

# Direct Bonded Composite Veneers for the Artistically Challenged Dentist

## By Martin B. Goldstein DMD

You're not alone. While many a gifted dentist is capable of producing crown preps and endodontic fills deserving of admiration from their peers, the same DDS may very well shudder at the thought of sculpting six or eight composite veneers from scratch. In fact, the application of direct composite veneers is considered by some to be the pinnacle of dental artistry in that the practitioner cannot lean on the skills of an artistic laboratory counterpart. A harkening back to the days of Dental Anatomy 101, that found us slinging wax on stone and hoping for results that met the approval of our mentors, occurs when faced with the prospect of same day cosmetic rehabs. (As I've taken to calling them) The case and technique that follows materialized for two reasons: the first, a desire to produce an attractive result in less time than usual, thus controlling cost, and the second, a desire to resurrect direct composite veneering as a viable option for those dentists that fit the description above.



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Those of us old enough to have practiced in the late 70's and early 80's will recall Caulk's Nuva Light and even Nu-vafill. You will also recollect such pioneers as Dr. Irwin Smigel who employed the then new technology to plant the seeds of what has grown into the enormous field of dental cosmetics. Direct bonding became the first and only conservative method to offer youthful dental cosmetics to (are you ready for this?) THE PARENTS OF THE BABY BOOMERS. While many a practitioner scoffed at such a "wonton and self serving" waste of dental skills, the ball had been set in motion. Conservative (i.e. minimally invasive) cosmetics had arrived and those with the eye and hands to produce it and who were unencumbered by the then questioned "ethics" of such dentistry, were off and running.

To be sure, then, as well as now, the barrier to participating in this particular area of dentistry is and was the practitioner's inability or lack of confidence to produce an attractive case. Moreover, the advent of the porcelain veneer, also occurring in the early 80's, brought about cosmetics for one and all, again relegating the conservative creation of new smiles to our trusty ceramists.

Make no mistake! The advent of porcelain veneer cosmetics should be considered a milestone as far as the delivery of healthy, youthful looking smiles is concerned. I for one am delighted when a patient is not only a good candidate for such treatment but is actually able to afford to have it done. Therein lay the problem. Eight and ten tooth ceramic makeovers simply aren't in the budget for many who would benefit by it. Moreover, there are other circumstances, such as in the case to follow, when a more serviceable option is desirable owing to anticipated gingival maturation and or youthful wear and tear.

### Things Have Changed

Modern day composites come in many flavors. We prefer the hybrids for their strength but wish for more polishability. Current day hybrids combine the super-small fumed silica particles (0.04 micron) found in microfills with an array of larger glass particles that vary in average size from 0.1 to 1 $\mu$ m. Most are 70 to 80 % filled by weight.

One such hybrid, Caulk Dentsply's, Spectrum TPH was used to construct the case featured in this article. While not capable of the luster of my usual favorite, Parkell's EPIC-TMPT (a unique microfill exhibiting considerable wear resistance for a material in its class), TPH's track record of fracture resistance coupled with appealing esthetics, made it the composite of choice for the case to follow.

Microfills on the other hand are less filled; generally 30-50% inorganically filled by weight. And the fumed silica filler particles are much smaller, averaging just 0.05 micron or less. That's actually smaller than a wavelength of light. Microfills handle more easily and owing to their superior optical qualities and higher translucency, they readily lend themselves to esthetic creativity.

Yet another and exceptionally promising class of composite is the so-called mini-hybrid that utilizes a specialized class of glass fillers that range from .4 to .8  $\mu$ m but are filled 70 to 80% by weight. Products in this class such as Dentsply

Caulk's EsthetX are said to possess the strength of a conventional hybrid yet provide a more lustrous finish and more pleasing optical qualities owing to their smaller particle size. As will be noted in the case discussed, EsthetX has an additional quality of "extreme shape stability" prior to curing. That is to say, much like modeling clay, you can place it in a multitude of configurations, walk away to enjoy a cup of coffee or take a phone call, and return to find it pretty much as you left it. It will not flow into an amorphous mass. This unique quality lends itself to direct bonded veneers done conventionally but prohibits its sole use for the technique that will follow. Still, as you will see, I do employ EsthetX as part of the system early on in the veneer placement.

The point? If our profession steps back for an analytical look at itself, it's apparent that today's direct restorative dentistry is all about composite resin materials. The American reward system has provided good reason for the dental manufacturing industry to continue to upgrade and improve the materials that we use to restore teeth. Today's composites are a far cry from those available in the 70's and 80's exhibiting esthetic possibilities that are remarkable. So doesn't it make sense to expand our repertoire and look for ways to employ it creatively? In that vein, let's take a look at how a fourteen year old boy, Kyle, regained his smile.

**CASE PRESENTATION:**

Kyle was referred to me by his pedodontist, Dr. Steve Fox of Cheshire, CT, following completion of orthodontics carried out by Dr. Bruce Gottlieb of Waterbury, CT. I was informed that several years back, our new patient had lost his central incisors traumatically, during play, and that a decision had been made, based upon tooth size and arch form to move Kyle's lateral incisors and cuspids medially such that his laterals occupied the arch space once held by the centrals. Likewise, his cuspids would take up residence in that space formally occupied by the laterals. The bicuspid would now be viewed as cuspids. It was apparent to Steve and to the Lister family that the case needed "finishing", thus the cosmetic referral.



