

THE TAKE-AWAYS

- Today's minimally invasive porcelain veneers can deliver predictable results.
- The biostimulatory benefits of lasers help with dental health and esthetics.

# New techniques, technology, laser deliver new smile

When properly planned and executed, bonding porcelain to virtually undisturbed enamel creates great results.

by DR. HUGH D. FLAX

## THE TEAM

Bringing together a variety of voices for the best advice and big ideas.

### TEAM MEMBERS

- Dr. Robert Lowe (Lead)
- Dr. Gary Radz
- Dr. Hugh Flax
- Dr. Lori Trost

### ABOUT THE AUTHOR

Dr. Hugh D. Flax received his DDS degree from Emory University in 1983 following undergraduate Phi Beta Kappa honors. He is on the editorial boards of the Journal of Cosmetic Dentistry and Practical Procedures and Aesthetic Dentistry. In May 2008, he was elected Vice President of the American Academy of Cosmetic Dentistry and will become President in 2010-2011.

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### WEB EXCLUSIVE

To find other articles on minimal prep veneers as well as a variety of articles on lasers, go to [dentalproductsreport.com](http://dentalproductsreport.com).

## THE SET-UP

"In many cases 'Less is More' and that holds true for a number of patients who may have minor esthetic and functional concerns. This month, Dr. Hugh Flax discusses the combination of 'no prep' and 'minimal prep' porcelain veneers that promote enamel conservation in conjunction with all-purpose dental lasers. This 'minimally invasive approach' can often provide maximal results."—DR. ROBERT LOWE, TEAM LEAD

THE growing popularity in the public arena for "no prep" or "minimal preparation" smile enhancements is advocated by technological enhancements and research that per Dr. Michael Sesemann "is supportive of the fact that enamel is a cherished human tissue with unique qualities that cannot be duplicated after its removal." Long-term research has demonstrated a 94% survival rate of minimally invasive porcelain veneers according to Drs. Howard Strasseler and Mark Friedman.<sup>2</sup> Dr. John Calamia's original investigation in 1983 was performed with little or no preparation and the process needed to be reversible in case it didn't work. He also cautioned the need to avoid over contouring for periodontal purposes—even with veneers that were about 0.5 mm thick.

This led to the conclusion that some slight preparation was needed to create a biological appropriate emergence profile.<sup>4</sup> Although the thicknesses of today's minimal veneers are closer to 0.3 mm, the addi-

**86%**  
of GPs who use a laser perform gingival contouring.  
Source: February 2009 DPR Laser survey

tive nature of this conservative technique can still encroach on the biomimetic needs of the gingival complex<sup>5</sup>, as well as make it difficult for the ceramist to create natural anatomic contours. Fortunately, the confluence of laser technology with these new restorative methods provides a healthy adjunct to this new philosophy of care.

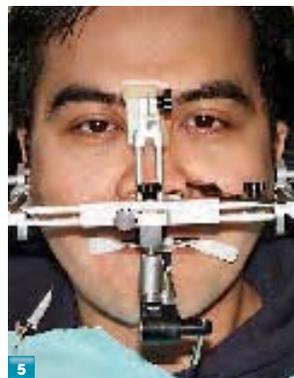
### Exam/treatment planning

A 34-year-old male presented for smile enhancement. After many years of hiding

## AT A GLANCE



**Figs. 1-3** Patient's upper teeth with good midline positioning, with a goal for shade Chromoscope 030 (Figs. 1-2). T-Scan shows vertical occlusal discrepancies in posterior teeth (Fig. 3).



**Figs. 4-7** Fig. 4 shows profile views used in the treatment planning, while facebow records (Fig. 5) are sent to the lab technician. Occlusal equilibration is performed (Fig. 6) and the patient then gets visual verification (Fig. 7) of the direction for his new look.

his smile, he desired whiter teeth while closing the spaces. After a photographic and radiographic analysis along with mounted study models and a 5-phase exam, these observations were made:

Eight upper teeth with good midline positioning; generalized diastema and prominent canines that create a slightly negative smile line; Shade A2 generally (with A3 to A3.5 in the canines); his goal shade is Chromoscope 030 (Figs. 1-2); Class III occlusion with end-to-end anterior tooth relationship and group function; no wear or muscular pathology noted; range of motion was 57 mm; T-Scan showed vertical occlusal discrepancies in the posterior teeth (Fig. 3); LED Dental's VELscope (ledental.com) testing yielded no pathological markers; despite less than ideal flossing and mild calculus buildup, bone levels were excellent radiographically with no soft-tissue swelling or bleeding points; biomechanical—other than a previous history of a crown restoration over an endodontically treated tooth No. 3, tooth strength was optimal; no apparent history

of clenching or grinding, but abraded lesions were noted in the bicuspid areas.

