

# Gingival melanin depigmentation by 810 nm diode laser

Eser Elemek<sup>1</sup>**Correspondence:** Dr. Eser Elemek

Email: eserelemek@gmail.com

<sup>1</sup>Private Practice, Istanbul, Turkiye

## ABSTRACT

The color of gingiva is determined by number and size of blood vessels, thickness of epithelium, keratinization degree, and melanin pigments present in epithelium. Melanocytes, located in basal and suprabasal layers of epithelium, are the cells that produce melanin pigments which play a main role for pigmentation of gingiva. In this case series, the use of 810 nm diode laser for depigmentation of gingiva is presented. Two female patients applied with a chief complaint of “darkened gums” due to heavy smoking. In intraoral examination, diffuse melanin pigmentation was observed in both the maxilla and mandible. Under the local anesthesia, 810 nm diode laser was applied for depigmentation at 1.3 W power in continuous mode. Patients were recalled at weeks 1, 4, and 12 to evaluate the healing and recurrence rate. Both the patients had no postoperative pain or edema, and complete healing was observed at week 12. This study revealed that depigmentation with 810 nm diode laser is successful in terms of esthetics and patient comfort.

**Key words:** Depigmentation, diode laser, gingiva, melanin

## INTRODUCTION

Melanin is a brown pigment, located in basal and suprabasal layers of gingival epithelium.<sup>[1]</sup> It plays a main role in physiologic gingival pigmentation which is also determined by the thickness of epithelium, presence of blood vessels, and epithelium keratinization degree. Physiologic pigmentation is mainly genetically determined; however, some other factors such as activity of endocrine glands, ultraviolet radiation, smoking, and medication can also cause gingival hyperpigmentation.<sup>[2]</sup> It is a real esthetic concern for most of the individuals, especially in the anterior keratinized gingiva of the maxilla and mandible.

For depigmentation of gingiva, different techniques have been used such as rotary instruments, scalpel technique, electrosurgery, and different types of lasers.<sup>[3,4]</sup> Each technique has its own advantages

and disadvantages. In addition to carbon dioxide and erbium: yttrium–aluminum–garnet lasers, diode lasers with different wavelengths have also been commonly used with no side effects.<sup>[5,6]</sup>

In this case series, the use of 810 nm diode laser for gingival depigmentation caused by smoking is presented.

## CASE REPORT

Two female patients aged 28 and 25 years with a chief complaint of “darkened gums” visited private practice. Both the patients were systemically healthy and not under any medication. They have been smoking more than one pack of cigarette every day for more than 10 years. In clinical examination, periodontal tissues were healthy, but bilateral melanin pigmentation was

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Elemek E. Gingival melanin depigmentation by 810 nm diode laser. *Eur J Dent* 2018;12:149-52.

**DOI:** 10.4103/ejd.ejd\_373\_17

### Access this article online

Quick Response Code:



**Website:**  
www.eurjdent.com

present in both the maxilla and mandible [Figure 1]. Dummett–Gupta oral pigmentation (DOP) index<sup>[7]</sup> was used to determine the level of depigmentation, and the score was diagnosed as “4” for both of the patients (1: no clinical pigmentation, 2: mild clinical pigmentation, 3: moderate clinical pigmentation, and 4: heavy clinical pigmentation).

Under local anesthesia, depigmentation procedure was applied by 810 nm wavelength diode laser (Cheese® Wuhan, China). The fiber-optic laser tip having a 400 µm diameter at 1.3 W power in continuous mode was kept in contact with the pigmented area. Depigmentation was performed in a horizontal direction, using the laser tip in contact mode on the pigmented part of the gingiva and parallel to the root surfaces not to cause overheating, and the area depigmented was wiped with gauze soaked in saline [Figure 2]. After the procedure, no periodontal dressing was applied and no antimicrobials were prescribed. Patients were instructed to avoid smoking and hot, acidic, and spicy food that can jeopardize the healing process and cause patient discomfort. Following depigmentation, patients were recalled at weeks 1, 4, and 12 during postoperative period for clinical evaluation and repigmentation rate.

Patients mentioned a mild sensitivity only at the day of the surgery. No postoperative pain, hemorrhage, or scarring was observed in both patients, and the healing

was uneventful. At week 1, gingiva showed a rapid but immature epithelialization. On the final healing at 12 weeks, gingiva appeared pale pink which was satisfactory for both patients and operator [Figure 3]. DOP index for both patients was scored as “1.”

## DISCUSSION

The degree of melanin pigmentation depends on the number and distribution of melanocytes and their capacity to transfer melanin and melanin uptake by keratinocytes.<sup>[8]</sup> Melanin-pigmented gingiva is often a demand for depigmentation mainly for esthetic reasons. Different techniques have been used for this procedure such as scalpel technique, cauterization, cryotherapy, diamond burs, and lasers, the latter being the most recent and reliable one.<sup>[9-11]</sup> To date, many wavelengths of the lasers are suggested to be beneficial in melanin depigmentation procedure. However, all of the published studies employed a different set of irradiation parameters.<sup>[12]</sup> In this study, we used 810 nm diode laser to remove melanin pigmentation in the anterior region of both the maxilla and mandible of patients.

