as well as a canted midline to the left (Fig 1). Heavy wear patterns on incisal edges were creating a reverse smile. The lateral incisors were flared and rotated, and the buccal corridors were slightly deficient (Figs 2 & 3).

The patient had some gingivitis but there was no significant pocketing, and minimal bleeding upon probing. Her temporomandibular joints were asymptomatic, with no internal disarrangement, and no crepitis or clicking of the joints. She had a Class I occlusion with a mild overbite and overjet relationship; however, teeth #8 and #9 were worn and chipped (Fig 4) due to posturing habits and uneven lower ante-

rior teeth.<sup>3,4</sup> The entire dentition was caries-free and there was no tooth mobility. Radiographs revealed no periapical pathology. The patient had a deteriorating composite on tooth #4 that was temporized for an onlay.

## DIAGNOSIS

The patient's smile was not esthetically pleasing and violated a number of ideal smile design principles.<sup>1,2,10</sup> The midline was canted to the left and the central incisors were worn and chipped, causing a reverse smile and lack of central dominance. Previously placed bonding was breaking down and stained. In addition, the buccal corridors were underdeveloped, the lateral incisors were rotated, and the gingival line was asymmetrical. The mounted diagnostic casts revealed deficient anterior guidance and a restricted envelope of function.<sup>3,4</sup>

The fact that the patient was motivated to improve her appearance

with conservative treatment modalities, specifically in terms of minimal tooth preparation, was also an important factor in establishing a treatment plan.

## TREATMENT PLAN

The records that were taken to help develop a treatment plan included full radiographs, diagnostic casts mounted on a semi-adjustable articulator with a facebow and centric relation bite records,<sup>3,4</sup> and a set of digital photographs showing all 12 views as recommended by the AACD.<sup>5</sup>

A lengthy discussion of treatment modalities also aided in the formation of the treatment plan. Different options were presented to the patient, including indirect porcelain veneers restoring teeth ##4–13; or 10 direct resin veneers<sup>6</sup> restoring teeth ##4–13, with bleaching of her lower teeth. She chose the latter option for reasons previously addressed.



*Figure 2: Before; flared laterals, reverse smile, and insufficient buccal corridors distracted from the patient's smile. After; the nicely aligned dentition, full buccal corridors, and harmonious smile line create a more esthetic smile.*

Esthetically, the first issue to be addressed was the midline. Then, the creation of longer incisors would result in a fuller, more pleasing smile that would correct the reverse smile line, as well as improve the anterior guidance. Central dominance also would be achieved by increasing the length. In addition, the gingival line would be leveled during treatment, and buccal corridors enhanced. The mounted diagnostic casts would be utilized to address occlusal discrepancies, anterior guidance, and envelope of function prior to treatment.<sup>3,6,4</sup>

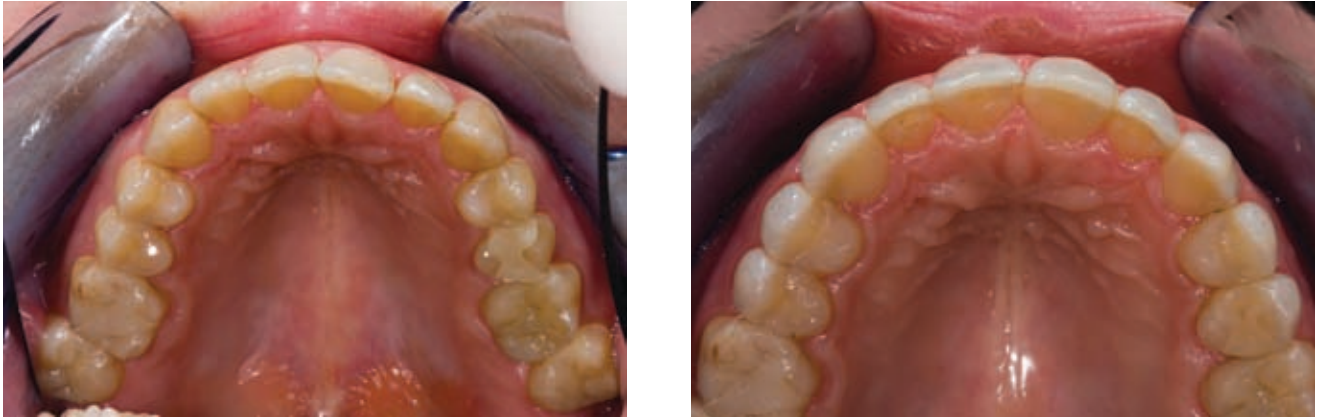
After equilibrating the dentition, another maxillary impression would be taken, along with a facebow. After mounting on a semi-adjustable articulator, I would create a diagnostic mock-up, an impression of which would be made with polyvinyl siloxane putty material. This impression would be cut along the incisal edges and used as a matrix during the application of the resin on the lingual aspects and the incisal edges. The diagnostic mock-up model would be duplicated in stone to create a

