

Laser-assisted Pink Esthetic Management for an Orthodontic Patient

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ABSTRACT

Dental esthetics is an important branch of dentistry which deals with the harmony of the teeth and the gingiva in relation to the face. In modern society, it defines a person's character, social acceptance, overall progress in his chosen profession and which reinforces on the social well being of a person. This emphasis has further reiterated the feeling of looking good and being self-confident. Lasers in dentistry have paved a way for the general practitioners to easily manage the soft tissue contour and enhance the pink esthetics in relation to the teeth and the facial profile. This case report deals with the management of the gingiva in terms of the color, texture and contour, thereby enhancing the smile of a dentally compromised patient.

Keywords: Depigmentation, Gingivectomy, Gingivoplasty, Laser treatment, Soft tissue crown lengthening, Frenotomy, Frenectomy, Orthodontic correction, Minimal bleeding and pain.

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INTRODUCTION

'Dental esthetics' is defined as the skills and techniques used to improve the art and symmetry of the teeth and face to enhance the appearance as well as the function of the teeth, oral cavity and face. 'Gingival esthetics' is defined as the proper tinting, contouring and festooning of the gingival tissue portion in relation to the tooth. A great deal of importance has been devoted to dental and gingival esthetics of a person as it increases one's self-esteem. Procedures such as gingivectomy, gingivoplasty, frenectomy, frenotomy, crown lengthening and depigmentation form a group of esthetic treatment related to the gingiva.¹ Patients' awareness has considerably increased to such procedures due to social pressure and post-treatment personal satisfaction.

Gingivectomy is a type of periodontal surgery²⁻⁶ that removes and reforms the diseased gum tissue or other gingival buildup related to serious underlying conditions. Clinical attachment levels of the gum to the teeth and supporting structures determine the success of the surgery. Surgery required beyond gingivectomy involves the regeneration of attachment structures through tissue and bone grafts. Periodontal surgery is primarily performed to alter or eliminate the microbial factors that create periodontitis, and thereby stop the progression of the disease. Periodontal diseases comprise a number of conditions that

affect the health of periodontium. The factors include a variety of microorganisms and host conditions, such as the immune system, that combine to affect the gums and, ultimately, the support of the teeth. The primary invasive factor creating disease is plaque-producing bacteria. Once the gingiva is infected by plaque-making bacteria unabated due to immunosuppression or by oral hygiene, the bacterial conditions for periodontitis or gum infections are present. Unless the microorganisms and the pathological changes they produce on the gum are removed, the disease progresses. Gingivoplasty surgery is a dental procedure in which the gums are reshaped. This procedure is typically carried out by a periodontist and can be done for both cosmetic and medical reasons. Gingivectomy and gingivoplasty are often carried out in conjunction as a treatment for periodontal disease.

Crown lengthening⁷ is done when there is too much of gingival display during smile by removing some gum tissue. This is soft tissue crown lengthening procedure. In some cases after the biological width considerations are done, both hard and soft tissue crown lengthening is carried out to enhance the patient's smile design.⁸

Labial or lingual frenotomy/frenectomy⁹ is a procedure usually done for orthodontic reasons and during midline diastema. Frenectomy is a common procedure in the field of oral and maxillofacial surgery where the band of frenum is excised to relieve the excessive pull on the teeth which might bring about recession of the gingiva. Frenotomy on the other hand is to reposition the frenum more apical to the teeth.

Gum depigmentation (gum bleaching) is a procedure used in cosmetic dentistry to remove black spots or patches on the gums caused by excessive melanin. The normal color of the gingiva is coral pink, but excess deposit of melanin (melanin gingival hyperpigmentation) creates an esthetic or cosmetic problem. A clinical assessment is carried out to customize the treatment to the patients' needs, and the procedure itself can involve surgical, chemical or laser ablation techniques. Melanocytes are cells which reside in the basal layer of the gingival epithelium. These cells produce melanin, which are pigments that cause discoloration or dark spots in gums. A dental laser can target and ablate the melanocytes, thus reducing the production of melanin in the gingival tissue. Following laser depigmentation,¹⁰ the gingiva heals by secondary intention. This results in a lighter and more uniform color of the gums.¹¹

This case report describes the laser parameters¹² of performing upper labial frenectomy, gingivoplasty, gingivectomy, depigmentation and crown lengthening procedures in a post-orthodontic patient¹³ without infiltration of local anesthesia. Moreover, the reassurance of the patient about the painless procedure is one of the most important criteria. The advantage of laser surgery includes higher precision when compared to surgical tools, which results in less pain, bleeding, swelling and scarring. The procedure is less time consuming, easy to perform in an outpatient setup and no sutures are required, which decreases the risk of postoperative infection. This case report further describes the advantages of diode laser surgery¹⁴ purposely omitting routine procedure as laser transmits energy to the cells causing warming, welding, coagulation, protein denaturation, drying and vaporization.

