

Comparison of Different Techniques of Gingival Depigmentation: A Case Series

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Abstract

Pigmentation of gingiva not just hampers esthetic appearance but also affects the psychological status of an individual. Excessive gingival pigmentation is a major concern for many people. Melanin pigmentation is known to be caused by melanin granules within gingival epithelium. Cases reported here of hyperpigmentation were treated with surgical abrasion method using diamond bur, electrosurgical, and diode laser in split-mouth design with note on the comparison of healing.

Keywords: Surgical abrasion, Electrosurgery, Laser, Melanin, Depigmentation.

INTRODUCTION

A smile is not only a method of communication but also a method of socialization. Harmony of smile is based on not only the color of teeth but also depends on the color of the gingival tissues. Any feeling of pleasure, happiness, laughter, or simply a greeting leads to a smile resulting in the exposure of teeth and gingiva. It could be an esthetic issue for some patients, especially when it is located in the anterior labial gingiva, is combined with a high smile line, and is not uniform in appearance.^[1]

Melanin hyperpigmentation of the gingiva does not pose any medical problem, but many patients may consider this an esthetic problem, particularly patients who have an excessive gingival display or gummy smile. In such cases, the excessive melanin pigmentation can be corrected by a simple periodontal plastic procedure known as gingival depigmentation.^[2]

Gingival hyperpigmentation is seen as a genetic trait in some populations and is more appropriately termed physiologic or racial gingival pigmentation. It has also been suggested that although pigmentation under normal conditions is genetically determined, its particular distribution in the mouth may be the result of secondary influences and perhaps environmental factors.^[3]

Gingival hyperpigmentation can be defined as a darker gingival color beyond what is normally expected. Pigmentation is contributed by-products of the physiological process such as melanin, melanoid, carotene, oxyhemoglobin, reduced

hemoglobin, bilirubin and iron and/or pathological diseases, and conditions. Melanin pigmentation results from melanin granules which are produced by melanoblasts. Furthermore, environmental risk factors such as tobacco smoking contribute to gingival hyperpigmentation in both active and passive forms.^[4]

Gingival depigmentation has been carried out using various nonsurgical and surgical procedures. Different treatment modalities which have been reported include bur abrasion, scraping, partial thickness flap, cryotherapy, electrosurgery, gingivectomy, gingivectomy with free gingival autografting, chemical agents, such as 90% phenol and 95% alcohol, and lasers. Recently, laser ablation has been recognized as a most effective, pleasant, and reliable technique.^[5]

This case series presents different techniques commonly used for gingival depigmentation.

CASE REPORT 1

A 26-year-old female visited the department of periodontology with chief complaint of black gums (Figure 1). Medical history was non-contributory. Melanin hyperpigmentation was found

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on maxillary and mandibular gingiva. Her oral hygiene was good. Professional mechanical plaque control was carried out at the initial visit. A week later after obtaining written informed consent, infiltration anesthesia was administered. Scalpel method of depigmentation was done on the right mandibular quadrant. A #15 scalpel blade was used to slice the pigmented gingiva from mesial to distal direction on the left mandibular quadrant depigmentation was done by surgical scraping method using high-speed arotor and diamond burs. After the complete removal of the hyperpigmented gingiva, pressure pack was applied to stop the bleeding. Periodontal dressing was given. Post-operative instructions and medications were prescribed. The patient was recalled after 1 week. Healing at the end of a week was uneventful and with no post-operative complications (Figure 2).

CASE REPORT 2

A 27-year-old male reported with chief complaint of black gums. Medical history was non-contributory. Melanin hyperpigmentation was found on maxillary and mandibular gingiva (Figure 3). His oral hygiene was good. Professional mechanical plaque control was carried out at the initial visit. A week later after obtaining written informed consent, infiltration anesthesia was administered. Depigmentation was done using electrosurgery on the right maxillary quadrant. On the left maxillary quadrant, depigmentation was done by a 980-nm diode laser (LX16 Wood Pecker). Depigmentation was carried out at power set at 0.5 W, continuous wave, and in contact mode. The pigmented gingival epithelium was ablated with 400-micron tips in a painting stroke method in both mesial to distal as well as in apicocoronal directions.



Figure 1: Pre-operative



Figure 2: Pre-operative

Periodontal dressing was given. Post-operative instructions and medications were prescribed. The patient was recalled after 1 week. Healing at the end of a week was uneventful and with no post-operative complications (Figure 4).