vacuum-formed stent to be used as a preparation guide, to ensure the preservation of as much tooth structure as possible.<sup>2</sup>

An onlay on #4 would be delivered prior to restoring the patient's 10 anterior teeth with direct resin veneers. An occlusal guard would be recommended for nighttime protection.<sup>3</sup>

#### ARMAMENTARIUM

- EOS Rebel digital camera (Canon; Tokyo, Japan)
- EOS 20D digital camera (Canon)
- Jeltrate Plus alginate (Dentsply Caulk; Milford, DE)
- yellow hydrox stone (Kerr; Orange, CA)
- Denar facebow (Waterpik; Fort Collins, CO)
- Denar semi-adjustable articulator (Waterpik)
- AccuFilm articulating paper (Parkell; Edgewood, NY)
- Zoom2 whitening system (Discus Dental; Culver City, CA)
- Vita Lumin shade guide (Vident; Brea, CA)
- RSVP clear polyvinyl siloxane impression material (Cosmesdent; Chicago, IL)
- vacuum-formed copyplast pin-hole preparation guide (Schofu; San Marcus, CA)
- Septocaine with 1:100,000 epinephrine (Septodont; New Castle, DE)
- The Wand (Milestone Scientific; Livingston, NJ)
- gingival retraction cord (Ultradent; South Jordan, UT)
- Midwest 330 bur, 7902 finishing bur, and 7406 egg-shaped bur (Dentsply)
- Mopper anterior composite preparation and finishing system (Brasseler; Savannah, GA)
- Micro Etcher (Danville Engineering; San Ramon, CA)
- Ultra-Etch 35% phosphoric acid (Ultradent)
- Gluma desensitizer (Heraeus Kulzer; Armonk, NY)



*Figure 3: Before; note the labioversion and rotation of #7 and #10, the linguoversion of #9 distal, and that both cuspids are rotated distally. After; the arch is aligned symmetrically and harmoniously.*

- Optibond Solo Plus adhesive (Kerr)
- Optilux 501 curing light (Kerr)
- IPC carver (Cosmedent)
- Renamel microfill, hybrid, and opaquers (Cosmedent)
- clear mylar strips (3M ESPE; St. Paul, MN)
- Renamel Creative Color composite stains (Cosmedent)
- Kolor + Plus Stain Kit (Kerr)
- #1 and #2 brushes (Cosmedent)
- Sof-Lex finishing and polishing strips (coarse, medium, fine, super-fine) (3M ESPE)
- Vision Flex diamond strips, WS37ET (Brasseler)
- #12 Bard-Parker blade (BD Medical Systems; Franklin Lakes, NJ)
- blue and pink cups and points (Cosmedent)
- FlexiBuff discs and Enamelize polishing paste (Cosmedent)
- mint waxed floss (Johnson & Johnson; New Brunswick, NJ)
- unwaxed floss (John O. Butler Co., Chicago, IL)

