

Gingival melanin depigmentation with 4 different laser wavelengths 445, 940, 1064 and 2940 nm: a case report

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INTRODUCTION

Melanin gingival hyperpigmentation is not reported as a medical problem, but many patients may consider their black-colored gingiva unpleasing. (1) Gingival depigmentation is a periodontal plastic surgical procedure, and several methods have been employed to create a more esthetic smile. Recently, lasers have been reported as a successful treatment method for gingival depigmentation with several benefits in comparison to the previously mentioned methods. Laser therapy is generally a noninvasive technology, and many patients prefer it as it is painless requiring minimum amount of local anesthetics with less postoperative pain, swelling and discomfort and better wound healing. (2,3)

METHODOLOGY

A 19-year-old female patient of slightly dark skin, described in this clinical report, with a chief complaint of dark colored gums that appear during speech and smiling. She reported that this discoloration is not of a recent appearance and there is a family history of this condition too. She was medically free and denied taking any medication that may have caused this pigmentation. Upon extraoral examination, the patient had a high smile line. Moreover, the intraoral examination revealed score 3 gingival pigmentation index (4) (diffuse brown to black pigmentation, marginal, and attached). (Figure 1)



Figure (1): A, Pre operative full smile photo reveals bilateral gingival melanin pigmentation. B, Pre operative intraoral photo showing diffuse brown to black pigmentation in marginal and attached gingiva.

Following the patient's request, a laser depigmentation procedure was planned after obtaining the patient's consent. Three laser machines with 4 different laser wavelengths were used; Nd:YAG 1064 nm (Fotona LightWalker, Fotona) in upper right quadrant, Er:YAG 2940 nm (Fotona LightWalker, Fotona) in lower right quadrant, Diode 940 nm (EpicX, Biolase) in lower left quadrant and Diode 445 nm (SiroLaser Blue, Dentsply Sirona) in upper left quadrant. The parameters of each laser wavelength based on the manufacturers' instructions were applied as shown in Table 1. The patient was treated in 1 session. Laser safety goggles of each wavelength were worn by the patient and the operator following the Food and Drug Administration laser safety rules.

RESULTS AND DISCUSSION

The patient reported pain during surgery with all wavelengths except 2940 nm. However, no postoperative pain or swelling with all the wavelengths. The patient was

reviewed after 3 weeks with no signs of gingival melanin pigmentation. (Table 2, Figure 2)

| Laser | nm | Site | Power (W) | Tip | Cool |
|--------|------|----------------------|-----------|--------|---------------|
| Nd:YAG | 1064 | Upper right quadrant | 1.5 | 300 μm | No |
| Er:YAG | 2940 | Lower right quadrant | 1.5 | No | Air and water |
| Diode | 940 | Lower left quadrant | 1.5 | 400 μm | No |
| Diode | 445 | Upper left quadrant | 1.5 | 200 μm | No |

Table(1): Parameters of different laser wavelengths used.

| Outcome evaluation | Laser wavelength | Er:YAG 2940 nm | Nd:YAG 1064 nm | Diode 940nm | Diode 445nm |
|---|------------------|-----------------------------------|-----------------------------|-------------|-------------|
| Pain during laser procedure by VAS | | Score 0 | Score 7 Score 0 after LA | | |
| Bleeding during laser procedure | | Score 3 moderate | Score 0 non | | |
| Pain after 24 hours by VAS | | Score 0 | | | |
| Gingival pigmentation index after 3 weeks | | Score 0 (absence of pigmentation) | | | |
| Patient satisfaction | | Very satisfied | | | |

Table(2): Comparison of different outcomes between different laser wavelengths used.



Figure (2): A, Post operative full smile photo B, Post operative intraoral photo

CONCLUSION

All 4 wavelengths were effective in melanin depigmentation similarly with high patient satisfaction.

REFERENCES

1. Roshna T, Nandakumar K. Anterior esthetic gingival depigmentation and crown lengthening: report of a case. J Contemp Dent Pract. 2005;6:139-47.
2. Altayeb W, Hamadah O, Alhaffar BA, Abdullah ARomanos G. Gingival depigmentation with diode and Er,Cr:YSGG laser: evaluating re-pigmentation rate and patient perceptions. Clin Oral Investig. 2021;25:5351-61
3. Arif RH, Kareem FA, Zardawi FM, Al-Karadaghi TS. Efficacy of 980 nm diode laser and 2940 nm Er: YAG laser in gingival depigmentation: A comparative study. J Cosmet Dermatol. 2021;20:1684-91.
4. Kumar S, Bhat SG, Bhat MK. Development in techniques for gingival depigmentation-An update. Indian J Dent 2012; 3:213-21