Stress-Free Direct Composite Veneers

A Peer-Reviewed Publication
Written by Ian Shuman DDS, MAGD, AFAAID

Abstract
Direct composite veneers serve as one method for restoring anterior teeth. However, many dentists shy away from this procedure due to a lack of innate artistic talent, lack of experience, past failures, and the length of time needed to complete the procedure. As a result, they opt for laboratory-fabricated alternatives. This course will demonstrate the steps required to create direct composite veneers in a highly simplified manner.

Educational Objectives
The focus of this clinical study will provide the dental professional with the steps needed to create direct composite veneers in a highly simplified manner. After reading this article, the reader should be able to:
1. Understand the properties of esthetic composite resin
2. Know the technique differences between direct and indirect veneers
3. Refer to the history of direct composite veneers
4. Have the ability to restore anterior teeth in a rapid manner using the materials outlined with the steps discussed

Author Profile
Ian Shuman DDS, MAGD, AFAAID maintains a full-time general, reconstructive, and aesthetic dental practice in Pasadena, Maryland. Since 1995 Dr. Shuman has lectured and published on advanced, minimally invasive techniques. He has taught these procedures to thousands of dentists and developed many of the methods. Dr. Shuman has published numerous articles on topics including adhesive resin dentistry, minimally invasive restorative, cosmetic and implant dentistry. He is a Master of the Academy of General Dentistry, an Associate Fellow of the American Academy of Implant Dentistry, a Fellow of the Pierre Fauchard Academy. Dr. Shuman was named one of the Top Clinicians in Continuing Education since 2005, by Dentistry Today.

Author Disclosure
Dr. Shuman has no commercial ties with the sponsors or the providers of the unrestricted educational grant for this course.
Educational Objectives
The focus of this clinical study will provide the dental professional with the steps needed to create direct composite veneers in a highly simplified manner. After reading this article, the reader should be able to:
1. Understand the properties of esthetic composite resin
2. Know the technique differences between direct and indirect veneers
3. Refer to the history of direct composite veneers
4. Have the ability to restore anterior teeth in a rapid manner using the materials outlined with the steps discussed

Abstract
Direct composite veneers serve as one method for restoring anterior teeth. However, many dentists shy away from this procedure due to a lack of innate artistic talent, lack of experience, past failures, and the length of time needed to complete the procedure. As a result, they opt for laboratory-fabricated alternatives. This course will demonstrate the steps required to fabricate direct composite veneers in a highly simplified manner using veneer templates and microhybrid composite resin.

Introduction
Veneers are created for patients based on a multitude of needs. They may be required to esthetically correct misalignment, form, color, and spacing issues of anterior teeth. They may also be necessary to restore carious lesions. Regardless of need, veneers can be fabricated as indirect restorations using porcelain or composite resin, or as direct restorations using composite resin. With the direct method, the restorative material must be placed and completed in one appointment. The final result depends entirely on the proficiency and artistry of the dentist. However, the length of time needed to perform this treatment, and the difficulty of this technique has limited this to those talented few with the proper abilities. This alone is why many in our profession may choose or prefer using indirect restorations. However, new resin restorative materials and preformed veneer templates has opened this treatment modality to any dentist regardless of skill level or artistic ability.

Discussion
Direct composite veneers are one option for veneering teeth and for more than 60 years, the science and application of direct composite resin has grown and matured. The application of composite resin has progressed into a high-level service demonstrating excellent results, especially in vital teeth.

The reasons for choosing this treatment method can be many and varied. They include correction for esthetic concerns, attrition and erosion, abstraction, fractures, caries, diastemases, restoring proximal contact, occlusal discrepancies, the desire for a minimally invasive approach, and the financial limitations of the patient. Also of significant benefit is their use in medically compromised patients who display dental anomalies as secondary signs of conditions such as fluorosis, and amelogenesis imperfecta.

When compared to porcelain, research has shown that direct composite holds up just as well. In a study by Rosentritt et al., toothbrush abrasion and in vitro aging on ceramic (direct technique) and composite veneers (direct technique) were investigated. A five-year period of oral service was simulated by thermal cycling and mechanical loading. The results showed that all materials revealed comparable wear resistance, failure rates, and satisfying longevity.