## TREATMENT

### PREPARATION

The patient's teeth were bleached and postoperative instructions were given. Several days later, shade selection was made prior to preparation. Shade A1 (progressive shade) was selected.<sup>1,2</sup> In other words, the centrals were to be the brightest teeth; and, in order to achieve that, shade B1 was to be added at the incisal one-third of the tooth. The canines were to be the richest in color by adding more A2 at the cervical one-third to mimic the natural progression of shade, as in nature. (Before the appointment, a full-contour mock-up had been executed, creating ideal morphology and arrangement of the teeth.) The midline was corrected to eliminate the cant. A polyvinyl siloxane putty impression was made from the mock-up and the impression was trimmed along the incisal edges to form a matrix. Essentially, this matrix guided the lingual and incisal formation of the teeth and created a backdrop onto which the composite resins could be layered.<sup>2,7,8</sup>

After anesthetizing the patient, preparation was initiated with a 770.10 burr. Preparation of tooth #8 was done, followed by tooth #9 to ensure adequate removal of tooth structure and uniform layering using the pin hole preparation guide. There was no evident decay under the old composite. We continued to prepare the rest of the anterior segment using a conservative veneer preparation (Fig 5). Retraction cords were used to protect the tissue during preparation and to aid in placing the finish line slightly subgingivally. It was also utilized to level out the gingival height discrepancies.

### BONDING

Bonding was initiated with the placement of 35% phosphoric acid on the preparations, one at a time beginning with #8, for 15 seconds. The acid was rinsed off, and then the teeth were dampened with cotton pellets, leaving the surface moist. Next, a dentin sealer was applied. A thin layer of resin adhesive was then placed on the surface of the teeth and cured with a light for 10 seconds. The matrix was then positioned on





*Figure 4: Before; excessive gingival displays in the premolar area, coupled with worn and chipped incisal edges, cause a reverse smile. After; harmonious gingival line and incisal edges enhance the lateral smile view.*

the lingual aspect of the maxillary anterior teeth. The initial layer of composite shade A1 microhybrid was placed on the lingual aspect of tooth #8. Because it is important to establish an accurate midline and length, this initial layer created a lingual shell to act as a support for the rest of the restorations.

Clear mylar strips were used at this point to separate the teeth. A thin layer of pink opaquer was applied on the facial to block out any shine-through or transition from tooth to composite.<sup>1,2,7,8</sup> After a 20-second cure, a second layer of microfill A1 was sculpted to mimic the mamelons, then cured for 20 seconds. A very small amount of diluted blue tint was painted onto the incisal edge of each mamelon and then light-cured. A small amount of white opaque tint was placed along the internal aspect of the incisal bevel to create an internal halo effect. Some "maverick" colors, including ochre, were also added to mimic her natural dentition.<sup>2,7</sup> In the incisal one-third, room was left to add light incisal microfill. This was

sculptured with a carver and #1 and #2 brushes to create slight developmental depressions. Then it was cured for 60 seconds with an anti-oxidizing agent. Long flame-shaped, red-striped diamonds were used to create the shape of the central incisor (Fig 6).

Adhesion was accomplished similarly with tooth #9. All 10 front teeth were completed in general shape, and then the incisors were cut back to create developmental grooves and mamelons.<sup>2,9</sup> The putty matrix from the wax-up was used as a guide. Teeth #6 and #11 were also built with A2 cervically and A1 incisally to blend with the patient's natural dentition and mimic nature (Fig 7).

#### FINISHING

The contours were refined with an anterior composite finishing kit. The finish was generated with blue and pink points and cups; and coarse, medium, fine, and super-fine finishing and polishing strips and discs with polishing paste.<sup>1,2</sup> Occlusion was adjusted in centric occlusion

and eccentric excursions prior to the final finishing and polishing. Concentric and evenly loaded protrusive contacts on teeth #8 and #9 were established.<sup>3,4</sup> Centrals were made slightly longer to create a more convex, pleasing smile line. At this point, we took a series of photographs and made another appointment to refine and complete the case.

