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Gingival Depigmentation using Erbium-YAG LASER – Four Clinical Case

Dr. Harem Jaafar Hama Rashed BDS, Dr. Didar Sadiq Hama gharib BDS,
[1]*MSc Periodontic Dep. School of Dentistry, Faculty of Medical Science, University of Sulaimani*
[2]*MSc Conservative Dep. School of Dentistry, Faculty of Medical Science, University of Sulaimani*

Abstract: *Melanin, carotene and haemoglobin are the most common natural pigments contributing to the normal colour of the gums. Although physiologic and ethnic melanin pigmentation is not a medical problem, complains about "black gums" are common. Melanin hyperpigmentation usually does not present a medical problem, but patients usually complain of dark gums as unaesthetic. Many techniques have been used for gingival depigmentation. Recently, Laser Ablation has been recognized as one of the most effective, pleasant and reliable techniques. Effective depigmentation of the gingival requires removal of all or most of the melanocytes from the basal layer of the gingival epithelium. Using non-specific radiation means ablation of all the epithelial cell layers, as well as connective tissue rete pegs, leaving behind only remnants of the epithelial rete ridges. Erbium:YAG lasers, meeting most of these requirements and being available in the dental office, seems to be the laser of choice for this procedure. Five patients (2 F; 2 M) who were referred to the School of Dentistry at university of sulaimani for cosmetic therapy of dark/black gingiva, were treated using (Versa wave) Erbium-YAG laser . The laser beam was set up at 1000 mj/ 45 Hz per second. The beam was defocused to produce a 3 mm diameter circle, thus reducing the beam penetration while increasing the treated surface. Using the "brush" technique. Treatment required only topical anesthesia. Healing was perfect and required no supportive therapy. No any recurrence of pigmentation was observed during 3 months follow up. Patients' evaluation analysis showed that the results were pleasing; no pain was experienced during lasing as well as during healing.*

I. Introduction

Melanin pigmentation of the gingiva occur in all races.1-5 Melanin, a brown pigment, is the mostcommon cause of endogenous pigmentation of gingiva and is the most predominant pigmentation of mucosa. 6-10 Gingival hyperpigmentation is seen as a genetic trait in some populations and is more appropriately termed physiologic or racial gingival pigmentation. 1, 2, 7 Melanin hyperpigmentation usually does not present as a medical problem, but patients may complain their black gums are unaesthetic. This problem is aggravated in patients with a “gummy smile” or excessive gingival display while smiling. Gingival depigmentation is a periodontal plastic surgical procedure whereby the gingival hyperpigmentation is removed or reduced by various techniques. The first and foremost indication for depigmentation is patient demand for improved aesthetics.

Many ways available for doing depigmentation. The first and still popular technique to be used is surgical way with scalpel, with limited literature source.10, 11. The procedure essentially involves surgical removal of gingival epithelium along with a layer of the underlying connective tissue ending with the healing of operated connective tissue with secondary tension. Nowadays LASER technology uses is worldwide, and it is less invasive with minimum postoperative bleeding 12 and minimum pain experienced compared to scalpel technique. Accelerated wound healing with laser use has not been scientifically validated. The Erbium: YAG laser has demonstrated the best application of laser use when compared to other types of laser especially Nd: YAG and CO2 lasers, include thermal damage to underlying bone when these lasers are used on thin soft tissue, Tissue penetration from the laser may cause thermal damage 2 to 4 mm below the surface, causing underlying hard tissue damage.13 Erbium: YAG laser leaving the least thermal damage. However, there is no scientific evidence to establish that laser depigmentation is superior to scalpel depigmentation. The decision to use a laser should be based on the proven benefits of improved haemostasis keeping in mind the claimed advantage of less postoperative pain with gingivectomy, frenectomy, or other procedures 14.

II. Case reports

Case 1

28 years old male of Asian ethnicity visited the Periodontic department for an aesthetic issue which was diffuse black discoloration on his gingiva with no medical problems. Preoperative pictures were taken and topical anaesthetic applied, a staff with a protective eye glasses was available. (Versa wave) Erbium-YAG laser was used. The laser beam was set up at 1000 mj/45 Hz per second. The beam was defocused to produce a 3 mm

diameter circle, thus reducing the beam penetration while increasing the treated surface. Then after each 2 minutes the gingiva is wiped off by a wet sterile gauze soaked with 1% normal saline, then depigmentation continued until no pigment remained, each cases needed 45 minutes for completion. The patients are advised to avoid smoking, alcohol and spicy foods, also instructed to keep the wound area clean with soft brushing for the first week. No analgesics were prescribed

CASE 2

Young girl of 25 years old attended Periodontic department at school of dentistry seeking aesthetic treatment of her diffuse broad patches of brown-black discoloration of her gingiva on both upper and lower jaws. The procedure was done like in the case 1 and no any analgesics or any drugs prescribed except advising her to do a good oral hygiene with extra soft brush and dental flossing.

CASE 3 and CASE 4

Both 28 female and 30 years male were received the same treatment and instructions like the case1 and case 2.

Clinical results

We did a follow –up for the cases in which after 24 hours we found the lased gingiva covered with a layer of fibrin which have been exfoliated during the 1st week of treatment. Healing achieved completely during one week and normal pink gingiva was seen, and the gingiva showed completely depigmented except in case 2 in which she had huge amount of stain, we observed a small patch of pigment remained on the canine area in which we removed it simply by the laser within minute. We asked each patient regarding the postoperative pain and discomfort, all answered that there was no pain.

CASE (1) preoperative picture

CASE (1) postoperative picture

CASE (2) preoperative

CASE (2) postoperative

Except two of them has had sensitivity on 2-3 teeth for two days and they received no treatment for this situation.

III. Discussion

Laser have been suggested by many authors for soft tissue removal in different fields of dentistry including periodontics 15,16. Experiencing less bleeding favoured the use of laser in a surgical treatment of highly vascular oral tissues upon hand scalpel, but a less painful procedure in comparison between both laser over scalpel not confirmed up to date17. Like Tal et al 18, and Alsawaswan et al 19, we used infiltration anaesthesia of minimum amount and as theorized that experiencing less pain and discomfort with laser may

attributed to the protein coagulum that is formed on the wound healing may act as a surgical dressing on the area17,20. And sealing of the sensory nerves 21. Also in lased gingiva you may find less scar even operating deeper for stain removal in comparison to conventional treatment 22,23. Studies showed a delay in re-epithelization in using laser 24,25. But in our study we found that complete healing was achieved during 7 days after treatment. Atsawasuwan et al 19, treated four cases with Nd-YAG and observed no re-pigmentation during 20-22 months, however, Nakamura et al 21 was used Co2 laser and 4 out of 10 observed to undergo repigmentation after 24 month. On other hand Tal et al 18 experienced no repigmentation in any cases done by Er-YAG laser after 6 month follow up. In the present study in the four cases no repigmentation was observed during two month follow-up, however needing long term follow up.

IV. Conclusion

Using a laser especially Er-YAG for treatment of gingival hyperpigmentation in a defocused mode was found to be completely accepted by the patients in term of having no or minimum bleeding, no postoperative pain, swelling, infection or discomfort, with a good and acceptable healing time without scar. As we observed no repigmentation occurred during 2 months so we think that Er-YAG laser is the treatment of choice for gingival hyperpigmentation.

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