Methods
In the past, direct composite veneers have been created using a whole host of materials and techniques. In 1976, Faunce and Myers reported the “no-tooth-reduction” method of direct resin veneers using cold cure bonding materials (Concise, 3M and Adaptic, Johnson & Johnson) polymerized with the Nuva-Lite System (Dentsply/Caulk). More than a decade later, Larson and Phair reviewed the methods to duplicate the intricate color distribution and surface texture of natural tooth structure using a direct bonded, microfilled composite resin veneer. With time, this technique was improved using opacifiers and tints, streamlined with preformed transparent acrylic resin matrices, and unique free-hand methods. In addition, other materials and procedures were introduced as a direct attempt to enhance the efficiency of these techniques.

The “Indirect-Direct” application of preformed acrylic laminate veneers with bonded composite resin was attempted (Mastique Laminate Veneers, DeTrey, Dentsply) with disappointing results. In a study by Hofding, these plastic veneers were evaluated over four- and 10-year periods. It was found that these laminates detached from the tooth surface due to poor bond chemistries, demonstrated a low resistance to abrasion, marginal leakage, and discoloration. Iterations of this concept were developed including thin pre-polymerized hybrid composite shells (Componeer System, Coltene, Altstätten, Switzerland), and most recently laser sintered thermally tempered composite veneers (Edelweiss, Ultradent) that are demonstrating great promise.

Other attempts have been made to speed the process of direct resin veneers. One such concept was the use of preformed, clear mylar matrices in the shape of veneers with attached interproximal strips in a variety of sizes. Another, the “Split-Splint” technique, involved sending the lab an impression of the existing dentition. A stone model was made on which two vacuform shells were made. The soft shell was perforated on the mid-facial for each tooth to be veneered. These holes accommodated the tip of composite compules. Interproximal slits were made to allow clear matrices to be used.
required. The rigid shell helped maintain the final form prior to curing. Regardless of technique, success or failure is often dependent on the material used to achieve the end goal.

**Materials: Direct composite resin**

The ideal direct veneering composite resin should have very specific properties. In an article by Vanini on “Light and color in anterior composite restorations,” “specific diagnostic techniques were presented to establish predictable identification and reproduction of the natural anatomy and nuance color characteristics exhibited by natural dentition with composite resin. Of great importance is the interaction between light and the hard tissues of the tooth as compared to the interaction between light and composite restorative materials. Based on the philosophy of color interpretation and its subsequent practical application in the development of a fluorescent and opalescent microhybrid composite system, the protocol outlined allows the clinician to achieve restorations with a light/composite interaction that closely resembles that of light/natural dentition. A detailed evaluation of hue, chroma, opalescence, and fluorescence are presented in order to simplify the composite stratification technique.”

With this understanding, direct composite resin should fluoresce and bear opalescent qualities of natural tooth structure, especially since patients are seen under various lighting conditions. It should have low-translucent, high-fluorescent dentin shades, combined with highly translucent/opalescent enamel shades to facilitate the superior reproduction of natural teeth. It should be sculptable with enough body to prevent slumping and easy to polish offering a high luster. A beautiful match to either stock or custom shade guides is a must, and the system should be available in many shades. A high radiopacity is necessary to distinguish the restoration from both tooth structure and future caries. In addition, the composite should have a regular or average filler particle size to avoid pitting during finishing and polishing and continue providing a high polish during its lifetime.

Microhybrid composite resins have been one of the preferred materials for direct veneering. They have the ability to retain a high polish similar to microfills, with the strength of hybrid resin. In this report, one such microhybrid, (Vit-l-escence, Ultradent) has demonstrated these qualities. In a study by Ribeiro et al., one nanofill and three microhybrid resins were evaluated for degree of conversion after curing using second- and third-generation curing lights with Vit-l-escence having the highest conversion.

Santini et al. substantiated this finding in an alternate study. His group also found this composite to have a higher degree of Knoop hardness when compared to other resin-based composites containing trimethylbenzoyl-diphenylphosphine oxide. In August of 2013, a study by Albuquerque et al. evaluated the color stability and integrity of composite resins by using photoinitiator systems derived from phosphine oxides as an alternative to the traditional camphorquinone (CQ)/amine photoinitiator system. It was concluded that the use of a photoinitiator system containing phosphine oxides might improve the color stability of resin composites compared with the traditional CQ/amine system while attaining similar physicochemical properties for the composite.

