

Smile Enhancement with Direct Composite Veneers: A Clinical Case Report



Gerard J. Lemongello, Jr, DMD Private Practice Palm Beach Gardens, Florida Phone: 561.627.9000 Fax: 561.627.9162 Email: lernerlemongello@aol.com

[QA: Captions were not provided. Captions were taken from the text. Please review captions.]

ne of the most rewarding yet challenging treatments available is the placement of direct resin veneers to enhance a smile. Composite resin offers the esthetic dentist full control of the desired outcome. It can be used to enhance and design a smile and allows artistic expression in the overall smile design. Tooth contours, surface texture, morphology, hue, value, chroma, incisal characteristics, and translucency are all up to the artistry and technical skill of the treating dentist.1 There are a myriad of materials and techniques available to choose from to achieve lifelike results. The resulting blend of artistry and technology can result in a beautiful smile—changing the lives of all those involved in its creation.2



Figure 1—The patient is a 36-year-old woman in excellent health.

CASE STUDY

History

The patient is a 36-year-old woman in excellent health (Figure 1). She presents for consultation unhappy with her smile, especially as it relates to the right and left cuspids. The patient's history includes trauma to the central incisors at age 15 resulting in class IV incisal edge fracture and subsequent restoration with composite. At age 25, she sought a solution to her failing composite restoration and smile enhancement whereby she received six direct composite veneers. After 11 years with the deterioration of her existing composite veneers, the patient's dissatisfaction with her smile became apparent. The patient's upcoming marriage and relocation to Atlanta, Georgia was the final motivation to seek a smile makeover.

Clinical Examination

Clinical examination revealed no hard or soft tissue pathology with all oral structures within normal limits. Temporomandibular joint examination revealed normal healthy joints, range of motion within normal limits, and no sign or symptoms of pathology.3 An examination revealed a history of orthodontic treatment with four bicuspid extractions, resulting in class I occlusion. A hard tissue exam revealed isolated aging amalgam restorations in teeth Nos. 2, 14, and 31. Teeth Nos. 12 and 13 were presented with incipient occlusal decay. It was recommended that the aging amalgams and decay be restored appropri-

ABSTRACT

Dentistry continues to experience the demand for esthetically pleasing restorations. It is sometimes confusing because of the multitude of information available to choose from. The information helps dentist choose what smile enhancing technique and which restorative material to use to fulfill each individual patient's wants and desires. One of the challenges dentists face is to provide esthetic-enhancing treatment that fits each individual patient's needs, expectations, and their budgets. As dentists we need to develop the skills and become comfortable providing smile enhancement with the material that best fits the situation. There is no one material or procedure indicated for all situations. Flexibility in what a dentist can provide is the key. By mastering the art of composite resin for the use of enhancing a smile it allows the artistic expression and manipulation of all the natural characteristics of teeth. When the technique of direct composite veneers has been mastered it opens new doors to mastering all other restorative materials throughout the dentition both in the anterior and the posterior.

LEARNING OBJECTIVES

After reading this article, the reader should be able to:

- Examine and diagnose all aspects of a smile and understand what is necessary to provide esthetic improvement.
- Determine what is required regarding tooth preparation in complex cases to achieve lifelike restorations with composite resin.
- Understand how to layer composite resin to achieve natural esthetics manipulating hue, value, chroma, and translucency.
- Understand how to finish and polish composite achieving natural contours, surface texture, tooth morphology, and incisal characteristics.

ately concurrent with veneer placement or shortly there after. An esthetic examination revealed 3.5 mm of incisal edge display with lip at rest. The full smile revealed visual display of teeth to the first molar (Figures 2 through 4). Lip movement, from rest to full smile, was approximately 8 mm to 10 mm, resulting in gingival display because of lip hypermobility.⁴ The amount of gingival display was not considered

displeasing to both the patient or the author.⁵ The tooth proportion was unnatural, falling outside the accepted range of width to length ratio and golden proportion.^{6,7} The midline was canted to the patient's left with the central and lateral incisors after this inclination (Figures 5 through 7). The contact points, as well as the gingival and incisal embrasures, were altered creating a lack of esthetic balance. Tooth









Figures 2 through 4—A full smile revealed a visual display of teeth to the first molar.