After reviewing findings, an ortho treatment plan with whitening was presented as an ideal solution. Because of the length of time needed to make these changes, the patient preferred a more convenient solution. Using the profile photos (Fig. 4) the labial surfaces of the upper teeth fell inside a line connecting the vermilion borders of the lips, allowing for a proper lip comfort.<sup>7</sup>

Increasing the “volume” of tooth structure by using DURAtin veneers (durathinveneers.com) would close the spaces, build more reflective surfaces and dramatically enhance his smile. However, it was important to create better interproximal contours while closing the spaces using a laser to create concave soft-tissue troughs or “papilla sites” to receive the new restorative material.

### Case sequence

Next came the following sequence:

1. The lab waxed up tooth Nos. 7-10 and 23-26; eventually tooth Nos. 5, 6, 11, 12, 21, 22, 27, and 28 will be restored as the patient's budget allows.



Figs. 8-9 Pre-op shades are taken prior to any desiccation of the enamel.

2. Prophylaxis was done with aggressive homecare to prepare for temporization and restorative maintenance.
3. A Kois Deprogrammer was used to retrain muscle engrams prior to occlusal equilibration (koiscenter.com).
4. Home whitening with customized trays and Heraeus Kulzer's Venus Smile, 16% carbamide peroxide (heraeus-kulzer-us.com) was completed.
5. Veneer treatment with minor removal of undercuts and smoothing sharp incisal edges along with soft-tissue adjustments was done as described.
6. An “esthetic protective appliance” was placed after the veneers were placed.

### Treatment care

After facebow records and specific width/length measurements were sent to the lab technician (Fig. 5), the patient was fitted in a deprogrammer to be worn for four weeks. This allowed him to efficiently multi-task his hygiene and whitening care, treatment blueprinting, and the decrease of masticatory muscle memory.

Occlusal equilibration was performed using the Kois technique, which allowed for anterior freedom occlusally and restoratively to avoid creating a “constricted chewing pattern” (Fig. 6). Collaboration and approval of the wax blueprint gave our patient visual verification (Fig. 7).



**Figs. 10-11** Precise shaping is performed with an all-purpose laser at a soft-tissue mode.

After polishing away any pellicle with flour of pumice, labioincisal line angles and potential undercuts were performed conservatively with sandpaper discs. Shades were taken pre-operatively to help demonstrate color shifts before any desiccation of the enamel (**Figs. 8-9**). After verifying biological width, the soft tissue was sculpted three dimensionally, taking into account the buccolingual thickness so the ceramist could create better contours on the lingual aspect.

This shaping was precisely done using a Biolase Technology Waterlase ErCr: YSGG laser ([biolase.com](http://biolase.com)) at a soft-tissue mode and 2.0W/20% Air/20% Water setting with a 9.0 mm G-9 tip (600-micrometer thickness). This ensured a bloodless field and gave artistic control to the operator (**Figs. 10-11**).

Polyvinyl siloxane impressions and bites were created to send to the ceramist. Using a “shrink wrap technique,” provisionals were carefully crafted using DMG America’s Luxatemp ([dmg-america.com](http://dmg-america.com)) to generate esthetic, functional and biological results that were an immediate improvement for the patient. After reviewing his homecare technique, the patient went home for a week to “test drive” the new contours and esthetics.

With some minor occlusal fine tuning and written permission to move forward, impressions of the prototypes were taken to give the lab some three dimensional input on the final shapes and bioesthetics. To ensure all external outlines are duplicated, a putty matrix serves to meet a high standard of quality control, and is verified on the solid model when the veneers are returned (**Fig. 12**).

The restorations are carefully placed under isolation using Ivoclar Vivadent’s Variolink II Translucent Base Cement ([ivoclarvivadent.com](http://ivoclarvivadent.com)). By properly contouring the margins in the gingival sulcus, finishing and homecare were extremely easy and atraumatic to complete.

Occlusion was verified and refined with Tekscan’s T-Scan system ([tekscan.com](http://tekscan.com)) and with the patient sitting up to simulate more natural jaw positions.

### Closing thought

Without a doubt, when properly planned and executed, bonding porcelain to virtually undisturbed enamel creates a predictable result. Blending new porcelain technologies, techniques and materials, improved working knowledge of the esthetic periodontal connection, and the precise, as well as biostimulatory benefits of lasers, we can take Dr. Calamia’s original ideas to an even higher standard. We notice from the post-op photos (**Figs. 13-15**) that we have been able to transform this patient’s appearance to one



**Figs. 12-15** Fig. 12 shows a putty matrix on a solid model after veneers are returned. The transformation of the patient’s improved smile (**Figs. 13-15**).