After evaluation of the mid-treatment photos, some minor changes in contour were made and the restorations were polished with points and cups; then coarse, medium, fine and super-fine finishing and polishing strips and discs were used, followed by polishing paste. Polishing revealed small subsurface bubbles and a small inclusion of dark debris. Repair of these small defects was achieved by means of the following: Removing the defect with a small diamond, beveling the defect, air-abrading the area, etching to clean, applying a thin layer of unfilled resin, placing a small amount of flowable microfill, curing, then finishing and polishing the area<sup>2</sup> (Fig 8). Another appointment was made



*Figure 5: Preparations are conservative for direct resin restorations on teeth ##4–13.*



*Figure 6: Tooth #8 is built with microhybrid on the lingual and microfill on the facial, and is ready to be contoured.*



*Figure 7: Before; overall appearance is not pleasing, due to stains and excessive yellow chroma. After; a brighter, cleaner appearance blends with the chroma of the whitened lower arch.*

for postoperative photographs one week later.

An occlusal guard was fabricated,<sup>3</sup> and the patient was advised to wear it every night to maximize the longevity of her new restorations.

## CONCLUSION

In some situations, as with this young patient, composite veneers can be considered the treatment

modality of choice. Remarkable esthetic and functional results can be achieved with direct resin veneer restorations. The keys to success are beginning with the end in mind, and following specific smile design principles.<sup>1,2,6,10</sup> The patient and I were both very pleased by the esthetic results. This process gave this young woman a new, pleasing smile for which she was extremely grateful. The final results and her gratitude

were truly fulfilling rewards, well worth the challenges of the case.

## Acknowledgments

*The author thanks Dr. Jimmy Eubank, Dr. Jeff Morley, and Dr. Brian LeSage for their significant educational contributions; and Dr. Susan Hollar for her help in editing this article. He also gives special thanks to his wife for her continuous support, and acknowledges his dedicated staff.*



**Figure 8:** Before; the surface texture is mottled, stained, and dull. After; the surface texture after treatment has a smooth and shiny luster.


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## Examiners' Perspective for Emil Hawary, D.D.S., F.A.G.D.



by  
J. Fred Arnold, III, D.M.D.  
Lexington, KY  
[www.lexingtonsmiles.com](http://www.lexingtonsmiles.com)

Case Type V, Six or More Direct Resin Veneers, can challenge even the most experienced practitioners. To increase the odds for success, examiners agree that good case selection is extremely important. Are the teeth properly aligned, with good vertical and horizontal symmetry? Is only a slight color change necessary? Is the gingiva healthy, with good architecture and good papillae height? When the patient smiles, are his or her lips symmetrical, so as to form a beautiful frame for the teeth?

Candidates often report that they have a difficult time finding a good patient for Case Type V. Because this case type tends to need fine-tuning several times after studying the photography, patient flexibility and availability is extremely advantageous (this is an excellent case type on which to use a staff member or relative, when possible). Take numerous photographs and evaluate the case using the Accreditation criteria. Have the patient return, and make the modifications needed until the results are in the zone of excellence. (If you are not sure, team up with a mentor, listed in the Accreditation section of the AACD Web site. Mentors are examiners who give of their time because they want to help Accreditation candidates to succeed).

Dr. Emil Hawary did a nice job handling Case Type V. Demonstrating a knowledge of smile design principles, Dr. Hawary corrected the midline cant and lengthened the incisors to correct the reverse smile line. This created a pleasing smile line that followed the curvature of the lower lip. The buccal corridor also was addressed by restoring the premolars with more facial volume, to fill the excess negative buccal space.

Candidates sometimes neglect to address a deficient buccal corridor (Accreditation criteria #88), yet it is very easy to handle and will have an extremely positive influence on the smile's appearance. The majority of examiners gave this case the optional bonus of +1 based on the overall appearance in the 1:10 portrait view.

Dr. Hawary was able to achieve a natural-looking polychromatic result with resin. His use of various tints, opaquers, and translucent enamel shades demonstrated an ability to layer composite resin very convincingly.

Examiners did, however, deduct points on this case for visible margins. A major fault in this case was the asymmetry in contours between the central incisors. One examiner gave a minor fault for too much moisture in the photography, while another felt that there was an open contact between #8 and #9.

Saliva should always be blown dry on the retracted photographs. Excess moisture can make the case difficult to grade and, if excessive, points will be deducted.

Although this case did have some faults, it was within the zone of excellence needed to pass. Dr. Hawary is to be congratulated for a job well done. *AF*

