

Comparative Evaluation of Depigmentation Technique with Diode Laser and Electrosurgery – A Case Report

Mohammed Abrar Khan*, Mayur Kaushik, Nitin Tomar, Apoorva Arun

ABSTRACT

Excessive gingival pigmentation is a major esthetic concern for many people. The gingiva is an important intraoral tissue which when affected particularly by pigmentation is mainly responsible for the unpleasant appearance. A harmonious smile accounts for a perfect balance between the pink and white component of oral cavity. It mainly affects the confidence, self-esteem, and esthetics of an individual, which can also have a psychological impact on them. Melanin pigmentation is known to be caused by melanin granules within the gingival epithelium. In this case report, a split-mouth depigmentation was done using electrosurgery and diode laser with melanin hyperpigmentation in the anterior maxilla and mandible which provides increased satisfaction in patients.

Keywords: Depigmentation, Diode laser, Electrosurgery, Gingival hyperpigmentation
Asian Pac. J. Health Sci., (2022); DOI: 10.21276/apjhs.2022.9.2.52

INTRODUCTION

Health and appearance of gingiva are important parts of a smile. The color of gingiva varies in different individuals and is thought to be associated with cutaneous pigmentation.^[1] It depends primarily on the number and size of vasculature, epithelial thickness, degree of keratinization, and pigments within the gingival epithelium. Melanin, carotene, reduced hemoglobin, and oxy-hemoglobin are the prime pigments contributing to the normal color of the oral mucosa.^[2] Gingival pigmentation is presented as a diffuse deep purplish discoloration or as irregularly shaped brown and light brown or black patches, striae, or strands. It results from melanin granules, which are produced by melanoblasts. Melanin is a natural skin pigment, a non-hemoglobin-derived brown pigment, that is the most common of the endogenous pigments. It is located mostly in basal and suprabasal layers of gingival epithelium.^[3] Melanin appears as early as 3 h after birth in the oral tissues and in some cases is the only sign of pigmentation on the body.^[4] Pigmentations can be removed for esthetic reasons. It is generally agreed that pigmented areas are present only when melanin granules synthesized by melanocytes are transferred to the keratinocytes. This close relationship is known as the epidermal-melanin unit.^[5]

The most frequently pigmented tissue in the oral cavity is the gingiva.^[6] Gingival pigmentation is defined as a discoloration of the gingiva due to a variety of lesions and conditions associated with several endogenous and exogenous etiologic features.^[7] It is essential to understand the cause of a mucosal pigmentation before planning the treatment of such lesion.^[8] Broadly, gingival pigmentation may be classified as physiologic or pathologic.

Physiologic (Ethnic/Racial) Gingival Pigmentation

Pigmentation is asymptomatic and no treatment is required. It is common in African, Asian, and Mediterranean populations. Attached gingiva is the most common site of such pigmentation.^[7]

Pathologic Gingival Pigmentation

It includes smoking-associated melanosis, tobacco, drug-induced, endocrine diseases like Addison's disease, metallic

Department of Periodontology, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Meerut, Uttar Pradesh, India.

Corresponding Author: Mohammed Abrar Khan, Department of Periodontology, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Meerut, Uttar Pradesh, India. E-mail: mabrarkhan538@gmail.com

How to cite this article: Khan MA, Kaushik M, Tomar N, Arun A. Comparative Evaluation of Depigmentation Technique with Diode Laser and Electrosurgery – A Case Report. *Asian Pac. J. Health Sci.*, 2022;9(2):264-266.

Source of support: Nil

Conflicts of interest: None.

Received: 12/04/2022 **Revised:** 13/05/2022 **Accepted:** 18/06/2022

pigmentation, for example, lead, bismuth, mercury, silver, arsenic, and gold.

Different procedures have been proposed for gingival depigmentation. Roshni and Nandakumar in 2005 classified different gingival depigmentation methods as:^[9]

Methods used to remove the gingival pigmentation

It includes surgical methods (such as scalpel surgical technique, Bur abrasion method, electrosurgery, cryosurgery, and lasers) and chemical methods.