**Imaging**

As referenced in previous articles, I rarely proceed with any sort of ambitious cosmetic rehabilitation without first imaging the case. Kyle's initial consultation provided an opportunity to take a simple portrait as well as the pertinent intra-oral dental shots. Of course the pros and cons of both modalities were discussed with a promise to the parents that at our next meeting I would have a recommendation for them once I had some time to study his models and photos. I also promised them a digital simulation of the completed case. This piece of the puzzle was assigned to Smile Vision imaging labs. Shortly after emailing them Kyle's portrait I was able to download the completed simulation, carried out per my instruction. (www.smilevision.net).



At our follow up consultation, the completed simulation was presented to the family. Mrs. Lister's eyes welled up upon initial viewing of the simulation. Kyle's dental journey appeared to be near completion. The simulation had provided a glimpse at the normalization of her son's appearance. After quickly gaining family approval of the simulated smile, I recommended a direct composite bonded solution. As alluded to before, Kyle's age and anticipated gingival and physical maturation would result in the need for future "upgrades". Composite resin lends itself nicely to additions and corrections unlike porcelain veneers. The family was also pleased that I could offer the restoration at half the cost of a similar porcelain restoration. Much money had already been spent on Kyle's rehab.

**Time to Deliver:**

If you're a thinker (and I know that you are), the first logical question is "how would I reproduce what Kyle's parents saw on the simulation?" This next piece of the puzzle was once again provided by Smile Vision and took the form of what they call a "Resin Replica". This is simply a composite mock up of the proposed case, based upon the digital simulation and a set of articulated study models. Consider it to be the more conventional "wax up", on steroids.



3-D replica

The Resin Replica is accompanied by Smile Vision's Hard/Soft templates that likewise may be considered the conventional vinyl template, on the same steroids. (See figure 6) Typically this device is intended to provide an exceptionally good matrix for delivering a set of temporary porcelain veneers. I had always suspected, however, that the soft part of the matrix could be called upon to do more. Why couldn't the same soft component be used as an oversized "strip off crown form" if you will? Who hasn't been delighted by the wonderful dental anatomy that materializes when we've had the occasion to use a clear strip off crown form when creating large build ups? Please be advised that the soft template supplied by Smile Vision is exquisitely detailed, much more so than the vinyl templates that we have been accustomed to fabricating and using in our offices.



Soft template with Mylar strip

Soft template with Injection holes

**Some Logistics to Ponder:**

The next question that comes to mind is how does the operator not to wind up with a solid mass of connected composite veneers. That is, "how does one control the placement of the composite?" Therein lays the key to the technique and I'm happy to report that it's not rocket science. From this point we will proceed in step by step fashion.

**Phase 1: Template preparation**

To the right you will find an image of the soft template made on a duplicate of the 3-D replica. It has been sliced interproximally so as to separate the individual teeth. This is evidenced by the Mylar strip that had been placed in one of the interproximal slits. It was accomplished with nothing more than a sharp #15 blade. You'll also note that the embrasure spaces where the papilla are located have been carved away to facilitate our ability to contour the gingival composite with a Mylar strip; in very much the same fashion that we form conventional class three restorations (the Smile-Vision lab will do this for you). In the image to the extreme right you'll note the same matrix with multiple labial holes punched that will allow introduction of the nipple of a hybrid composite compule, in this case TPH. Certainly, a Centrix syringe full of your favorite composite could accomplish the same so long as the composite possessed similar flow characteristics to the likes of Dentsply Caulk's Spectrum TPH and the tip fit snugly into the created portal. This step completed, it's show time.

**Phase 2: Preparing the Case and applying Composite**

Following administration of two carpules of Septocaine, conservative veneer preps were carried out on the maxillary anterior six teeth. Owing to Kyle's near edge to edge anterior occlusion, it was necessary to create enough incisal clearance to allow me to translate the incisal edges forward to effect a near class I relationship. Since the rehab was primarily an additive one, minimal reduction was necessary. Primary attention was paid to establishing a definitive finish line and creation of adequate incisal clearance.

Additionally, minor electrsurgery was employed to trim and bevel redundant tissue as well as to create more ideal gingival architecture.

**Embrasure Form:**

Following preparation, all six teeth were etched with 33% phosphoric acid for ten seconds and then coated with Parkell's Touch and Bond bonding agent according to manufacturer instructions. While Parkell does not require the pre etch with Phosphoric Acid, so long as the tooth surface has been prepped, I prefer the pre application of phosphoric acid in such cases to serve as a detergent of sorts. Additionally, the preponderance of enamel needing to be bonded encouraged me to take this extra step to ensure an evenly etched surface.



