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### **Management of ‘Gummy Smile’ With Minimally Invasive Technique Using Diode Laser. A Case Report**

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#### **ABSTRACT-**

Excessive gingival display in maxillary anterior region or “gummy smile” is a major concern for a large number of patients. To correct this excessive gingival display various techniques have been employed, crown lengthening by gingivectomy procedure is one of them. Crown lengthening can be done by various methods including conventional surgery using scalpel, electro-surgery, lasers etc. As the paradigm is shifting from the conventional methods towards minimally invasive surgical procedure, laser mediated flapless crown lengthening are noted in literature. The present case report describes a simple and effective minimally invasive method for esthetic crown lengthening to treat gummy smile using 810 nm diode laser.

**KEYWORDS-**excessive gingival display, gummy smile, esthetic crown lengthening, 810 nm diode laser, minimally invasive surgery.

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## INTRODUCTION-

An aesthetically pleasing smile elevates the self-confidence of an individual. The harmony of a smile is determined by shape, position, and colour of teeth along with the position and contour of the gingiva. A display of gingiva of approximately 2-3 mm during smile is considered as aesthetically acceptable. However, in a sample of over 450 adults, aged 20–30 years, 7% of men and 14% of women were found to have a gummy smile.<sup>1</sup> This excessive gingival display leads to compromised appearance of an individual due to unesthetic appearance and leads to lack of confidence. Goldstein classified smile line (consisting of the lower edge of the upper lip during smile) according to the degree of exposure of the teeth and gums into three types: High, medium, or low gummy smiles (GSs) ranged from mild, moderate, and advanced, to severe.

Depending on the situation and the therapeutic endpoint required, a number of surgical procedures are available. However, if bone removal is not necessary, it is possible to perform crown lengthening procedure to increase the amount of labial exposure of the clinical crown, and to increase the amount of tooth exposed superior to the bone to prevent impingement of the restoration on the biologic width.

Common to all crown lengthening procedures is the need for meticulous maintaining the anatomical requirements of the biologic width, which, if violated, can lead to chronic inflammation, attachment loss, and recession. In dentistry evolving technologies have served to provide various minimally invasive techniques which are beneficial for both the patients and the clinicians. Minimally invasive surgeries using Lasers has evolved as potentially effective adjunct tool within this arena.<sup>6-7</sup>

The documented advantage of laser in periodontal surgery includes less bleeding thus, allowing good visibility at the surgical site and post-operative patient comfort is minimum.

The present case reports a simple and effective flapless esthetic crown lengthening procedure using 810 nm diode laser in minimally invasive fashion with satisfied results and excellent patient satisfaction.

## CASE REPORT

A 26 years old female patient visited to the department of periodontology, Subharti Dental College & Hospital Meerut, with a complain of unpleasant appearance due to gummy smile. Patient was systemically healthy with non-contributory medical history. Clinical examination revealed healthy periodontium and sufficient amount of attached gingiva. During smiling the patient's teeth were visible from right maxillary right first premolar to maxillary left first premolar with 8-9 mm of gingival display in the maxillary central incisor region [Fig.1,2]. The teeth had normal anatomic proportions. Patient was informed and discussed about esthetic crown lengthening with laser as a

treatment option to correct her gummy smile. Written informed consent was obtained from the patient.



**Fig- 1 Pre-operative extra-oral photograph demonstrating gummy**



**Fig-2 Preoperative intraoral photograph**

After completion of the phase I therapy patient was recalled after 2 weeks and was asked to rinse with 0.2% chlorhexidine gluconate solution for 1 min prior to the surgical procedure. The protocols for laser safety were established and monitored and 2% lidocaine with 1:100,000 epinephrine local anesthetic solution was injected at the site. The cemento-enamel junction was determined by careful probing around labial surface of each tooth. Pocket marking was done on the external surface of the gingiva corresponding to the cemento-enamel junction using pocket markers. Diode laser of wavelength 810nm, output power 3.5 W was used for esthetic crown lengthening. Tip was kept perpendicular to the tooth surface and 2.5 to 3.5mm of the gingiva was excised from margin [Fig.3].



**Fig-3 Immediate post-operative after gingival tissue excision by diode laser**

The patient was given the post-surgical instructions and was prescribed ibuprofen 200mg 3 times per day for 5 days. The patient was recalled after 10 days and then after 1 month for evaluation [Fig.4]. No post-operative complications were reported and the patient displayed uneventful healing with no discomfort or pain [Fig.5].



**Fig-4 one month post-operative picture showing resolution of gummy smile**



**Fig -5 one month post-operative intraoral photograph**

## **DISCUSSION**

With the advent of minimally invasive surgical procedures, laser mediated flapless crown lengthening is continuously gaining attention in dental and periodontal literature. A number of laser mediated flapless crown lengthening procedures has been reported. There are abundant evidence confirming markedly less bleeding in highly vascular oral tissues, with laser surgery. Excessive gingival display leads to compromised esthetics which appears unpleasing during smiling thus, most patients seek its removal due to esthetic concerns. Various treatment modalities have been used for this purpose including scalpel, electrosurgery, and laser. Conventional or scalpel technique for crown lengthening is time consuming, tiring and leads to excessive blood loss. Whereas, the undesirable haemorrhage and increased postoperative discomfort along with the need to cover the surgical site for 7–10 days makes the administration of this technique unpleasant to the patient. Electrosurgery requires more expertise than scalpel surgery. Furthermore, application of electrosurgical electrodes should be done with utmost care as its contact with bone or teeth may cause damage to the underlying structures and the heat accumulation in tissues may cause undesired tissue destruction.<sup>12</sup> Keeping these factors in mind laser was used in present case report. The semiconductor diode laser is emitted in continuous wave or gated/pulsed mode. Emitted laser light is highly absorbed in hemoglobin and other pigments which make it an excellent choice for cutting and coagulating soft tissues. The diode laser exhibits thermal effects using the “hot tip” effect caused by heat accumulation at the end of the fiber and produces a relatively thick coagulation layer on the treated surface.

The usage of laser is similar to electrocautery but tissue penetration is less. In this case report, diode laser was used and did not produce any deleterious effect in oral tissues. The healing period was shorter without any post operative bleeding.

## CONCLUSION

Gingivaplays an important role in building a patients smile, yet it effects the facial appearance. The application of diode laser is minimally invasive treatment option and it is of great advantage over the conventional method to treat soft tissue surgery. Laser can be considered as safe and effective alternative procedure for the treatment of esthetic crown lengthening. In the present case,the result was obtained with minimal inflammation with no scarring and the patient did not reportpain or discomfort.

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