Figures 5 through 7—The midline was canted to the patient's left with the central and lateral.







Figures 8 through 10—Teeth Nos. 7 through 10 revealed aging, worn, discolored, and unesthetic composite veneers.

Nos. 6 and 11 revealed displaced composite veneers exposing previous tooth preparation. The underlying tooth color was low in value and high in yellowbrown chroma. Teeth Nos. 7 through 10 revealed aging, worn, discolored, and unesthetic composite veneers (Figures 8 through 10). The remaining natural tooth structures were healthy with high value enamel characterization. A soft tissue examination revealed healthy periodontal tissues. The patient's oral hygiene was excellent and here gingival display, papillary height, and gingival contours were adequate. The gingival zenith position was altered on teeth Nos. 7 through 10, requiring only minor gingival zenith relocation.

Diagnosis

The unesthetic smile was because of an aging worn inadequate or displaced composite resin veneers with altered tooth proportion, canting, inclination, midline and soft tissue zenith. The recommended treatment plan consisted of an esthetic enhancement with gingival recontouring on teeth Nos. 7 through 10 and direct composite veneer placement on teeth Nos. 5 through 12.

Treatment Plan

The prescribed treatment plan will enhance and improve the patient's smile through restoration of proper tooth and gingival proportions and contours providing a more natural anatomy and morphology. The treatment sequence is as follows:

Complete set of American Academy of Cosmetic Dentistry

- Academy of Cosmetic Dentistry (AACD) [QA: Is this correct?] recommended diagnostic photographic views for study and examination of required changes and enhancements.
- Diagnostic models for analysis of tooth proportions as well as occlusal analysis. Models will also be used to create a diagnostic wax-up and incisal index to guide composite placement, gingival

recontouring and zenith placement teeth Nos. 5 through 12.

- Preparation of teeth Nos. 5 through 12 to correct the midline and provide adequate tooth reduction to place composite resin veneers with proper proportions, contour, emergence profile, and embrasures.
- Direct composite resin veneers to lengthen, align and idealize tooth proportions and contours while controlling color match and tooth characteristics consistent with the natural existing dentition.
- Equilibration and mandibular anterior incisal edge tooth recontouring to balance occlusion and anterior guidance.

Smile Design

The overall smile design was formulated with the patient's input on desired color. The patient was aware of the tooth display to first molar and requested the composite resin veneers blend with her natural dentition. The patient was also

very specific regarding the desire for very white "bleached" teeth, but not monochromatic. With the aid of the preoperative slides and mounted study models, the critical elements in smile design would be color and tooth morphology. A blend of composite to match the first molars and create pleasing, polychromatic teeth would be needed. Correction of the midline, the tooth canting and inclination, and the correction of the length to width ratio and golden proportion to fit the overall facial form would also be needed. The central incisor length was determined by the position of the existing incisal edge position relative to the lower lip.6 A central incisor length of 10.5 mm was chosen. All other tooth proportions would be corrected based on this tooth length and incisal edge position. Corrections to the length width ratio and golden proportions would be made. Gingival zenith correction would be accomplished and use of open, graduating incisal embrasure form and contact points would be used to create a youthful, feminine appearance.3,7 The surface morphology was to be highly characterized to blend with the natural dentition.

Preparation

The patient was anesthetized with 7.2 mL 2% Lidocaine 1:100 epinephrine (AstraZenca Pharmaceuticals LP). Initially teeth Nos. 7 through 10 were prepared with a No. LVS1 0.05-mm depth cut bur (Brasseler USA®) to establish the thickness of the existing composite veneers. This revealed that teeth Nos. 6 through 11 had been previously prepared for placement of the existing composite veneers. This was taken into consideration regarding required preparation depth for the new planned veneers. All composite and tooth structure were then removed to the extent of and in between the depth cut with a No. 6844 016-diamond bur (Brasseler USA®). The preparation reduction was refined and inspected. Teeth Nos. 6 and 11 had been previously prepared for





Figures 11 and 12—The teeth were cleaned with Consepsis® and final inspection was completed.

composite veneers, but the existing composite veneer had been displaced. Teeth Nos. 6 and 11 required minimal additional preparation.

