

# Creating Aesthetic Illusions: Smile Enhancements Using a Closed Flap Technique

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**Laser technology has expanded the clinician's ability to perform plastic surgery and smile design on dental patients. The erbium chromium-YSGG laser enables clinicians to use a minimally invasive "closed flap" technique for controlling hard and soft tissue contours. Throughout this procedure, biologic and occlusal guidelines are observed—creating predictable artistic improvements, reducing healing periods, and increasing patient satisfaction.**

Creating ideal cosmetic, biologic, and functional results have always been challenging in the aesthetic zone. This is especially true when the clinician is attempting to address large diastema cases with more than 3 mm between the central incisors. Closure of these spaces with restorative materials generally compromises aesthetics and hygiene, while drawing even more attention to the existing condition. Standard procedures often require orthodontic and/or periodontal therapies as adjunct or potentially definitive solutions.

Patients are often frustrated by the need to be referred to yet another clinician to improve the periodontal framework. Even more challenging is the extended healing time created by reflective mucoperiosteal surgery that affects the chronology of final restorative care and delays the patient's ultimate satisfaction for a minimum of two to three months. Fortunately, dental lasers have evolved considerably as an adjunctive and alternative treatment for safe, conservative, and reliable improvement of the hard and soft tissue contours. Erbium chromium (ErCr)-YSGG lasers have been shown to deliver thermal coagulative results as well as bony ablation characteristics similar to those provided by a dental bur.<sup>1</sup>

Kois' landmark study defined the total dentogingival complex (DGC) as clinically predictable at 3 mm on the direct facial aspect and at 3 mm to 5 mm

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**FIGURE 1.** The large midline was a major detriment to this patient's appearance.



**FIGURE 4.** After the soft tissue was laser-sculpted, flowable composite was placed and polished to train the contour of the proximal surfaces of the midline papilla.



**FIGURE 2.** Broad widths of the gingival papillae created an unfavorable framework to more harmonious aesthetics.



**FIGURE 3.** A mounted diagnostic waxup is a critical road map to planning a realistic result.

interproximally when measured from the free gingival margin to the osseous crest.<sup>2</sup> It is critical that the gingival margin mimics the osseous scallop while maintaining the DGC. By adhering closely to these principles, aesthetic and functional parameters can be satisfied on a predictable, long-term basis.

### CASE PRESENTATION

A 62-year-old female patient presented for correction of what she termed her “Sponge Bob Smile” (Figures 1 and 2). Clinical photographs demonstrated how self-conscious the patient was about her smile’s appearance. A large midline diastema that measured approximately 4 mm was the centerpiece of a dentition that included missing maxillary canines and discolored metal-ceramic 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 prevent her from achieving an improved smile. Further challenges included the presence of a deep overbite and a thick, deep labial frenum. Other considerations were budgeting and time constraints, as well as a desire to utilize a conservative approach.

Diastema closure 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 promotes easy hygiene.





**FIGURE 5.** A frenectomy was performed at a soft tissue setting after the osseous sculpting was completed. Note the minimal trauma and bleeding after use of the laser.



**FIGURE 6.** The midline papilla was checked intraorally. Note the margins were placed subgingivally to optimize the emergence profile of the porcelain.

Specialty referral was ruled out by the patient because of the aforementioned concerns. A plan was, therefore, 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 teeth #4 through #14 (“second stage”). These new contours would be determined with the aid of a mounted diagnostic waxup (Figure 3). Due to the time constraints of the patient, whitening and occlusal procedures were also performed during the first stage of periodontal-restorative procedures.

At the initial closed periodontal lift, an ErCr-YSGG laser (ie, Waterlase, Biolase Technology, San Clemente, CA) was used in three modes (eg, gingival sculpting, osseous recontouring and smoothing, frenectomy). The desired framework was planned and outlined using a fine marker, and a G-6 tip was subsequently used to shape the gingival region. No tissue necrosis or significant bleeding occurred as a result of using the laser’s relatively lower settings. A flowable composite was then cemented along the mesial aspects of teeth #8 and #9. After smoothing with a “safe end” bur (ie, H135TDF, Axis Dental, Irving, TX), a solid matrix was created to mold the midline papilla (Figure 4). Osseous sculpting required great precision in order to maintain a 3-mm DGC. Prior to use, the T4 tip was measured and marked to 3 mm in order to maintain controlled adjustments within the gingival sulcus during a machine stitch movement of the tip. The



**FIGURE 7.** Provisional restorations were placed to fine-tune function and the patient’s aesthetic desires.

resection was smoothed with a 7/8 curet. 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 decreased histamine release and helped to increase fibroblasts for junctional epithelial growth. The patient was placed on a vigorous homecare regimen and closely monitored for a month while occlusal therapy procedures were performed.

At four weeks postoperatively, the tissues were healed and restorative care was initiated. The patient’s teeth were prepared for veneers/crowns and mild soft tissue reshaping was performed. After impressions and bite registrations, prototype provisionals (ie,





**FIGURE 8.** Natural incisal thicknesses and proximal embrasures promote better function and health.



**FIGURE 10.** Ideal proportions and emergence profile will create long-term healthy tissues and bioaesthetics.



**FIGURE 9.** Significant improvement in aesthetics boosted this patient's self-confidence and pride in her dentition.

Luxatemp Plus, Zenith DMG, Englewood, NJ) were fabricated. Improvement and acute angles for the papillae, which are a reflection of the ideal geometric aesthetic progression from anterior to posterior, were noted (Figures 6 and 7).

The patient was provisionalized for 10 days. Minimal modifications were necessary to improve the patient's appearance and bite. Measurements and photos were sent to the ceramist. Using the temporary model, a labioincisal matrix was created to maintain a consistent aesthetic and functional relationship.

The restorations were returned from the laboratory pre-etched and silanated. They were inspected for contour and fit labially for aesthetics and occlusally for hygiene

purposes (Figure 8). Using isolation procedures, the porcelain (ie, Authentic, Lawrenceville, GA) was bonded using a translucent resin cement (ie, Variolink II, Ivoclar Vivadent, Amherst, NY). The patient was ecstatic about the aesthetic results achieved through the perio-restorative procedure (Figures 9 and 10).

## CONCLUSION

In this world of expanding emphasis on minimally invasive care, dentistry has an 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 provides cosmetic dentistry with a patient-friendly tool to predictably and comfortably complement the many advances in smile design. These are truly exciting times for dental patients and professionals alike!

## REFERENCES

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