The long-term maintenance of the surface quality of materials is fundamental to improving the longevity of esthetic restorations. Of great significance is the lifespan of these materials, including strength, color stability, and polish, among others. In addition, having an average particle filler size of 0.7 µm offers the ability to impart a high polish and luster typically seen in finer microfill resins.

**Materials: Direct composite template**

Following in the tradition of simplified direct anterior veneers, a system has been created to ease the difficulty and shorten the time needed for the process. A kit of 32 autoclavable, translucent templates in two universal sizes that mimic the precise anatomic facial contour of upper and lower teeth, including and between the second premolars (Uveneer, Ultradent, Utah). The templates can be used with any preferred composite material, producing consistent, predictable, beautiful results with regard to final tooth shape, shine, and smile design.

Following tooth preparation and routine adhesive bonding techniques, composite resin is applied to the entire restorable surface and the template is then pressed onto the composite. Once excess material has been removed and the interproximal areas adequately separated and contoured, the composite is light cured through the template. With a nonstick surface, the template is removed leaving a high-gloss finish. The template prevents the oxygen inhibition layer during curing, resulting in a hard, glossy surface.

A study by Attar evaluated the effect of various finishing and polishing procedures on the surface roughness of six different composite resin materials. It revealed that the smoothest surfaces were recorded for the resin-coated and Mylar strip-formed surface groups. This was confirmed in a separate in vitro study by Uçtaşli et al. by examining the effect of two different finishing systems and mylar matrices on the surface roughness of different types of composite restorative materials. The Mylar matrix strip provided a smoother surface than the discs.

The Uveneer system offers several distinct advantages. At its most basic, there is an economy of material and time: The template dictates the amount of composite resin needed per tooth, preventing waste and thereby avoiding the overbuilding/cut-back process. Also, because of the variants in template contour, a greater amount of composite is imparted in the midfacial and less as the restoration progresses toward the inciso-gingivo-facial aspects. In an article by Lowe, this idea was described as follows: “... this varied thickness of material creates different effects and values and, as a result, only one shade of composite is needed in many cases to get a natural gradient.
effect, obviating the need to use different shades using a layering technique.”

Applications
In addition to direct composite veneers, preformed universal templates offer other benefits in clinical practice:
• Is easy to use
• Can enhance clinic productivity significantly
• Saves time—no need to spend time and effort on carving and polishing
• Requires minimal preparation
• Is cost effective

When to use Uveneer:
• For all direct composite veneer restorations, for one or multiple teeth, to correct diastemas, fractures, abrasions, discolored or mispositioned teeth, caries restoration, and other esthetic corrections
• For the creation of temporary veneers between appointments while porcelain veneers are being made in the lab
• For direct chairside mock-ups before conducting the procedure
• Class V, and full veneer coverage from one tooth up to 10 teeth per arch, from central incisor to second bicuspid
• Cosmetic preview mock-up and shade selection
• Laboratory model wax-up

Case report
The patient, a 23-year-old female, presented for a routine prophylaxis and exam. Due to a history of allergy induced mouth-breathing and medication induced xerostomia, the desiccated anterior teeth had multiple carious lesions. (figure 1) In addition, the teeth were malpositioned and the marginal tissue inflamed. Following a smile evaluation, it was explained to the patient that her wide smile allowed visibility of the posterior teeth bilaterally. It was agreed that composite veneers would be placed from the right to left upper second premolars. Following local anesthesia, the gingival tissue was sculpted to create symmetry. A false pocket caused by lingual malposition of the upper left lateral incisor was probed. (figure 2) The pocket was measured prior to the gingivoplasty to ensure that the biologic width was not violated. The tissue was then plastied using a diode laser (figure 3).

Figure 2.