Depth cuts were made on teeth Nos. 5 and 12. The tooth structure was then prepared to and in between the depth cut with a No. 6844 016-diamond bur. Previous preparation of teeth Nos. 6 through 11 did not include any incisal edge preparation. Incisal edge preparation would be required. When the facial preparation of teeth Nos. 5 through 12 was finalized, the incisal edge preparation of 1.5 mm was completed. Evaluation of the prepared teeth revealed the need to prepare interproximally to allow correction of the midline. Initial interproximal reduction was made on the mesial of tooth No. 8 to establish the midline. All other interproximal preparations were based on this new midline. This made it necessary to reduce the distal of teeth Nos. 9 and 10, and the mesial of tooth No. 7 opening the interproximal contact areas bringing the midline to the right.8 The gingival architecture was altered and leveled, and gingival zenith was corrected on teeth Nos. 7 through 10 with the BIOLASE® Twilite Laser (BIOLASE® Technologies, Inc). Minor gingivectomy was performed. When facial, incisal, and interproximal preparation was accomplished, preparation of the margin and finish line was completed. Interproximal elbow preparation was prepared where it was needed to tuck the margin and finish line interproximal to conceal the margin and extend composite into the embrasure. The preparation was guided by the use of a Sil-Tech® putty (Ivoclar Viva-

dent®, Inc) incisal guide stent created from the diagnostic wax-up. 10,11 All sharp angles were smoothed. Extension of the lingual margin of the anterior teeth Nos. 6 through 11 was evaluated to allow for development of cuspid rise and anterior guidance with incisal coupling. 12 The teeth were then cleaned with Consepsis® (Ultradent Products, Inc)

and final inspection was completed (Figures 11 and 12).

Resin Application

Before the adhesive and composite placement, a dry field is required. This was accomplished using the split rubber dam technique (Hygienic Dental Dam, Colténe/Whaledent, Inc).¹³ With isolation complete, the application



of adhesive and composite placement was initiated. Teeth Nos. 8 and 9 were etched with 37% phosphoric acid (Total Etch®, Ivoclar Vivadent®, Inc) for 20 seconds. The teeth were rinsed with water but not dried. Gluma® Desensitizer (Heraeus Kulzer, Inc) was applied to the wet tooth structure as a wetting and desensitizing agent. The

teeth were then dried with a cotton pellet leaving a moist surface. Ha,15 Prime & Bond® NT™ (Dentsply Caulk) was applied by brush with repeated coats until a glossy surface was achieved. The teeth were then air dried with an A-Dec® dryer (A-Dec®, Inc) leaving a uniform glossy surface and it was light-cured for 6 seconds with the Apollo™ Elite curing

light (Dental/Medical Diagnostic Systems).

Composite layering was then initiated starting at the gingival margin. Renamel® microfill (Cosmedent®, Inc) shade A1 was placed, smoothed and light-cured for 9 seconds. Shade B1 Renamel® microfill was added, blending over shade A1 gingivally and extended to the middle



Figure 13—Minor finishing was initiated to establish initial contours to aid in continued composite veneer placement on the remaining teeth.

one third of the tooth. This layer was then light-cured. A layer of Renamel® microfill shade SB1 was layered from the middle one third of the tooth to the incisal edge.16 The lingual contour and mamelons were developed and created with this layer.¹⁷ This layer was shaped using the incisal guide for reference. Renamel® microfill shade T was placed facial and incisal to the developed mamelons creating a zone of translucency. A thin strip of Renamel® microfill shade W (white) was placed at the incisal edge creating a halo.18 Renamel® microfill shade SB3 was contoured facially blending from the layer of composite shade B1 in the middle one third over the mamelons formed by composite shade SB1 and T to the incisal edge blending with the white composite creating the halo. The incisal guide was then removed and a clear Mylar strip (Patterson Dental Supply, Inc) placed interproximally. This strip was used to set the midline. Renamel® microfill shade SB3 was then blended mesially and distally to create the remaining interproximal contour of the teeth. A final thin layer of Renamel® microfill shade T was smoothed over the entire facial surface of both teeth from gingival to incisal, mesial to distal and light-cured for 9 seconds. The final light-cure was achieved with multiply light exposures on all surfaces. Minor finishing was initiated to establish initial contours to aid in continued composite veneer placement on the remaining teeth (Figure 13). Teeth Nos. 7 and 10 were then rinsed and dried to provide a clean surface to begin composite placement.