Methods used to mask the gingival pigmentation

- Free gingival graft
- Acellular dermal matrix allograft.

CASE REPORT

A 24-year-old male patient reported to the Department of Periodontology and Implantology, Subharti Dental College and Hospital, Meerut with a chief complaint of black gums in both the upper and lower jaw region. Medical history was ruled out. On clinical examination, healthy periodontium with pigmented gums in maxillary and mandibular arch was observed. Depigmentation

using electrosurgery and laser was planned out in maxillary arch and mandibular arch, respectively [Figure 1].

A study was conducted by Murthykumar *et al.*^[11] in a South Indian population in which it was detected that there was

Surgical Procedure

Before starting the procedure, a written consent was taken from the patient and the entire procedure was explained to the patient. Routine oral hygiene procedures were carried out and oral hygiene instructions were given. The local anesthesia containing articaine 4% with adrenaline 1:100,000 was administered and the electrosurgical unit (Bonart)[®] was used for carrying out the procedure in the maxillary region. The pigmented site was slowly scraped off using a straight electrode [Figures 2a and b]. It was used at a power setting of 5 and in cutting and coagulation mode. It was found that this method controls hemorrhage, permits adequate contouring of tissues, and causes less discomfort to patient, less scar formation, and lesser chair time.^[10]

In the similar manner, depigmentation was performed in the mandibular region using Diode laser (Sunny Gold)[®]. It was done at a wavelength of 980 nm. The laser was used in continuous mode at a power output of 2W. Figure 3 shows the immediate post-operative view of the surgical field. Patient was advised to use antibiotic (Amoxicillin 500 mg with clavulanic acid 125 mg 3 times a day) and analgesic (Diclofenac sodium 50 mg with serratio-peptidase 10 mg twice a day) postoperatively for 5 days. There were no postsurgical complications. Patient was recalled at 1 week [Figure 4], 1 month, 3 months, and after 6 months [Figure 5], the gingiva appeared pink, healthy, and firm. The patient expressed satisfaction over the enhanced color of the gingiva.

DISCUSSION

Dummett^[6] described the distribution of melanin pigmentation as:

- Palate – 61%
- Gingiva – 60%
- Mucous membrane – 22% and
- Tongue – 15%.

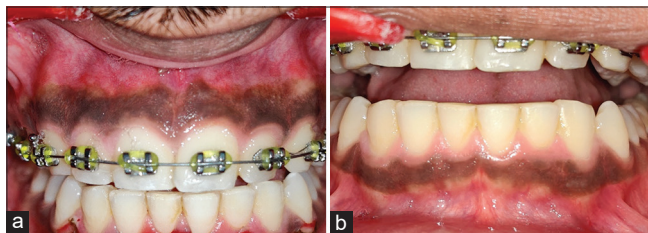


Figure 1: (a) Pre-operative maxillary arch, (b) Pre-operative mandibular arch

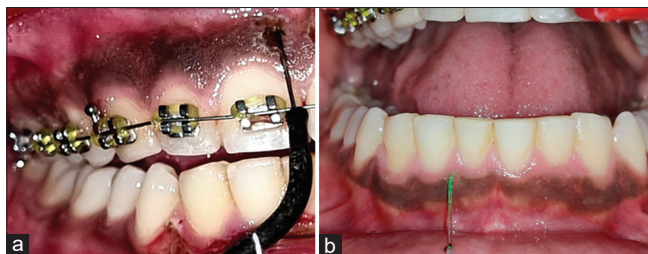


Figure 2: (a) Operative view using electrosurgery, (b) Operative view using laser