Following the removal of the carious lesions, and mylar strips and/or teflon tape was inserted between the teeth. The preparations were then etched, rinsed and dried. A fifth generation bonding agent was applied and cured. A flowable composite was used to restore these small, irregular areas. (figure 4) Next, the appropriate Uveneer templates were selected from the kit and tried against the teeth. (figure 5) A B1 shade composite was selected and applied to the entire surface of the upper right central incisor. The central line on the Uveneer template was aligned with the long axis of the tooth, and gently pressed. (figure 6) Excess composite was removed from around the edges of the veneer to reduce the need for trimming after curing. The composite was then cured through the Uveneer template. The template was removed by gently lifting on the handle. Additional excess resin was removed from the margins of the veneer. The remaining teeth were restored in the same manner (figure 7) and the direct composite veneers were polished as needed. One week later, the soft tissues appeared healed and healthy (figure 8) and the patient was placed on four month recare.

Figure 1.

Figure 3.
Conclusion

It is now possible for any dentist to consistently and cost effectively create composite veneers that are predictable in final tooth shape and symmetry. The Uveneer system has eliminated those barriers so that virtually any practitioner can now accomplish this in a short amount of time, with the results being a beautifully designed direct composite veneer case. Unlike prefabricated veneer systems, with Uveneer, dentists use their own composite and can also use layering techniques. The Uveneer system removes several shortcomings of prefabricated systems including thickness, sizing and shade restrictions, cost, and stock holding. It’s so easy, dentists can incorporate more direct composite veneer work into their schedule, creating a real opportunity to increase practice income. Now, dentists can give patients the option of composite veneers without hesitation. Uveneer is a kit system that can be used to create final provisional veneer restorations for one or multiple teeth, correct diastemas, fractures, abrasions, discolored or malpositioned teeth, caries restoration intraoral mock-ups, study model correction, communication with the lab technician or orthodontist, and any other situation when a rapid, beautifully formed composite facing is needed. The technique demonstrated in this case report is simple, reliable, and repeatable.

References

11. Machado AN, Coelho-de-Souza FH, Rolla JN, Erhardt MG, Demarco FF. Direct or indirect composite veneers in anterior...
12. LeBlanc B. Creating financial treatment options with minimally invasive composite techniques. Dental Econ. 98(7).
Questions

1. Many dentists shy away from doing direct composite veneers due to which of the following:
   a. Lack of innate artistic talent
   b. Lack of experience
   c. The length of time needed to complete the procedure
   d. All of the above

2. Veneers may be required for all of the following except:
   a. Esthetic correction of existing proper alignment
   b. Form
   c. Color
   d. Spacing

3. In a study by Coelho-de-Souza et al., the application of composite resin has progressed into a high-level service demonstrating excellent results, especially in:
   a. Primary teeth
   b. Nonvital teeth
   c. Vital teeth
   d. None of the above

4. The reasons for choosing direct composite veneer for veneering includes:
   a. Occlusal discrepancies
   b. Highly invasive approach
   c. Attrition and erosion
   d. a and c

5. The reasons for choosing direct composite veneer include all but which of the following:
   a. Abfraction
   b. Fractures
   c. Opening proximal contacts
   d. Caries

6. Which of the following dental anomalies can benefit from direct composite resin veneers:
   a. Fluorosis
   b. Amelogenesis imperfecta
   c. a and b
   d. Meniere’s disease

7. Who conducted a study evaluating toothbrush abrasion and in vitro aging on ceramic and direct composite veneers:
   a. Rosentritt
   b. Robin
   c. Maurice
   d. Barry

8. Direct composite resin should be sculptable with enough body to prevent:
   a. Slumping
   b. Premature curing
   c. Dulling
   d. None of the above

9. In regard to radiographs, direct composite should exhibit a high radiopacity to distinguish the restoration from:
   a. Periodontal ligament
   b. Tooth structure and caries
   c. Alveolar bone
   d. Subgingival restorations

10. Direct composite resin should have:
    a. Lines of demarcation
    b. A nitrogen inhibition layer
    c. High-translucent, low-fluorescent dentin shades
    d. Low-translucent, high-fluorescent dentin shades

11. Which of the following evaluated the color stability and integrity of composite resins by using photoinitiator systems derived from phosphine oxides:
    a. Ansari
    b. Gaffigan
    c. Schumer
    d. Albuquerque

12. In a study by Ribeiro et al., which microhybrid resin exhibited the highest degree of conversion:
    a. Vit-l-escence
    b. Thermostet
    c. ResiRet
    d. Hybridize

13. Uveneer can be used for all except which of the following:
    a. Direct composite veneer restorations
    b. Cosmetic mock-up
    c. Temporary veneers
    d. Lingual ramps