Figure 14—Composite layering with Renamel® microfill was initiated and completed to match teeth Nos. 8 and 9, with the blending of shade A1, B1, SB1, T, W, and SB3.

Teeth Nos. 7 and 10 were etched, rinsed, wet, desensitized, primed, and light-cured as described for teeth Nos. 8 and 9. Composite layering with Renamel® microfill was initiated and completed to match teeth Nos. 8 and 9, with the blending of shade A1, B1, SB1, T, W and SB3 (Figure 14). Teeth Nos. 5 and 6 were then treated with the same steps, sequence, and materials as described. Finally teeth Nos. 11 and 12 were treated. Application of the final layer of Renamel® composite on teeth Nos. 5 through 12 was now complete, leaving the teeth over contoured in preparation for final finishing, contouring, and polishing.

Finishing

Finishing was accomplished when all the veneers were completed. The first step in the finishing process was to achieve rough anatomical form. Contouring was initiated interproximally using a 7901 carbide bur (Dentsply Professional) on all teeth to develop tooth proportions. The gingival margins and gingival one third of each tooth was contoured with the 7901 carbide bur developing gingival embrasure form. When the gingival form was complete, the interproximal and incisal embrasures were contoured with the 7901 carbide bur each time refining the anatomical shape to mimic natural tooth morphology. Mesial and distal line angles on teeth Nos. 8 and 9 were completed to mirror each other. Similar contouring was achieved on the facial surface creating convexities and concavities. The lateral incisors, cuspids, and bicuspids were then shaped to reflect natural anatomic form and morphology. Artistic and subtle differences were created to make the end result more lifelike and natural all in concert with how they relate to facial form and the overall smile.¹

On completion of creating tooth contour and anatomy, the

teeth were initially polished to a matt finish with the Enhance® Polishing and Finishing System (Dentsply Caulk). The teeth were then further polished using FlexiCups™, FlexiPoints™, and FlexiDiscs™ (Cosmedent®, Inc) to a smooth luster. Further polishing was achieved with Enamelize™ (Cosmedent®, Inc) and soft rub-

ber cups. The interproximal surfaces were polished with Flexi-Strips[™] (Cosmedent[®], Inc). The teeth were then inspected for uniformity of polish. Satisfied with anatomy and contours, the final texture was achieved using light and intermittent contact of a course diamond on the facial surfaces of the teeth in a skid-















Figures 15 through 21—The patient scheduled for the final evaluation in 30 days when she would be returning for the last time.

ding motion. 18,19 This technique interrupts the surface polish in a random pattern scattering light as it strikes the surface. When the texture has been added the final polish is achieved with extensive polishing at a high a rpm with a slow speed headpiece using FlexiBuff™ discs (Cos-

medent[®], Inc) and Enamelize[™]. The occlusion was evaluated using AccuFilm[®] II (Parkell, Inc) articulating paper. The desired canine rise and anterior guidance with coupling of the incisors was achieved.¹²

Equilibration of the mandibular anterior teeth was necessary, as expected to achieve the final occlusal balance. The patient was scheduled to return in 1 week for evaluation before her relocation. The patient returned and the healing progress and composite veneers were inspected. It was determined that a slight modification of translucent zones on teeth Nos. 8 and 9 would be altered and the gingival margins of teeth Nos. 8 through 10 required modification and additional polishing. Tooth No. 10 required additional interproximal finishing with polishing strips. Treatment was completed and the teeth polished as before. A full set of AACD study photographs were exposed even though some inflammation from polishing and manipulation was present. The patient scheduled for the final evaluation in 30 days when she would be returning for the last time (Figures 15 through 21).

Conclusion

The patient was very happy with the result of her new composite veneers. The new smile makeover was an improvement that would help mold her new life in Atlanta and allow her the smile she dreamed of at her upcoming wedding. The patient was unable to return from Atlanta for her final evaluation and photographs to reflect 30 days of healing. Even though this author was unable to see this case mature beyond the final

photographs presented here, this author feels it portrays the insight and artistry of natural anatomical form, contour, morphology and texture needed to exhibit a natural blend to the existing dentition and skill required to achieve success with direct composite veneers.