Melanocytes, located in mostly basal and suprabasal layers of gingival epithelium, should be eliminated for a proper depigmentation. Superior to other techniques, application of a laser results in homogeneous ablation of epithelial and rete pegs as well. Diode laser with 810 nm wavelength is used in soft tissues



Figure 1: Baseline



Figure 2: Depigmentation by diode laser



**Figure 3:** Complete healing 12 weeks after depigmentation

for coagulation and cutting. Diode laser irradiation also has bactericidal effect resulting in hemostasis.<sup>[13]</sup> Having a high affinity to penetrate into hemoglobin and melanin pigments makes it the preferred laser for depigmentation of gingiva. Diode lasers can be used both in pulsed or continuous mode. Application of the laser in pulsed mode prevents overheating of surrounding tissues that may cause necrosis and jeopardize healing. Taking into consideration the previously published studies,<sup>[3,4,14,15]</sup> diode laser was used in continuous mode in this study knowing the fact that it may penetrate deeper and affect connective tissue as well. That's why, the evaluations were also made at weeks 4 and 12. The use of lasers has several advantages such as no need to place a periodontal dressing, short healing period, no or very slight pain, no hemorrhage. The only disadvantage may be the high cost of the lasers.

Repigmentation may also occur depending on the technique used and the race of the patients.<sup>[16]</sup> According to the theory, melanocytes migrate from the adjacent pigmented tissues to treated sites resulting in repigmentation.<sup>[17]</sup> It is an outcome of histologic changes in the melanocyte activity and density of melanin pigments that can be seen from 15% to 30% even after 6 months of depigmentation.<sup>[18]</sup> It is important to remove as much melanocytes as possible in order to prevent them to migrate from periphery.

That's why, it may be beneficial for a clinician to use magnifications during the procedure. In this study, patients were followed up for 3 months, and no repigmentation was observed during that time. However, the reason for this result may be the short follow-up period as the histological changes may vary depending on the race and technique used.

In this case series, the use of 810 nm diode laser for depigmentation of gingiva resulted in complete healing at week 12. It was also shown to be a safe and effective method for acceptable esthetic result and maximum patient comfort. A longer follow-up of the patients is necessary to monitor the occurrence of repigmentation.

#### **Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

#### **Financial support and sponsorship** Nil.

#### **Conflicts of interest**

There are no conflicts of interest.

## **REFERENCES**

1. Dummett CO. Normal and locally induced oral pigmentations. *Int Dent J* 1976;26:152-6.
2. Houshmand B, Janbakhsh N, Khalilian F, Talebi Ardakani MR. Efficacy of conventional laser irradiation versus a new method for gingival depigmentation (Sieve method): A clinical trial. *J Lasers Med Sci* 2017;8:88-94.
3. Bakutra G, Shankarapillai R, Mathur L, Manohar B. Comparative evaluation of diode laser ablation and surgical stripping technique for gingival depigmentation: A clinical and immunohistochemical study. *Int J Health Sci (Qassim)* 2017;11:51-8.
4. Kathariya R, Pradeep AR. Split mouth de-epithelization techniques for gingival depigmentation: A case series and review of literature. *J Indian Soc Periodontol* 2011;15:161-8.
5. Kher U, Khan Z. Gingival depigmentation using the diode laser: Three case reports. *Int J Laser Dent* 2012;2:78-83.
6. Anoop S, Abraham S, Ambili R, Mathew N. Comparative evaluation of gingival depigmentation using scalpel and diode laser with 1 year follow-up. *Int J Laser Dent* 2012;2:87-91.
7. Dummett CO. Physiologic pigmentation of the oral and cutaneous tissues in the negro. *J Dent Res* 1946;25:421-32.
8. Feller L, Masilana A, Khammissa RA, Altini M, Jadwat Y, Lemmer J, et al. Melanin: The biophysiology of oral melanocytes and physiological oral pigmentation. *Head Face Med* 2014;10:8.
9. Murthy MB, Kaur J, Das R. Treatment of gingival hyperpigmentation with rotary abrasive, scalpel, and laser techniques: A case series. *J Indian Soc Periodontol* 2012;16:614-9.
10. Atsawasuwan P, Greethong K, Nimmanon V. Treatment of gingival



- hyperpigmentation for esthetic purposes by nd: YAG laser: Report of 4 cases. J Periodontol 2000;71:315-21.
11. Shah C, Dave R, Shah M, Dave D. Evaluation of scalpel versus diode laser for gingival depigmentation: A case report. Int J Adv Health Sci 2014;1:24-7.
12. Pavlic V, Brkic Z, Marin S, Cicmil S, Gojkov-Vukelic M, Aoki A, *et al.* Gingival melanin depigmentation by er: YAG laser: A literature review. J Cosmet Laser Ther 2017;6:1-6.
13. Kanakamedala AK, Geetha A, Ramakrishnan T, Emadi P. Management of gingival hyperpigmentation by the surgical scalpel technique-report of three cases. J Clin Diagn Res 2010;14:2341-6.
14. El Shenawy HM, Nasry SA, Zaky AA, Quriba MA. Treatment of gingival by diode laser for esthetical purposes. Maced J Med Sci 2015;3:447-54.
15. Suragimath G, Lohana MH, Varma S. A split mouth randomized clinical comparative study to evaluate the efficacy of gingival depigmentation procedure using conventional scalpel technique or diode laser. J Lasers Med Sci 2016;7:227-32.
16. Gupta G, Kumar A, Khatri M, Puri K, Jain D, Bansal M, *et al.* Comparison of two different depigmentation techniques for treatment of hyperpigmented gingiva. J Indian Soc Periodontol 2014;18:705-9.
17. Perlmutter S, Tal H. Repigmentation of the gingiva following surgical injury. J Periodontol 1986;57:48-50.
18. Hegde R, Padhye A, Sumanth S, Jain AS, Thukral N. Comparison of surgical stripping; erbium-doped: yttrium, aluminum, and garnet laser; and carbon dioxide laser techniques for gingival depigmentation: A clinical and histologic study. J Periodontol 2013;84:738-48.