Figure 3: Immediate post-operative view

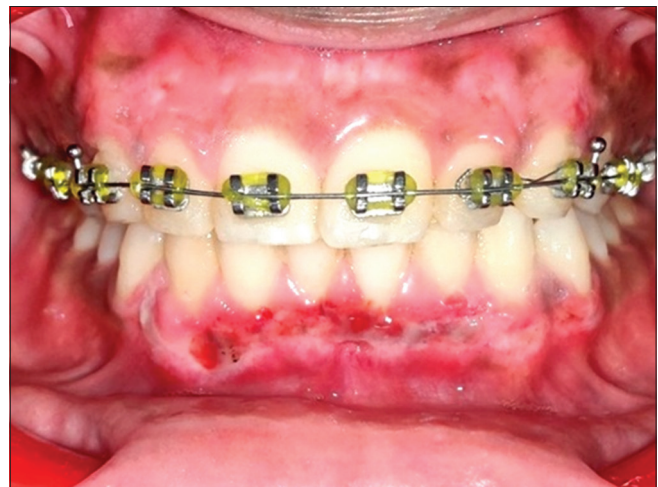


Figure 4: Post-operative 1 week



Figure 5: Post-operative 6 months

obvious significant association between skin color and gingival hyperpigmentation.

Dummett-Gupta oral pigmentation index (DOPI) score scale of pigmentation is:

0 – Pink – no pigmentation

1. Light Brown – mild pigmentation
2. Mixed Pink and Brown or Medium Brown
3. Deep Brown – Blackish-Brown.

Melanin-pigmented gingiva is often a demand for depigmentation mainly for esthetic reasons.^[12] The present case report was carried out to compare two commonly used techniques, electrosurgery, and diode laser for depigmentation.

Electrosurgery is a term used to describe multiple modalities that use electricity to cause thermal destruction of tissue through dehydration, coagulation, or vaporization. In electrosurgery, high-frequency, alternating electric current at various voltages, is passed through the tissue to generate heat. It requires a power supply and a handpiece with one or more electrodes. The device is controlled using a switch on the handpiece or a foot switch. It is applied directly to tissue to induce histological effects. As the current passes through the tissue, it generates heat, which boils the tissue water, creating steam, resulting in either cutting or coagulation of tissue.

Diode laser energy is highly absorbed in pigments such as melanin and hemoglobin. Hence, they are highly efficient for gingival depigmentation. Melanin pigmented gingiva was ablated with a flexible and hollow-fiber delivery system in the contact mode. The laser technique has many advantages which include.^[13]

1. Relatively bloodless surgical and post-surgical course
2. Ability to coagulate, vaporize, and cut tissues
3. Sterilization of the wound site
4. Minimal swelling and scarring.

However, patient discomfort was more in laser treated site during the initial healing period as compared to scalpel.

Ojha and Srivastava^[14] reported that laser is better than scalpel and electrosurgery in terms of healing and patient acceptance. However, in this present case, there is delayed healing on the site which was treated by laser after 1-week post-operative period.

Elemek^[12] concluded from his study that 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.

Electrosurgery and laser therapy showed desirable results with better patient satisfaction and there was no recurrence 3-month postoperatively. These two techniques have the advantage of the bloodless field during surgery and technical expertise is required. Both the techniques did not show any post-operative complications. Laser therapy is of high cost, which also needs to be taken into consideration. However, the recurrence was less at 6-month postoperatively when compared with electrosurgery.^[4] Similarly, in this present case report, no recurrence was seen up to 6 months.

Re-pigmentation refers to the clinical reappearance of melanin pigment following a period of clinical depigmentation. Repigmentation may also occur depending on the technique used and the race of the patients.^[15] According to the theory,

melanocytes migrate from the adjacent pigmented tissues to treated sites resulting in repigmentation. Following surgical procedure, patient was recalled at 1-week, 1-month, 3-month, and 6-month postoperatively to evaluate the recurrence of melanin pigments and wound healing. In this case report, patient treated with electrosurgery showed complete healing within the 1-week period and for both laser and electrosurgery the patient had better compliance, less pain, and no signs of bleeding.

CONCLUSION

As a matter of fact, the laser and electrosurgery need to be used with caution and have the advantage of minimal bleeding, and technical expertise is required. Furthermore, the high cost of the laser apparatus has to be taken into consideration. However, the healing at 1 week was best with electrosurgery as compared to the laser. Thus, within the confines of the present case report, it can be concluded that both two modalities produce comparable results in the long-term.

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