REFERENCES

- Dietschi D, Dietschi JM. Current developments in composite materials and techniques. *Pract Periodontics Aesthet Dent.* 1996;8:603-613.
- Dietschi D. Free-hand bonding in the esthetic treatment of anterior teeth: creating the illusion. J Esthet Dent. 1997;9:156-164.
- Dawson PE. Evaluation, Diagnosis and Treatment of Occlusal Problems. 2nd ed: St. Louis, MO: CV Mosby; 1989:92-106.
- Spear F. State of the Art Esthetics. Seattle Institute for Advanced Dental Education; Orlando, FL: January 2001.
- Kokich VO Jr, Kiyak HA, Shapiro PA. Comparing the perception of dentists and lay people to altered dental esthetics. J Esthet Dent. 1999;11:311-324.
- Chiche GJ, Pinault A. Esthetics of Anterior Fixed Prosthodontics. Carol Stream, IL: Quintessence Publishing Co; 1994.
- 7. Rufenacht CR. *Fundamentals of Esthetics*. Chicago, IL: Quintessence Publishing Co; 1990.
- 8. Rosenthal L. Orthodontic veneering and the cosmetic smile-lift. *Dent Econ.* 1993;12:76-77.
- Rosenthal L. The state of the art in advanced porcelain veneering: Part 2. Esthetic Dentistry Update. 1991:2:96-101.
- Terry D. Direct reconstruction of the maxillary anterior dentition with composite resin: a case report. *Pract Periodontics Aesthet Dent.* 1999;11:361–367.
- Dietschi, D. Free-hand composite restorations: a key to anterior aesthetics. *Pract Periodontics Aesthet Dent.* 1999;11:361-367.
- Spear F. Occlusion in Clinical Practice. Seattle Institute for Advanced Dental Education; Orlando, FL: October 2001.
- Rosenthal L. Syllabus for the Aesthetic Advantage Continuum. Paper presented at: Postgraduate seminar at the Atlantic Coast Research Clinic: March 1998; West Palm Beach, FL.
- Kanca J 3rd. Improving bond strength through acid etching of dentin and bonding to a wet surface. *J Am Dent Assoc.* 1992;123:35-42.
- 15. Kanca J 3rd. Resin bonding to a wet substrate: bonding to dentin. *Quintesscence Int.* 1992;23:39-41.
- Magne P, Holz J. Stratification of composite restorations: systematic and durable replication of natural aesthetics. *Pract Periodontics Aesthet Dent.* 1996; 8:61-68.
- Fahl N Jr, Denehy GE, Jackson RD. Protocol for predictable restoration of anterior teeth with composite resins. *Pract Periodontics Aesthet Dent*. 1995;7:13-21
- Fahl N Jr. Ultimate aesthetics with composites: when art and science merge. *Dent Today*. 1999;18:56-61.
- Croll TP. Simulating irregular enamel surface texture in composite resin restorations. *Quintesscence Int*.1998;19:311-312.

ONTINUING





INSTRUCTIONS

Contemporary Esthetics offers 12 Continuing Education (CE) credit hours per year. Each clinical CE article is followed by a 10-question, multiplechoice test, providing 1 hour of credit. To receive credit, record your answers on the enclosed answer sheet or submit them on a separate piece of paper. You may also phone your answers in to (888) 596-4605, or fax them to (703) 404-1801. Be sure to include your name, address, phone number, social security number, and method of payment. The deadline for submission of quizzes is 12 months after the date of publication. Participants must attain a score of 70% on each quiz to receive credit. To register, call (888) 596-4605. Participants are urged to contact their state registry boards for special CE requirements.

- 1. Which of the following are up to the artistry and technical skill of the treating dentist?
 - a. Tooth contours and surface texture
 - b. Morphology, hue, and value
 - Chroma, incisal characteristics, and translucency
 - d. All of the above
- 2. In this case, the full smile revealed visual display of teeth to the:
 - a. First bicuspid
 - b. Second bicuspid
 - c. First molar
 - d. Second molar
- 3. The treatment plan included diagnostic models for:
 - a. Analysis of tooth proportions
 - b. Occlusal analysis
 - c. Creating a diagnostic wax-up and incisal index
 - d. All of the above
- 4. The central incisor length was determined by the position of existing incisal edge position relative to the:
 - a. Lower cuspids
 - b. Lower lip
 - c. Lower central incisors
 - d. Tongue at rest

