

**Creating Illusions with Closed Flap Smile Enhancements**  
**(For 2004 AACD Monograph)**  
**Hugh Flax, DDS, Accredited Member AACD**  
**Atlanta, GA**

**ABSTRACT** Laser technology has become a rising star in the evolution of appearance enhancements in plastic surgery and smile design. Dentistry has seen a huge breakthrough with the introduction of a combination hard-soft tissue Erbium Chromium-YSGG wavelength. Among the many benefits, a “closed flap technique” will minimally-invasively put control of gingival and osseous contours into the hands of the cosmetic restorative dentist. It is critical that biologically and occlusally correct protocols are adhered to in order to create predictable artistic improvements. The results are reduced healing/treatment times, and greater patient satisfaction.

The intent of this presentation is to illustrate the aforementioned benefits with an “outside the box” case that would have previously involved specialty care.

**ARTICLE**

**Introduction**

Creating ideal cosmetic, biological, and functional results have always been challenging in the esthetic zone. This is especially true when dealing with large diastama cases of more than 3.0 mm between the central incisors. Trying to close these with restorative materials creates a compromise esthetically and hygienically that draws even more attention to the original problem. Standard procedure usually calls for orthodontic and/or periodontal therapies as adjunctive or possible final solutions.

Often patients will become frustrated by the need to be referred to yet another doctor to improve the periodontal framework to create an ideal result. Even more challenging is the extended healing time created by reflective mucoperiosteal surgery affecting the chronology of final restorative care as well as delaying the patient’s ultimate happiness for a minimum of 2 – 3 months. Fortunately, dental lasers have evolved considerably as an adjunctive and alternative treatment for safely, conservatively, and reliably improving the hard and soft tissue contours. Historical studies of ErCr: YSGG lasers by Rizoiu and others have shown that thermal coagulative results, as well as bony ablation characteristics are similar to a dental bur. Kois’ landmark study defined the total dentogingival complex (DGC) as clinically predictable at 3.0-mm on the direct facial aspect and at 3.0-5.0-mm interproximally when measured from the free gingival margin to the osseous crest. It is critical that the gingival margin mimics the osseous scallop while maintaining the DGC. By adhering closely to these principles, in selected cases such as the one presented, esthetic and functional parameters can be satisfied long term. With precise restorative planning and technique, patients are provided with optimal results more comfortably and efficiently.

## Case Study

A 62 year old woman visited us for correction of what she termed her "Sponge Bob Smile" (Figures 1 and 2). Recent photos at her son's wedding had demonstrated how self conscious she was about her smile's appearance. A large midline diastema of about 4.0mm was the centerpiece of a dentition that had missing upper canines and dark porcelain metal restorations that had been placed without a master plan for complete dental health and appearance. Consequently, the patient was frustrated that her previous care would be holding her back from achieving a better smile. Further challenges were her deep overbite and a very thick and deep labial frenum. Other considerations were budgeting and time constraints as well as a desire to create a conservative approach.

Closing spaces is an art form that involves not only the repositioning of proximal surfaces but integrating the gingival interface and occlusion to create ideal proportions and natural contours that can be easily cleansed. Specialty referral was ruled out by the patient because of the above concerns. Therefore, a plan was devised to laser sculpt the soft and hard tissue to create an external framework to train the gingival ("first stage") and eventually place porcelain restorations from tooth #4 through #14("second stage"). These new contours would be determined with the aid of a mounted diagnostic waxup (Figure 3). Since the patient's time was at a premium we also multi-tasked whitening and occlusal procedures during the first stage of periodontal-restorative procedures.

At the initial closed gum lift, a Waterlase™ (Biolase Technology, San Clemente, CA) was used in three modes- gingival sculpting, osseous recontouring and smoothing, and frenectomy removal. After carefully outlining our planned framework with a fine marker a G-6 tip (Biolase) easily shapes the gingival at a setting of 1.5W/30%air/30%water. No tissue necrosis or significant bleeding occurred as a result of using the relatively lower settings. This allowed us to place a flowable composite bonded with I-Bond (Heraeus Kulzer, Armonk, NY) along the mesial aspects of #8 and #9. After smoothing with a H135TDF "safe end" bur (Axis Dental Irving, TX), we had created a solid matrix to train the midline papilla (Figure 4). Osseous sculpting required great precision in order to maintain a 3.0mm DGC. A specially tapered T4 tip (Biolase) was used at a higher wattage of 2.5W. Prior to usage the tip was measured and marked to 3.0mm in order to maintain controlled adjustments within the gingival sulcus during a machine stitch movement of the tip. The resection was smoothed with a 7/8 curette. The frenectomy was cleanly performed at the soft tissue setting causing a release of the midline papilla and great freedom of the upper lip (Figure 5). At a setting of 0.25 W, biostimulation of the outer epithelium helps decrease release of histamine and increased fibroblasts for junctional epithelial growth. The patient was placed on a vigorous homecare regimen that included Oxygel (Oxyfresh, Coeur d'Alene, ID) and closely monitored for a month while occlusal therapy procedures were performed.

After four weeks, the tissues had healed beautifully to begin restorative care. Using our waxup as a guide to the width of the midline papilla (Figure 6), we were able to have a standard of comparison with patient's tissue after prepping for veneers/crowns and doing some mild soft tissue reshaping with the Waterlase. After impressions and bite registrations, prototype provisionals made with Luxatemp Plus (Zenith DMG, Englewood, NJ). Notice the improvement and acute angles for the papillae which are a reflection of the ideal geometric esthetic progression from anterior to posterior (Figure 8).

The patient was allowed to “test drive” her new smile and bite for 10 days. Fine tuning was done to her approval. Measurements and photos were sent to the ceramist. Using the temporary model, a labio incisal matrix was created to maintain a consistent esthetic and functional relationship (Figure 9).

The restorations were returned from the laboratory pre-etched and silanated. They were inspected for contour and fit not only labially for esthetics but occlusally for hygiene purposes (Figure 10). Using isolative procedures, the porcelain was bonded – cemented using translucent Variolink II (Ivoclar Vivadent, Amherst, NY). The patient was ecstatic about the results and could not stop raving about her new appearance (Figure 11). From a clinical point of view perio-restorative results using conservative and innovative methods that were nothing short of amazing (Figure 12).

### **Conclusions**

In this world of expanding emphasis on minimally invasive care (e.g. Botox, mestherapy); dentistry has as amazing ally in laser technology. The literature demonstrating the health benefits is being augmented with the cosmetic advantages as well. Carefully using the ErCr:YSGG laser gives cosmetic dentistry a patient friendly tool to predictably and comfortably compliment the many advances in smile design. These are truly exciting times.

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