

3-Visit Smile Reconstruction

A minimally invasive approach to restore maxillary peg laterals with the help of a diode laser

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This case report is a chairside reconstruction of a patient's smile using a targeted focus on restoring peg laterals. The goal was to restore the aesthetic and functional component through minimally invasive techniques in a time-sensitive manner. This report also includes a first-hand investigation on patients' perspective of operative time, postoperative pain and healing, including preventing possible relapse and complications.

Case study

Diagnosis and treatment planning

A 30-year-old male presented with the chief complaint: "I've had crowns before and they popped off, so now I have two small teeth and I want them fixed. Thing is, I live in a different state and was wondering if you could do anything before I leave in five weeks?"

Clinical intraoral examination revealed maxillary peg laterals that presented with previously prepped full-coverage crowns, no restorative crowns present. Patient was in a generally healthy state and he had no known allergies and did not smoke. The patient's dental hygiene was not optimal; therefore, a personalized oral hygiene regimen was discussed and reinforced upon each of the three visits.

Clinical evaluations and diagnoses were assessed during the treatment-planning phase (Appointment 1), which included the following findings:

- The patient presented with maxillary (teeth #7 and #10) as peg laterals.
- Both right and left side of dentition presented with Class I malocclusion.
- The patient reported that the previous dentist put on crowns, but they "popped off."

Appointment 1: Preoperative phase

Upon a comprehensive radiographic analysis and intraoral evaluation of biologic width and keratinized tissue assessment, bone sounding presented with greater than 2mm from cemento-enamel junction. A laser gingivectomy on both #7 and #10 was recommended to create adequate exposure of anatomical crown for final prosthesis of E.max veneers (Ivoclar Vivadent) with ideal gingival contours at smiling. Patient accepted this treatment instead of previously recommended osseous reconstruction and then full-coverage crowns. Preliminary impressions of patient maxillary and mandibular arches were then made for preliminary study casts and wax-up design. Treatment was completed in two subsequent appointments.

Fig. 1



Fig. 1. Teeth #7 and #10 presented with previously prepared full-coverage crowns by previous dentist. The previous treatment had an unsuccessful outcome because of lack of retention and gingival disharmony.

Fig. 2



Fig. 2: Preoperative intraoral photo displays lingual view of maxillary peg lateral teeth #7 and #10.

Fig. 3



Fig. 3: After soft tissue diode laser recontouring at 1.5W continuous pulse.

Appointment 2: Restorative phase

Upon treatment and patient acceptance, patient was anesthetized with one carpule of 2 percent lidocaine with 1:100,000 epinephrine via apex of tooth #7 and tooth #10. Diode laser (DC International) at 1.5W continuous pulse (with all safety and precautions as mandated by Academy of Laser Dentistry) provided a precise excision with instantaneous coagulation of blood vessels, sealing lymphatics and maintained a clearer surgical field while in operation.¹

The diode laser excised 2mm. To prevent gingival relapse before restoration preparation, lateral incisors #7 and #10 were temporized with fabrication of chairside veneers at the time of nonsurgical procedure as shown in Fig. 4 (p. 34).

Note: Because the amount of tissue removed was greater than 1.5mm of gingival tissue, provisionals were placed at the time of laser gingivectomy to allow for healing and optimal aesthetic results upon delivery.

After completion of standard veneer preparation and impressions, teeth #7 and #10 were then temporized until delivery of final restoration.

Careful approximation and delivery of temporaries ensured that gingival margin of restorative component was convex to the

force, which would maintain gingival margin at level of the desired gingival contour.

Appointment 3: Delivery of final restorations

Temporary restorations were removed. Teeth #7 and #10 were pumiced, rinsed and isolated. Upon verification of margins, intaglio surface of the E.max veneers were cleaned with Ivoclean and cemented using Multilink (both from Ivoclar Vivadent) as per instructions as shown in Fig. 6 (p. 36). Shade was selected with the intention and desire of patient to undergo external bleaching treatments in the future.

Discussion

When considering use of a soft-tissue laser for recontouring and the excision of excess gingival tissues, consider numerous factors like biologic width and the amount of keratinized tissue present. Proper probing of the sulcus and bone sounding procedures should be completed before initiating treatment to determine the amount of free gingiva available to be excised without causing harm.² A minimum of 1.5mm of gingival sulcus should be retained to avoid violation of biological width and to minimize postoperative complications.



Fig. 4: Temporary restorations placed to maintain gingival position for delivery of final restorations while tissue heals.

Notice in this case the height of the contour of gingival margin is slightly distal to center and did not need to be altered. The use of diode laser would establish proper gingival contour for final restorations; however, before utilization, careful probing of the sulcus and bone sounding determined the amount of free gingiva that would be excised. In this case, excision probing depths revealed 4mm for #7 and 3mm for #10 at the gingival margin, ensuring that soft-tissue crown recontouring was possible.

Gingivectomy via soft-tissue laser required less operative chairtime, less postoperative inflammation and little to no bleeding. Advantages of using lasers includes hemostasis during surgery, safety around implants, minimal if any swelling, less scar tissue, less discomfort and use of fewer analgesics.³ Diode lasers are highly absorbable by melanin pigments that allow soft tissue to be recontoured while ensuring no interaction with dental hard tissues. Proper protective glasses are required for all laser-involved procedures to prevent possible retinal damage of provider or patient.

Careful evaluation of laser and tissue interaction should always be examined throughout the procedure. If charring or

carbonization occurs during the procedure, power settings should be lowered to prevent postoperative complications such as recession and pain. Tip should be held at a 45-degree angle to the tissue, creating an external bevel fashion, and tip is moved gently in a brush-stroke fashion horizontally. Compact design of the tip allows for soft-tissue precision removal with less discomfort and no bleeding because of capillary sealing by protein denaturation and stimulations of clotting factor.⁴ The heat produced by the diode laser causes not only protein denaturation but also coagulation that inhibits pain receptors at the incision location.⁵

Summarily, diode lasers serve for better control during procedures, allowing fewer postoperative complications. Disadvantages to laser diode gingivectomies include cost, and injury to the eyes if proper eyewear is not worn during procedures.

When placing temporary restorations, careful attention to provisional fabrications is essential. Overcontoured and overextended temporary restorations can cause tissue recession, which can delay the final delivery of restorations. If oral hygiene is compromised because of bulk at gingival margin, a perio aid can be administered.

Fig. 5: Postoperative healing results after temporaries were removed and preparations of #7 and #10 were completed preserving healthy pink tissue during the process.

Fig 6: Final appearance of veneers.



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Conclusion

Gingivectomy or excisional periodontal surgery is one of the most commonly utilized surgical procedures to remove excess gingival tissue to correct deviations from the ideal gingival tissue architecture. Both surgical and nonsurgical gingivectomy techniques have been proven effective in removal of excess gingival overgrowth with equal efficiency.

The lack of hemorrhage control has given rise to the use of more soft tissue lasers. The utilization of a diode laser is a good alternative to traditional scalpel techniques, allowing for a more precise excision with instantaneous coagulation of blood vessels,

sealing lymphatics, and maintaining a clearer surgical field while in operation.¹

Laser gingivectomy may also serve useful for faster chairtime operations, better gingival healing and can be beneficial for phobic patients. Diode lasers can serve as a great tool for soft-tissue removal and in restorative dentistry.

However, while the results and utilization of lasers in dental procedures seems promising, it is imperative that a comprehensive analysis be completed before initiating treatment. Regardless of the technique, patients should maintain good oral hygiene throughout subsequent appointments for optimal results. ■

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