- 5. When the facial preparation of teeth Nos. 5 through 12 was finalized, the incisal edge preparation of how much was completed?
 - a. 0.5 mm
 - b. 1 mm
 - c. 1.5 mm
 - d. 2 mm
- 6. What type of preparation was prepared where it needed to tuck the margin and finish line interproximal?
 - a. Chamfer
 - b. Bevel
 - c. Butt joint
 - d. Interproximal elbow
- 7. Composite layering was then initiated starting at the:
 - a. Mesial margin
 - b. Distal margin
 - c. Incisal margin
 - d. Gingival margin
- 8. A clear Mylar strip placed interproximally was used to:
 - a. Reflect light
 - b. Set the midline
 - c. Concentrate light
 - d. View both teeth simultaneously
- 9. The first step in the finishing process was to achieve:
 - a. The gingival margin
 - The gingival embrasure
 - Rough anatomical form
 - d. Mesial and distal line angles
- 10. The final texture was achieved using light and intermittent contact of a course diamond on the facial surface of the teeth:
 - a. On the incisal edge
 - b. In a skidding motion
 - c. On the gingival margin
 - d. On the lingual contact point

Product References

Products: 7.2 mL 2%Lidocaine 1:100 epinephrine

Manufacturer: AstraZenca Pharmaceuticals LP Address: 1800 Concord Pike
Wilmington, Delaware 19850
Phone: 800.237.8898 Address:

Products: Sil-Tech®, Total Etch® Ivoclar Vivadent®, Inc 175 Pineview Drive Amherst, New York 14228 Phone: 800 533 6825 Fax: 716.691.2285

Product: A-Dec® dryer Manufacturer: A-Dec®, Inc Address: 2601 Crestview Drive Newberg, Oregon 97132 Phone: 800.547.1883

Fax: 503.538.0276

Products: No. LVS1 0.05-mm depth cut bur. No. 6844 016 diamond but Manufacturer: Brasseler USA® Address: 1 Brasseler Boulevard Savannah, Georgia 31419 Phone: 800.841.4522
Fax: 888.610.1937

Products: Hygienic Dental Dam lufacturer: Coltène/Whaledent®, Inc Address: 750 Corporate Drive Mahwah, New Jersey 07430

Phone: 201.512.8000 Fax: 201.529.2103 Product: Gluma® Desensitizer

ufacturer: Heraeus Kulzer, Inc Address: 99 Business Park Drive Armonk, New York 10504 Phone: 800.431.1785 Fax: 914.273.9379

Products: Prime & Bond® NT™. Enhance®

Finishing and Polishing System

Manufacturer: Dentsply Caulk Address: 38 West Clarke Avenue Milford, Delaware 19963 Phone: 800.LDCAULK

Fax: 800.788.4110

Renamel® microfill composite,

FlexiCups™ and Points, FlexiDiscs™, FlexiBuff™ discs, Enamelize™, FlexiStrips™ Cosmedent®, Inc Manufacturer:

Address: 401 North Michigan Avenue Suite 250 Chicago, Illinois 60611 800.621.6729

Product: Clear Mylar strips
Manufacturer: Patterson Dental Supply Company
Address: 1031 Mendita Heights Road
St. Paul, Minnesota 55120

800.328.5536 651.686.9331

Apollo™ Elite curing light Dental/Medical Diagnostic **Product:** Manufacturer:

Systems 6416 Variel Avenue

Woodland Hills, California 91367 800.399.0999 Fax: 818.595.0226

Product: No. 7901 carbide finishing bur Dentsply Professional 1301 Smile Way ufacturer: Address:

York, Pennsylvania 17404 800 989 8826 Fax: 800.842.9024

Product: Consensis® Manufacturer: Address: Ultradent Products, Inc 505 West, 10200 South South Jordan, Utah 84095 800.496.8337

800.842.9024

Product: BIOLASE® Twilite Laser Address: 981 Calle Amanecer San Clemente, California 92673

888 424 6527 Fax: 949.361.4394

Product: AccuFilm® II ufacturer: Parkell, Inc Address: 155 Schmitt Boulevard

Farmingdale, New York 11735

hone: 800.243.7446 Fax: 631.249.1242