Surgical Lip Repositioning Using LASER for the Reduction of Excessive Gummy Smiles
A case Report

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ABSTRACT
The aim of this case presentation is to demonstrate an alternative method to treat one of the causes of gummy smile, by using LASER which provides us “Dentists” with so many benefits.

To do so, first of all we need to differentiate between the reasons that could cause this “unlikely appearance”. By using LASER beam a split thickness tape of about 10mm of oral mucosa is removed from the anterior region of maxilla above the dental arch, between the 1st molars on both sides, then the 2 edges of the wound is approached and sutured again.

The result we obtain is to reduce the show of the excessive gummy tissue by using relatively less aggressive procedure than orthognathic surgery.

The procedure would reduce but may not eliminate the problem in some cases.

KEYWORDS
Gummy smile, Treatment option, Laser.

INTRODUCTION
Aesthetics now a day became a demand for a fast growing population.

Aesthetic dentistry provides fantastic solutions most of the times to enhance the way the people look, which in turn enhance self confidence.

It is not only about dealing with misaligned or bad looking teeth due to shape or decay or coloration etc. aesthetic dentistry is about dealing with the “elements” or components of the smile which are teeth, gums and lips. Some times we need to do multidisciplinary approach to deal with an aesthetic demand of a patient.

So one of the problems that have a “big impact” on the way the people look is Excessive gingival display in the so called “Gummy smile” which can be a major cause of patient embarrassment.

Some patients who present with gingival and skeletal deformities may require more complex esthetic rehabilitation. For these challenging patients, the multidisciplinary approach can be beneficial to enhance the balance and harmony between all three components of the smile.

ETIOLOGIES
There are 4 POSSIBLE ETIOLOGIES which may cause excessive gingival display:
1 - DELAYED ERUPTION (Fig. 1) in which the gingiva fail to complete the apical migration over the maxillary teeth to a position that is 1 mm coronal to the cemento-enamel junctions.1,2 In these cases, esthetic crown lengthening is the recommended-well documented-treatment procedure to restore the normal dentogingival relationships.3,4 The procedure involves moving the gingival margins apically through soft and possibly hard tissue resection.

(Fig. 1) Example of Gingival Smile caused by Delayed Eruption
retraction of the elevator smile muscle and minimize the gingival display.

This procedure was first described in the plastic surgery literature in 1973\(^7\) and was recently published in the dental literature.\(^8\)

It is important to establish the etiology responsible for the excessive gingival display during patient examination. A diagnosis of delayed eruption, tooth malpositioning, and excessive skeletal deformities might best be treated by crown lengthening, orthodontics, and/or orthognathic surgery.

Treatment options in the case of jaw deformities (Vertical Maxillary Excess) includes:

1. Orthognathic Surgery:\(^6\) for the treatment of vertical maxillary excess, it can restore normal occlusal relationships and reduce gingival display. However this surgery is associated with significant morbidity and needs hospitalization.

2. Botulinum toxin (botox):\(^9\) it causes muscle paralysis by inhibiting acetylcholine release at the neuromuscular junction. This results in the inhibition of the exocytosis of acetylcholine, causing a neuromuscular blocking effect. The use of therapeutic doses allows partial paralysis of the muscles. The limitation of this technique is that it’s not permanent, it needs frequent application every several months.

3. Lip Repositioning:\(^7\) it’s an alternative treatment for the Excessive gingival Display, The procedure is accomplished by removing a strip of mucosa from the maxillary buccal vestibule and creating a partial-thickness flap between the mucogingival junction and the upper lip musculature, the lip mucosa is then sutured to the muco-gingival line, resulting in a narrower vestibule and restricted muscle pull, which reduces the gummy smile.\(^2\)
Muscles Responsible for Smile or:
Elevator smile muscles:
• Zygomaticus minor
• Orbicularis oris
• Levator anguli
• Levator superioris

Lip Repositioning procedure works by limiting the retraction of the above mentioned elevator smile muscles, the objective is to minimize the gingival display hence gingival smile.

LASER

The acronym LASER stands for light amplification by stimulated emission of radiation.

The usage of Lasers have been approved by FDA for endodontics, periodontics, oral surgery, restorations, lesion removal, and desensitization.

