

CASE REPORT

Laser assisted gingival depigmentation

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Abstract
Excessive melanin deposition by melanocytes, which are mostly found in the basal and suprabasal cell layers of the epithelium, results in gingival depigmentation and hyperpigmentation of the gingiva. It is becoming a social stigma for which various procedures are being performed. However, compared to conventional techniques like bur abrasion and surgical measures, depigmentation with lasers is quick and practical. Depigmentation can be done with any of the existing dental lasers, however dentists have certain wavelength preferences. This case report demonstrates a straightforward and efficient laser de-epithelization approach that has been employed to improve periodontal aesthetics.

INTRODUCTION

The color of the gingiva depends on multiple factors of race, systemic, local, physiologic, and pathologic factors. It could range from pale pink to coral pink, to deep red, and even violet depending on the pigmentation of the gingiva by five primary pigments- melanin, melanoid, oxyhemoglobin, reduced hemoglobin, and carotene, of which melanin pigmentation is the most common.^{1,2}

Systemic endocrine imbalances or pharmacotherapeutic agents and even exogenous agents such as heavy metals (mercury, bismuth, lead, iron) can also predispose to gingival hyperpigmentation. Hirschfeld stated that oral pigmentation was often considered as a manifestation of Addison’s disease at that time and termed it as “melanoplakia”.³ Several scoring system has been given for pigmentation e.g Dummett–Gupta Oral Pigmentation Index and Hedin’s classification.

Table 1. Dummett–Gupta Oral Pigmentation Index

| Score | Scale of Pigmentation |
|----------|---|
| Degree 1 | Isolated—only 1 or 2 pigmented interdental papillae |
| Degree 2 | Numerous pigmented interdental papillae |
| Degree 3 | Short continuous ribbons |
| Degree 4 | Long continuous ribbon |

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Table 2. Hedin’s classification

| Score | Scale of Pigmentation |
|-------|--------------------------------------|
| 0 | Pink–no pigmentation |
| 1 | Light Brown–mild pigmentation |
| 2 | Mixed Pink and Brown or Medium Brown |
| 3 | Deep Brown–Blackish Brown |

Different procedures have been proposed for gingival depigmentation.

Roshni & Nandakumar in 2005⁵ classified different gingival depigmentation methods as:

I. Methods used to remove the gingival pigmentation:

A. Surgical methods:

- a. Scalpel surgical technique
- b. Bur abrasion method
- c. Electro-surgery
- d. Cryosurgery,
- e. Lasers,
- f. Radiosurgery.

B. Chemical methods

II. Methods used to mask the gingival pigmentation:

- a. Free gingival graft.
- b. Acellular dermal matrix allograft.

CASE REPORT

A male patient aged 22 years with a chief complaint of “darkened gums” visited Department of Periodontology. The patient was systemically healthy and not under any medication. Upon clinical examination, periodontal tissues were healthy, but bilateral melanin pigmentation was present in the maxilla [Figure 1]. Dummett–Gupta oral pigmentation (DOP) index⁶ was used to determine the level of depigmentation, and the score was diagnosed as “4”.



Figure 1: Bilateral melanin pigmentation

After achieving adequate local anesthesia depigmentation procedure was carried out using 810 nm wavelength diode laser having 1.5 W power in continuous mode. Depigmentation was performed in a horizontal direction, using the fiber-optic laser tip in contact mode on the pigmented part of the gingiva and parallel to the root surfaces not to cause overheating [Figure 2], and the area depigmented was wiped with gauze soaked in saline [Figure 3]. After the procedure, periodontal dressing was applied and antibiotics 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, patient was recalled at weeks 1 and 4 during postoperative period for clinical evaluation.



Figure 2: During procedure



Figure 3: Depigmented area

No postoperative pain, hemorrhage, or scarring was observed and the healing was uneventful. On the final healing gingiva appeared pale pink which was satisfactory for both patient and operator [Figure3]. DOP index postoperatively was scored as “1.”



Figure 4: 1 week post-operative

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.⁷ Melanin-pigmented gingiva is often a demand for depigmentation mainly for esthetic reasons. 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.⁸ In this case, we used 810 nm diode laser to remove melanin pigmentation in the anterior region of maxilla.

Melanocytes, located in mostly basal and suprabasal layers of gingival epithelium, should be eliminated for a proper depigmentation. Application of a laser is superior to other techniques as it results in homogeneous ablation of epithelial and rete pegs as well. Diode laser with 810 nm wavelength is used in soft tissues for coagulation and cutting. Diode laser irradiation also has bactericidal effect resulting in hemostasis.⁹ 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. Taking into consideration the previously published studies,^{10,11} diode laser was used in continuous mode in this study. 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.¹² According to the theory, melanocytes migrate from the adjacent pigmented tissues to treated sites resulting in repigmentation.¹³ 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.¹⁴ It is important to remove as much melanocytes as possible in order to prevent them to migrate from periphery. 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.

CONCLUSION

Gingival depigmentation is a very viable option for improving esthetic appearance. Among the different surgical options available for depigmentation, the goal is to develop a treatment option with the fewest complications for patients among which laser has been proven to have minimal post-operative complications and maximum patient comfort.

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