14. Which of the following composite resin types has been one of the preferred materials for direct veneering:
    a. Microhybrid
    b. Macrofill
    c. Macrohybrid
    d. None of the above

15. Who confirmed that the Mylar matrix strip provided a smoother surface than discs:
    a. McLaren
    b. Bugatti
    c. Koenigsegg
    d. Ustašić

16. Who reported the “no-tooth-reduction” method of direct resin veneers using cold cure bonding materials:
    a. Parker and Barrow
    b. Martin and Lewis
    c. Faunce and Myers
    d. Hale and Denver

17. What feature is necessary to distinguish the restoration from both tooth structure and future caries:
    a. Nano particles
    b. High radiopacity
    c. Carbon fibrils
    d. Bioluminescence

18. What is the correct sequence of treatment when using the Uveneer template:
    a. Tooth preparation — adhesive bonding — composite applied — template seating — cure
    b. Tooth preparation — adhesive bonding — composite applied — template seat and remove — cure
    c. Tooth preparation — adhesive bonding — template seating — composite applied — cure
    d. Template seating — tooth preparation — adhesive bonding — composite applied — cure

19. Which one of the following is not a preformed laminate veneer:
    a. Edelweiss
    b. Compoener
    c. Mastique
    d. Ridgway

20. Which of the following are universally sized autoclavable translucent templates discussed in this article:
    a. Uveneer
    b. Mastique
    c. Split-Splint
    d. Mylarforms

21. In the case presented, caries of the anterior teeth was due to:
    a. Home care
    b. Amelogenesis Imperfecta
    c. Xerostomia
    d. None of the above
22. The upper left lateral incisor was probed prior to the gingivoplasty to ensure that which of the following was not violated
   a. C Factor
   b. biologic width
   c. mucogingival juncti
   d. b and c

23. In the case presented, a gingivoplasty was performed using a:
   a. scalpel
   b. diamond bur
   c. a and d
   d. diode laser

24. Following the removal of the carious lesions, what was inserted between the teeth.
   a. mylar strips
   b. teflon tape
   c. stainless steel matrix
   d. a and b

25. Prior to curing, what must be aligned on the UVeneer template
   a. the central vertical line
   b. the central horizontal line
   c. the intercuspid line
   d. none of the above

26. The template is removed after curing by
   a. breaking it loose with a scalpel blade
   b. using a carbide bur
   c. pulling on the handle
   d. tapping

27. In the case presented, recare was scheduled every
   a. 3 months
   b. 4 months
   c. 6 months
   d. 9 months

28. At its most basic, using preformed composite veneer templates offers an economy of
   a. material
   b. salary
   c. time
   d. a and c

29. Which of the following dictates the amount of composite resin needed per tooth preventing waste
   a. interproximal matrix
   b. template
   c. prep
   d. all of the above

30. A greater amount of composite is imparted in the mid-facial and less as the restoration progresses toward the inciso/gingivo-facial aspects because of the variants in template,
   a. contour
   b. handle angulation
   c. pressure
   d. none of the above
Stress-Free Direct Composite Veneers

Educational Objectives

1. Review the options for the rehabilitation of the edentulous patient
2. Review the indications/contraindications of implant-related treatment options
3. Evaluate advantages/disadvantages of fixed vs. removable implant options
4. Become familiar with the All-on-4 treatment concept

Course Evaluation

1. Were the individual course objectives met?
Objective #1: Yes No Objective #2: Yes No

2. To what extent were the course objectives accomplished overall?
   5 4 3 2 1
3. Please rate your personal mastery of the course objectives
   5 4 3 2 1
4. How would you rate the objectives and educational methods?
   5 4 3 2 1
5. How do you rate the author's grasp of the topic?
   5 4 3 2 1
6. Please rate the instructor's effectiveness.
   5 4 3 2 1
7. Was the overall administration of the course effective?
   5 4 3 2 1
8. Please rate the usefulness and clinical applicability of this course.
   5 4 3 2 1
9. Please rate the usefulness of the supplemental webliography.
   5 4 3 2 1
10. Do you feel that the references were adequate? Yes No
11. Would you participate in a similar program on a different topic? Yes No
12. If any of the continuing education questions were unclear or ambiguous, please list them.

PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.