Cutting hard/soft tissue is a complex interaction of laser energy with water and tissues (hydrophotonsics). When tissues interact with laser energy, the effect is influenced by emission wavelengths, tissue optical properties, time of exposure, laser energy, and absorption of the laser energy into the tissues. The absorptive effect is the key to how the target tissue’s atoms and molecules convert laser light energy into heat, chemical, acoustic, or nonlaser light energy. Thus, the amount of laser energy needed to produce desired results varies depending on the tissue involved.

It has been shown that the YSGG laser device is selectively absorbed in the target tissue and may result in either a direct tissue cut (cold cut) or vaporization of the water within a cell. This vaporization causes a rupture (thermal cut), a process known as thermal-mechanical tissue ablation. The thermal mechanical tissue ablation limits the amount of collagen damage to as little as 5um (approximately 2 cell widths), leaving the extracellular collagen matrix less affected. There is also reportedly less histamine release in tissues treated with a laser device, which accounts for the lessening or absence of intraoperative and postoperative pain and inflammation. Furthermore, there has been virtually no scarring and minimal tissue shrinkage on crestal, sulcular incisions.

Advantages of the laser with soft tissues include reduction in bleeding, reduction of postoperative pain, reduction of edema, and precise coagulation and cutting.

Benefits of using the laser in this case:
1. The ability to promote faster blood supply to the flap, thus getting faster healing than traditional methods (using the laser in a defocused mode with low-level radiation on the surgical site).
2. Less pain and swelling than traditional blade incisions.

CASE REPORT

A 28 years old female patient showed to the clinic complaining of “Gummy smile”, (Figs. 5,6).
The examination and Panoramic x-ray showed the following findings:
• There is a severe vertical maxillary excess.
• Anatomical crowns of the maxillary anteriors are partially hidden by the gingiva and the clinical crowns are shorter than the anatomical ones.
When we try to discussed the treatment options with the patient we find out that she was aware of the treatment options available by previous consultations of other dentists and surgeons, she didn’t want to go through the post-op pain and possible complications and the time consumption of surgery, she was also afraid the she may not like the way she looks when the orthognathic surgery is done. “I just want my smile to show less of my gums” she said.

The botox wasn’t a treatment of choice for the lady cause she didn’t want to re-do it every several months.

She was looking for an alternative treatment option, so the procedure of crown lengthening by gingivectomy along with lip repositioning was discussed with her.

She was told that this procedure is not the ultimate treatment modality in her case but it would reduce the gingival smile to a considerable extent, and she agreed on that.

The procedure:
Local Anesthesia was administered from the maxillary right to left molar in the vestibular mucosa (Articaine hydrochloride 4% with 1/100,000 epinephrine, Septodent).

A crown lengthening procedure was done first by gengivectomy of the gingival margins (Fig. 7).

Laser beam was used to outline the incisions on the tissue. (Fig. 8)

A partial thickness incision is made along the mucogingival junction, and another parallel one at a 10mm distance (from the first one) at the labial mucosa, the 2 incisions are connected to create an elliptical outline. (Fig. 9)

Dr. Simon mentioned that the amount of tissue excision should be double the amount of gingival display that needs to be reduced, with a maximum of 10-12mm of tissue excision.\(^{16}\)

As the procedure was done using laser, Bleeding was controlled, the epithelium was removed in the incision outline frame, the underlying submucosa was exposed.

The parallel incision lines were approximated with (Nylon 6/0, Atromat). Interrupted sutures starting from midline and then other locations, then a continuous interlocking suture from the left to right angle of the wound. (Fig. 10)

Nonsteroidal anti inflammatory drugs was administered to reduce postoperative discomfort, (occasionally oral antibiotics).

Patients are instructed to:
- Use ice packs for several hours
- Minimize lip movement when smiling and talking for one week
The patient reported tension on her upper lip with mild pain when smiling for 7 days after surgery. Sutures were removed 2 weeks after surgery, the scar resulted from the suture line healing was covered by the upper lip, there was an obvious although not complete reduction in the patient’s gummy smile. (Figs. 11,12) Variations in surgical lip repositioning procedure have been reported.

Some authors advocated myectomies to detach the smile muscle attachment17,18 to prevent relapse, and to allow for tension free suturing.

CONCLUSION
This procedure minimizes gingival display by placing upper lip in a more coronal position.

REFERENCES