

## Gummy Smile Correction with Diode Laser: Two Case Reports

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### Abstract:

Beautification of smiles is becoming an everyday requirement in dental practice. Apart from teeth, gingiva also plays an important role in smile esthetics. Excessive visualization of gingiva is a common complaint among patients seeking esthetic treatment. A wide variety of procedures are available for correction of excessive gum display based on the cause of the condition. Soft tissue diode laser contouring of gingiva is a common procedure that can be undertaken in a routine dental setting with excellent patient satisfaction and minimal post-operative sequelae. Two cases of esthetic crown lengthening with diode laser 810 nm are presented here.

**Key Words:** Crown lengthening, diode laser gum contouring, gingival esthetics, gummy smile

### Introduction

A gummy smile is a condition that affects the confidence of many young people. It is caused by a variety of factors. The main causes include excess gum covering the teeth, an excess of the maxilla, a short upper lip, or hyperactivity of the upper lip that retracts too much during full smile. When 3 mm of gum is displayed on smiling it is perceived as unesthetic or unnatural. Many individuals with the gummy smile are embarrassed to smile naturally and often end up in life not expressing their full potential. The method for correction of the gummy smile depends on finding the basic cause. In pronounced cases where there is an excess amount of maxillary jaw bone, orthognathic surgery in conjunction with orthodontic treatment is required for obtaining the best possible result. Cases where the gummy smile is due to gum overgrowth over the teeth can be more easily corrected via a gingivectomy or "gum contouring"

procedure where excess gum is removed to expose the natural length of the teeth.

Beautiful smiles are produced by three main parameters that are the teeth, the gums, and the lips, respectively. There are few instances where gum recontouring is necessary. First in cases of altered passive eruption, while other is clinical crown height of the tooth is less than anatomic crown height producing short teeth which are square and wide.<sup>1</sup> This may result in high smile line, with resulting appearance of "gummy smile." Dentists can easily modify the shape of the tooth, the interdental papilla, and contour of the gums while it may be difficult to correct discrepancies of the lip and position of lip in speech. In all corrections of gingival particular attention has to be given in preserving the biologic width.<sup>2</sup>

A classification system for esthetic crown lengthening procedures has been proposed by Lee.<sup>3</sup>

**Type I:** Sufficient soft tissue present allowing gingival exposure of the alveolar crest or violation of the biologic width. Corrective procedure may be performed by the restorative dentist. Provisional restorations of the desired length may be placed immediately.

**Type II:** Sufficient soft tissue allows gingival excision without exposure of the alveolar crest, but in violation of the biologic width. These conditions will tolerate a temporary violation of the biologic width, allows staging of the gingivectomy and osseous contouring procedures. The provisional restorations of the desired length may be placed immediately, requires osseous contouring, and may require a surgical referral.

**Type III:** The gingival excision to the desired clinical crown length will expose the alveolar crest. Staging of the procedures and alternative treatment sequence may minimize display of exposed subgingival structures. The provisional restorations of the desired length may be placed at second-stage gingivectomy, requires osseous contouring, and may require a surgical referral, limited flexibility.

**Type IV:** The gingival excision will result in an inadequate band of attached gingiva, limited surgical options, no flexibility, a staged approach is not advantageous, may require a surgical referral.

### Pretreatment planning

As in any case of esthetic dental treatments, certain parameters have to be critically assessed prior to performing

gummy smile correction.<sup>4</sup> This will help in proper treatment planning for the patient.

1. Patients expectations, systemic health, and habits;
2. Height, symmetry of face and smile line;
3. Lip thickness, size, and profile
4. Size and shape of the teeth
5. Gingival biotype and width of keratinized gingiva;
6. Thickness and contour of the alveolar bone.

A study cast and radiographs obtained will help in preparation of a surgical template<sup>5</sup> which can help in precisely planning the amount of gingival tissue removal and also plan to provide ideal gingival shape and contour.

The gingival shape refers to the curvature of the gingival margin. The gingival zenith for maxillary lateral incisors and the mandibular incisors must coincide with their longitudinal axis while that for central incisors and canines may alter with slight distal to the longitudinal axis (Figure 1). The gingival contour, when compared with gingival shape, it refers to the three-dimensional description of gingival topography. Ideal gingival contour has sharp interdental papillae and equally tapered gingival margins at the cervical third region of the tooth.