Composite is injected into the matrix

You will recall that earlier I mentioned the use of Caulk Dentsply's EsthetX during veneer construction. First, I applied, EsthetX to the mesio-gingival aspects of #7 and #10 to affect a preliminary and controlled diastema closure. Note that during the process of determining where the midline will be, the template can be taken on and off to verify midline position and axial inclination. The modeling clay handling characteristics of EsthetX allow this to occur without disturbing the uncured build outs. An A2 shade of EsthetX had been selected in keeping with the A2 TPH used to build out the rest of the case.

### **Pump It Up:**

Once this step has been completed, the matrix is fully seated, mylar strips placed on either side of the tooth to be injected, and the tip of the compule snugged into the receiving portal. At this point one begins to pump composite into the "crown form". The composite can be observed to slowly fill the intended form. When full, each mylar can be tugged as you would a class three to form a contact and embrasure, and cured one at a time. It is important to angle the light away from the second contact while you are curing the first. This process is repeated for each tooth. I chose to do 8 and 9 first where they are shown in roughed out form. Again the matrix can be taken on and off at any and all stages of the process. At right, all teeth have been injected and the matrix removed for inspection. Flash, while evident, does not appear so daunting as to discourage use of such technique. Above all, it can be readily observed that the intended anatomy has been faithfully reproduced. The original digital image had been translated to the restoration.

Discrepancies in contact can be quickly and easily mended with a mylar strip and reapplication of the TPH as shown here. Finishing is completed with but three Brasseler finishing burrs; the ET#9, a familiar long narrow carbide, the 7408 egg shaped finishing carbide, best suited for lingual finishing and the H50 A ideal for gingival trimming owing to its concave form and non end cutting tip. Consider it the secret weapon. Finally the case is polished with Caulk Dentsply's Enhance cups and points as well as their Enamelgloss polishing pastes, medium and fine. Interproximal finishing can be accomplished with Brasseler diamond strips in medium and fine grits. At the end of the visit the tissue was modestly shop worn but no doubt ready to bounce back with youthful vigor. Total case time: 3 hours (including extensive photographing of the procedure) Chair time is greatly reduced by the initially smooth surface and pre-ordained anatomy produced by the "crown forming" template.



Interproximal touchup



Finished case two weeks later

Two weeks later, we again see the finished case following a final polish and application of Bisco's Fortify to help seal the surface. In addition, fine tuning to embrasure spaces and gingival margins are performed at the same time. Needless to say, final photos are best taken at this visit. During the same visit, Kyle is provided with a protective splint produced from a stone version of his preop mock up. He was urged to wear it during all sporting activities.

### **Miscellaneous:**

The implications of such a technique are enormous. First and foremost, most any practitioner capable of wielding an effective finishing burr can achieve stellar results in but a short period of time. We again summon the help of our laboratory counterparts to aid our cause but that's OK because everyone comes out ahead. Keep in mind when pricing out such cases that the extra lab work and imaging involved needs to be factored into the case cost. I typically include them as diagnostic costs and pass that expense on to the patient without building a profit into that end of the treatment. You can do otherwise if you so choose.

Material selection will be based upon personal preference. It's imperative that the chosen composite possess enough flowability to allow for homogeneous coalescence of the injected paste. In cases that would dictate less free standing composite (i.e., have more tooth support) and possess adequate canine guidance, I'd be inclined to use EPIC TMPT. It could be introduced in a Centrix Syringe or in an emptied TPH compule. While EPIC TMPT is offered in its own compule, I found its nipple diameter did not lend itself as readily to the technique. A smaller portal insures the necessary back pressure to allow the technique to work and keeps more of the labial surface of the crown form, intact.

If the practitioner is willing to spend more time on the case (and of course extract a healthier fee), layering a hybrid such as TPH with a microfill such as EPIC TMPT (i.e., a veneer of the veneer), would provide the best of both worlds; the strength of the TPH hybrid and the glass like finish of EPIC TMPT. While multi-shade layering is always an option, the time required and consequent increase in fee might counter the original purpose of economy of time and control of cost.



Before



Imaged



After

**Conclusion:**

Today's composite resins are remarkable materials that when handled properly will provide years of attractive service and wear. My intent in presenting this case was to renew practitioner interest in an often over looked approach to cosmetics. Hesitancy has been very much related to the artistic barrier of placement. While no one will argue that the porcelain veneer is king, most will admit that there are times when they are inappropriate and of course can be priced too high for their intended recipient. Through use of Resin Replicas and their associated templates which ultimately stem from accurate digital imaging and simulation, even those who just skimmed by Dental Anatomy 101 can become direct bonded veneer all-stars. As we often hear, what goes around comes around! Keep an eye out for your next case.

**Bio:**

Dr. Goldstein is a 1977 graduate of the University of Connecticut School of Dental Medicine and practices general dentistry in a group setting in Wolcott, Conn. He enjoys promoting the cosmetic side of his practice and has found it helpful to incorporate high tech methodology into his daily routine to accomplish this. Dr. Goldstein serves on the staff of Contributing Editors at **Dentistry Today** and contributes regularly to multiple dental periodicals. Doctor Goldstein can be contacted at martyg924@cox.net or at his office at 203-879-4649. He lectures on both digital imaging in dentistry and on the use of such high tech methodology to further the cosmetic and restorative practice.

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