MATERIALS AND METHODS

Diode 940 nm (Ezlase, Biolase, USA) was used for this study. It is a solid state soft tissue laser with GaAlAs as the medium coming under the laser classification of IV.⁴ A 400 mm surgical disposable tip was initiated prior to using it for excision of the overgrowth. All universal precautions of laser safety were followed prior and during the procedure.

CASE REPORT

A 22-year-old female patient had come to our dental clinic with a complaint of proclined teeth (Fig. 1). She had difficulty in closing her lips and was physically conscious of her appearance. She also expressed her concern in relation to the color of her gingiva.

On clinical examination the patient had maxillary anterior proclination with spacing. Patient expressed her desire to undergo treatment for correction of malocclusion. Orthopantomogram revealed no supernumerary teeth in between the upper central incisors. After preliminary oral hygiene measures the case was referred to the consultant orthodontist who did fixed orthodontic treatment which lasted for 13 months (Fig. 2). The patient was very happy



Fig. 1: Preoperative view showing proclined upper anteriors with spacing

with the orthodontic treatment but expressed her concern over the bundling of soft tissue between her teeth.

The bundling of soft tissue could have occurred due to:

- Soft tissue accumulation in between the flared incisor teeth during the remodeling of bone.
- Inadequate oral hygiene maintenance.

The patient was explained about soft tissue esthetics and an informed consent was obtained from the patient. The options available were surgical intervention with scalpel, electrocautery, diode or erbium lasers. The procedures included in the pink esthetic restoration/enhancements were gingivoplasty, gingivectomy, frenectomy, soft tissue crown lengthening and depigmentation.

Frenotomy (Fig. 3), a simple and straight forward procedure with complete hemostasis and less chairside time for the dentist and patient. The procedure was performed in the mid orthodontic stage. A 400 nm initiated tip was used with diode (940 nm Ezlase, Biolase, USA) laser setting 1 W, continuous wave in contact mode (Fig. 4). The decreased amount of scarring aided in faster and effective treatment outcome with increased patient satisfaction post-orthodontically.

A 400 nm initiated tip (Fig. 5) was used for gingivectomy and gingivoplasty procedures. The initiated tip was used to remove the bundle of soft tissue in between the teeth. In some area gingivoplasty (contouring of gingiva) and gingivectomy (excision of the thickened gingiva) was done (Fig. 6) to sculpt the soft tissue and contour the gingiva to eliminate pseudo pocket thereby minimizing the food entrapment between the tooth and the gingiva. Taking into consideration the crown display and the biological width, the soft tissue covering the anatomical crown was excised and depigmentation or removal of the melanin pigments from the gingiva was done in selected areas to enhance the esthetics (Fig. 7).

The patient was recalled for a post-operative checkup (Fig. 8) to evaluate the initiation of healing process and pain. She appeared to be very comfortable throughout the procedure and all through the healing period with no



Fig. 2: Post-orthodontic treatment view



Fig. 3: Frenotomy done and orthodontic treatment has been started



Fig. 6: Gingivoplasty/gingivectomy is done—postoperative view

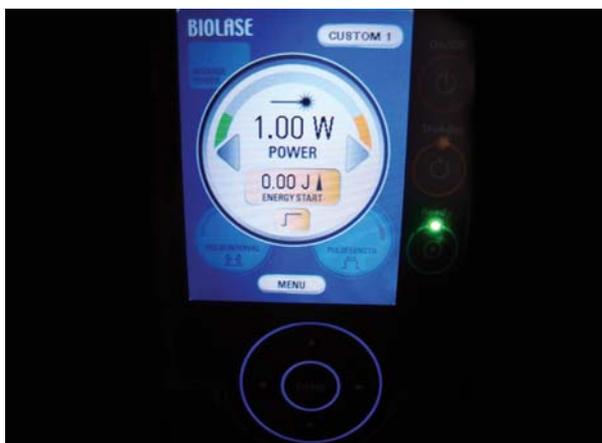


Fig. 4: Laser diode settings



Fig. 7: Crown lengthening and depigmentation done—postoperative view



Fig. 5: Diode (940 nm, Ezlase, Biolase, USA) laser is used with 400 mm tip



Fig. 8: One day postoperative view

problem with maintenance of the site (Figs 9 to 11). Her initial excitement of the interference to have gone without much hassle brought smile on her face and relaxed her anxiety. A 1 year follow-up was also done and the case was re-evaluated (Fig. 12). Patient was extremely happy with the total treatment outcome.

CONCLUSION

The role of laser surgery in the oral cavity is well established. The patient was comfortable throughout the multiple

procedures done in a single visit. The healing was uneventful and the patient had not taken any medication. The patient was able to resume to her daily routine and maintain good oral hygiene. The patient was extremely happy with the treatment outcome and had got her desired results within a short treatment span. With the advent of lasers in clinical practice, simple procedures like frenectomy, gingivoplasty, gingivectomy and crown lengthening which enhance the person's confidence can be included into routine dental treatment.



Fig. 9: One week postoperative view



Fig. 11: One month postoperative view



Fig. 10: Ten days postoperative view



Fig. 12: One year follow-up

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