The gingival countouring can be performed by many means including scalpel surgery, electrocautery, and lasers. In most of the cosmetic dentistry cases, cosmetic gingival contouring can be successfully performed by the soft tissue diode laser.<sup>7</sup> The soft tissue diode laser helps to establish a state of hemostasis and facilitate gingival recontouring. In some cases of minor corrections laser gum contouring can be done even without local anesthetics.

### Case Report

A female patient aged 18 years reported to the periodontist with a complaint of an excessive show of gums while smiling. On clinical examination of the patient, it was assessed that she had a combination of the skeletal problem along with altered passive eruption where 3-4 mm of her teeth was hidden under the gums (Figure 2a). Although a combination of orthognathic surgery and gingival recontouring was advised to her, she opted for only laser gingival contouring alone.

A stent was prepared preoperatively assessing the amount of gingiva that can be excised after ensuring that sufficient biologic width remains (Figure 2b). The diode laser excision was performed at 1.5 watts continuous mode with an activated tip (Figure 2c). Post-operative healing was uneventful with an acceptable smile for the patient (Figure 2d).

A 25-year-old female presented with a complaint of an excessive show of gums and whitish prominence of gums while smiling. Clinical examination of the patient revealed excessive gingiva covering the teeth with uneven gingival margins as well as

exostosis in the maxilla close to the premolar – Molar buccal gingival region which displayed as whitish prominences when the patient smiled (Figure 3a). Laser gum recontouring was advised for the anterior region with ostectomy for buccal bone removal in the posterior region. She opted for both treatments and her smile drastically improved. The diode laser contouring was done at 0.8-1.2 watts continuous mode with an activated tip (Figure 3b). The power used was lesser for this patient due to the presence of more melanin in the gums. The post-operative event was uneventful (Figure 3c). After osseous recontouring the patient was satisfied with the results obtained (Figure 3d).

### Discussion

Aesthetic gum contouring with diode laser is predictable and minimally invasive procedure that can produce immediate results and is easily acceptable to the patient.<sup>8</sup> The use of diode laser enables complete control over the procedure for even the general dentist as it allows for repeated contouring, better vision in a bloodless field to bring out excellent results in terms of height, contour and symmetry of the gingiva.

The major factor to be taken into consideration, while doing excision is to preserve the biologic width. Biological width is a summation of junctional epithelium and supra crestal connective tissue attachment. Alteration of biological width



**Figure 1:** Recommended zenith placement relative to long axis of maxillary anterior teeth. Note that lateral incisor zenith coincides with long axis of tooth, whereas zeniths of central incisors and canines are slightly distal to long axis.<sup>6</sup>



**Figure 2:** a) Preoperative smile, b) with acrylic stent, c) diode laser excision, d) one month post operative smile.



**Figure 3:** (a) Preoperative smile, (b) Diode laser contouring, (c) 2 week postoperative gingival contour, (d) One month post operative smile.

may lead to gingivitis, discomfort, recession, adjacent bone loss, and pocket formation. This value becomes more critical when crowns or veneers are planned after gingival contouring.

The soft tissue diode laser 810 nm has a high affinity for melanin and hemoglobin and is better equipped to perform soft tissue procedures in the oral cavity.<sup>9</sup> This laser does not interact with dental hard tissues at lower power settings and hence post-operative sequelae are more predictable. This property of the laser allows for a comfortable single sitting gingivectomy.

While doing the procedure with the laser it is important to realize that the laser does not cut like a blade; instead, the tissue is ablated by the laser energy at the fiber tip.<sup>9</sup> The activated laser tip is simply guided along the precise route desired to let the highly directed laser energy do the work. The tip of the fiber is then directed at the rolled margin in a sweeping motion to ablate the margins and bevel them to the desired sharpness. 3 weeks after gingival shaping and contouring, the tooth has a much more esthetic appearance.

Although used with right parameters laser are excellent, sometimes excess carbonization can occur with increased power settings leading to unwanted sequelae such as tooth

sensitivity, gingival recession, and post-operative pain. The clinician has to be wary of these events while performing the procedure.

### Conclusion

The excessive gingival display is a common concern among many patients. Most of these patients are not willing to undergo a major surgical procedure to correct this problem. The diode lasers provide the clinician with a tool to provide minimally invasive surgical alternative for the patient. Both the patients who opted for the procedure did not have any postoperative pain or discomfort. They were followed up for 1 year with excellent results which have sustained.

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