RESULTS

Results were compared with regard to postoperative pain, swelling, time, cost efficiency, and healing after the application of the four modalities. In the surgical abrasion method using a high-speed handpiece with diamond burs after 1 week, the wound area was still erythematous. This was in contrast to the electrosurgical case, where erythema was less, although edema was more. The best presentation was seen in the laser-operated side, where both erythema and edema were not present.

However, with regard to patient discomfort, at the end of 1 week, the least amount of discomfort was reported in the laser site, followed by the electrosurgical site, while maximum pain was reported in the surgical abrasion technique. From a clinical point of view, the least amount of manual dexterity and time is required in laser surgery, followed by electrosurgery, while maximum time and dexterity are required in the surgical abrasion technique. Bleeding was more for the surgical abrasion method while almost no bleeding was seen in laser and electrosurgery.

DISCUSSION

The synchronization of the smile is summarized not only by the shape, color, and position of the teeth but also by the gingival



Figure 3: After 1 week



Figure 4: After 1 week

tissues. Cosmetic expectations concerning facial esthetics have increased with time and current trends speak volumes about gingival esthetics and smile designing as an approach to enhance the personality and appearance of an individual. The color of the gingiva plays a key role in the esthetics of the patient.^[6]

Hyperpigmented gingiva is one of the most common reasons that force a patient to seek cosmetic treatment. Various methods are used for gingival depigmentation with varying degrees of success and recurrence rates in the periodontal literature. These include scalpel surgery, surgical abrasion using diamond burs, gingivectomy, gingivectomy with autografting, electrosurgery, chemosurgery, and lasers.

In this case series, we have used all three most commonly used techniques used to treat hyperpigmented gingiva.

The most common and the simplest is the scalpel method using a scalpel blade. It is relatively easier and much cost-effective.^[7] The main disadvantage is excessive bleeding, post-operative pain, and discomfort.^[8] This method is contraindicated in individuals with thin biotype.

Electrosurgery is an application of electrically generated heat energy to the tissues to alter it for therapeutic purposes. Electrosurgery is a more effective method for depigmentation than the surgical method. The effectiveness is based on Oringer's exploding theory which states that electrical energy when applied to the hyperpigmented gingiva leads to molecular disintegration of the melanin cells in the basal and suprabasal cell layer.^[9]

Although electrosurgery is relatively easier to use, it requires thorough knowledge and expertise. Electrosurgery can also lead to extensive destruction of the soft and hard tissue under inexperienced hands.

Today, the laser has largely found its place among the therapeutic arsenal for depigmentation. Several lasers have been used according to their wavelength like carbon dioxide (CO₂), semiconductor diode, neodymium-doped yttrium aluminum-garnet (Nd:YAG), and erbium-doped yttrium-aluminum-garnet (Er:YAG).^[10]

The diode laser is a solid-state semiconductor laser that is emitted in continuous wave and gated-pulsed modes. Laser converts electrical energy into light energy, which in turn is converted into heat. Diode lasers are soft-tissue lasers and have an affinity for hemoglobin and melanin. It is, therefore, ideal for gingival depigmentation.^[11]

A generally higher absorption with less tissue penetration has been observed for the diode laser compared to the Nd: YAG laser, resulting in deeper coagulation and more severe damage at the tissue surface.^[7]

Lasers are much superior to electrosurgery and scalpel techniques. The laser application more often leads to a homogenous ablation of hyperpigmented epithelium. A short healing period, no bleeding, and relatively no post-operative complications make laser ideal for depigmentation. The drawbacks include expertise in the use of lasers and high costs.

In all three cases, though the results were satisfactory, there was more discomfort and pain in the surgical abrasion method, but very minimal in both electrosurgery and laser methods.

CONCLUSION

Demand for depigmentation therapy is mostly seen in patients with excessive gingival display. Gingival biotype, clinician's expertise, patient preferences, and recurrence rate greatly determine the selection of a technique. Although a wide range of techniques has been employed. In modern dental practice using laser technology, procedures can be accomplished with less invasive methods, a more relaxed appointment, and less postoperative discomfort. Laser dental care is possible in all of the disciplines of dentistry. The public has an expectation that their dentist should be up to date and wants the most modern, advanced care possible. However, it is necessary to overcome the skepticism of some practitioners facing this relatively new technology to make it an everyday tool to make successful treatments.

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