

**CASE REPORT*****A Successful Esthetic Approach of Gingival Depigmentation Using 810 nm Diode Laser: A Case Report***Rajni Prajapati<sup>1</sup>, Ellora Madan<sup>2</sup>, Treena Kabiraj<sup>1</sup>, Atika Ismail<sup>1</sup>**Abstract**

*Gingival depigmentation is a periodontal plastic procedure that is performed in order to remove melanocytic pigmentation. Various treatment modalities have been proposed for depigmentation procedure which includes use of scalpel, bur abrasion, chemicals, gingival autograft, cryotherapy, electrosurgery, radiosurgery and lasers. The objective of this article is to report a case of the gingival depigmentation using 810 nm diode laser and to shed light on effectiveness of this technique which produces good results and patient satisfaction. The use of diode laser seems to be safe and effective treatment modality that provides optimal aesthetic results with reduced discomfort to the patients during the treatment.*

**Keywords:** Depigmentation, 810 nm Diode Laser, Gingiva, Melanin.

**Introduction**

Since perioaesthetics have become a major demand in dentistry, treatment protocols should not only address functional and biological problems but also establish harmony between teeth and gingiva.

A typical macro anatomical feature of healthy gingiva is its pink colour which diverges into various shades depending on degree of keratinization, thickness of the gingiva, degree of vascularization, reduction of haemoglobin, and the presence of melanocytic cells<sup>1</sup>.

Although, gingival hyperpigmentation does not represent a pathological problem, but can cause cosmetic problem that may have an adverse psychological impact on patients, especially those with short lips and high smile lines<sup>1</sup>.

The oral pigmentation index was introduced by Dummett and Gupta in 1971<sup>2</sup> as scores for GP according to its colour degree; score 1 is given to pink gingiva (no pigmentation), score 2 indicates light brown pigmentation (mild), score 3 represents medium brown or mixed brown pink and brown pigmentation (moderate pigmentation), and score 4 indicates deep brown or bluish-black pigmentation (heavy pigmentation).

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In addition, another classification by Hanioka et al<sup>3</sup> into three classes- class 0 indicates no pigmentation, class 1 represents solitary units of pigmentation in papillae only, and class 2 displays a continuous ribbon of gingival pigmentation(GP).

There are various methods of depigmentation procedure which include use of scalpel, bur abrasion, chemicals, gingival autograft, cryotherapy, electrosurgery, radiosurgery and lasers.

**Case Description**

A 20 years-old non-smoking patient reported to out-patient department complaining of darkened gum that aesthetically affected her smile and thus her social life. (**Figure 1**)

The patient was healthy, without any history of smoking, nor systemic condition, nor taking drugs. In clinical examination, periodontal tissues were healthy, but bilateral melanin pigmentation was deeply present in both maxillary and mandibular arches. (**Figure 2**) A final diagnosis of physiologic gingival hyperpigmentation was established. Following patient's request, laser depigmentation procedure in anterior keratinized gingiva of both arches was planned after obtaining the patient's consent.

Under local anesthesia, depigmentation procedure was carried out using 810 nm wavelength diode laser. Depigmentation for upper arch was conducted in first visit, while depigmentation of lower arch was carried out in the second visit.

Fiber optic laser tip having 320 µm diameter at 3 W power with 10 Hz frequency and 15 J energy in continuous mode was kept in contact with the pigmented area. Care was taken not to cause overheating and area was frequently wiped with gauze soaked in saline. After the procedure, periodontal dressing (Coe-Pak) was applied. Antimicrobial was prescribed and patient was instructed to avoid hot, acidic and spicy food. She was called back for follow-up and observation. At first week, gingiva showed rapid but still

immature epithelialization. At 1 month follow up, the re-epithelialization was complete. Degree of gingival color of both arches were measured using Dummet Oral Pigmentation Index (DOPI). It reduced from score 3 at baseline to score 1 at one month follow up.



*Fig.1a Real Smile*



*Fig. 1b Social Smile*



*Fig. 2 Full Mouth Intraoral View*



*Fig.3B.Coe-Pak Placement*



*Fig.3C. 1 Week Post-Operative View*



*Fig. 3D. 1 Month Post-Operative View*

#### LASER TREATMENT ON MAXILLARY ANTERIOR REGION



*Fig. 3A. Laser Application*

#### LASER TREATMENT ON MANDIBULAR ANTERIOR REGION



*Fig 4A. Laser Application*



Fig 4B. Coe-Pak Placement



Fig 4C. 1 Week Post-Operative View



Fig 4D. 1 Month Post-Operative View



Fig.5A. Pre-Operative View



Fig. 5B. 1 Month Post-Operative View

## Discussion

An aesthetic smile has number of components. Gingiva is an important integral tissue, which, when affected, particularly by pigmentation is mainly responsible for unpleasant appearance. It is determined by number and size of blood vessels, thickness of epithelium, degree of keratinization and melanin pigments found in basal and supra-basal layer of epithelium which are produced by melanocytes<sup>1</sup>. There are various methods of depigmentation procedure which include use of scalpel, bur abrasion, chemicals, gingival autograft, cryotherapy, electrosurgery, radiosurgery and lasers<sup>4,5</sup>.

Diode laser is a solid-state semiconductor that is emitted in continuous wave and gated-pulsed modes and contact mode preferably. It is characterized by wavelengths of 800 - 980 nm which target especially soft tissues and it does not interact over hardened dental tissues. It exhibits thermal effects using "hot-tip" effect caused by heat accumulation at the end of fiber and produces a relatively thick coagulation layer on the treated surface<sup>6,7,8</sup>. Laser is absorbed by pigments in the soft tissue, thus making it an excellent hemostatic agent and thereby help in providing a relatively dry surgical field.<sup>9,10</sup> Furthermore, photomodulation effects of diode laser were shown to help in stimulating the fibroblasts, angiogenesis and accelerating the lymphatic flow, which improves repair and regeneration<sup>7</sup>. Newly formed re-epithelization occurs after 1 - 2 weeks and is completed by the end of 4 weeks.

A study conducted by Agha and Polenik<sup>11</sup> in 2020 revealed that melanin shows strong absorption of diode wavelengths compared to erbium laser. This results in faster peeling of melanin and shorter treatment procedure with diode.

Another study by Eser Elemek<sup>12</sup> on Gingival melanin depigmentation by 810 nm diode laser concluded that depigmentation with 810 nm diode laser is successful in terms of esthetics and patient comfort.

In present case, gingival depigmentation was carried out using 810 nm diode laser. During the procedure, there was no bleeding. Postoperatively, patient was satisfied with her new smile. Healing was good. She did not report any infection, swelling, or other complications. She did not required the use of any form of analgesics. The procedure was thus shown to be safe and effective method for acceptable esthetic result and maximum patient comfort. However longer follow-up of patients is necessary to monitor and assess the occurrence of repigmentation.

## Conclusion

Gingival health and appearance plays major role in building a patient's smile. Gingival pigmentation especially on labial aspect of anterior teeth has become an important component of esthetics. To serve this purpose, several techniques have been proposed to treat gingival hyperpigmentation. The use of a diode laser seems to be safe and effective treatment modality that provides optimal esthetic results with reduced discomfort to the patients during the treatment.

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