

Efficacy of Various Depigmentation Techniques: A Comparative Evaluation with A Case Report

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ABSTRACT

Gingival pigmentation is an esthetic problem for many people. It is mainly caused by the physiologic deposition of melanin granules within the gingival epithelium by melanocytes. Melanin hyperpigmentation of the gingiva does not present a medical problem & is completely benign in nature. Many people complain of 'black gums', and this can pose psychological problems and embarrassment in some people, particularly if the gingiva is visible during speech and smiling (high lip line). In current case report, hyperpigmentation is reported & treated by using different techniques (scalpel, diode laser, bur abrasion and electrosurgery) in a split mouth design.

KEYWORDS: Gingiva, Depigmentation, LASER, Electrosurgery, Scalpel, Bur.

INTRODUCTION

Attractive smile expresses a feeling of joy, success, affection and courtesy and also reflects self-confidence. A beautiful smile is not only made by color, shape & position of the teeth, but also by the gingival tissues.¹

Oral pigmentation is a staining of the oral mucosa or gingival soft tissue owing to a variety of disorders associated with various endogenous and exogenous etiologic factors. Gingival pigmented lesions can have multifaceted etiologies, including heavy metals, tobacco use, genetics, endocrine disturbance, inflammation, systemic disorders and prolonged administration of certain drugs especially antimalarial agents and tricyclic antidepressants. It has been observed that smoking may also stimulate melanin production and cause melanin pigmentation. This type of gingival pigmentation is mostly located in the anterior labial gingiva, affecting females more than males. The prevalence of melanin pigmentation in different populations has been reported to vary between 0% to 89% with regard to ethnic factors and smoking habits.²

Most pigmentation is caused by five primary pigments: melanin, melanoid, oxyhemoglobin, reduced hemoglobin, and carotene. Other cases are caused by bilirubin, and iron.³ Melanin is non-hemoglobin derived brown pigment, and it is the most common of the endogenous pigments. It is a derivative of tyrosine and is synthesized in the Melanocytes. The Melanocytes are embryologically derived from neural crest ectoderm. In the human fetus, it enters the epidermis and presumably

the oral epithelium from the eleventh week onwards. Once in the epithelium, these cells constitute a self-producing population normally situated within the basal layer of the fully developed human epidermis, although they have been observed suprabasally in human oral epithelium.⁴

Though melanin pigmentation is not a medical disorder, patients may complain that their black gums are unaesthetic. Several procedures have been developed for depigmentation of gingiva, for example epithelial abrasion, free gingival graft, gingivectomy, cryosurgery, acellular dermal matrix allograft, electrosurgery and laser surgery.⁵

Thus, the purpose of this case report was to evaluate clinically the effectiveness four different techniques (Scalpel method, Bur Abrasion, Electrosurgery, Laser surgery) for gingival depigmentation in the same patient.

CASE REPORT

A 27-year-old male patient visited the Department of Periodontology, Narsinhbhai Patel Dental College and Hospital with a chief complained of black gums visible in upper and lower front region of jaws while smiling. There was no remarkable medical & dental history or any oral destructive habit. Diffused melanin hyperpigmentation was found on the labial surface of both the maxillary and mandibular arches (Fig. 1). The color of his gingiva was dark black (Fig. 1). An informed consent was obtained from patient after explaining the procedure.

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Fig. 1: Pre-operative view showing gingival pigmentation 27year old male patient

Local anesthetic injection was given before starting the procedure to reduce discomfort during procedure. The maxillary anterior gingiva from 14 to 11 was depigmented by Diode laser (Fig. 2) and the maxillary anterior gingiva from 21 to 24 was depigmented using a scraping technique with surgical blade no 15 (Fig. 3). The



Fig. 2: Diode laser surgery



Fig. 3: Scalpel method

mandibular anterior gingiva from 31 to 33 was depigmented by Electrocautery method (Fig. 4) and mandibular anterior gingiva from 41 to 43 was depigmented by surgical round bur (Fig. 5). A periodontal pack was placed for 1 week to reduce the postoperative discomfort. Painkiller was prescribed for

the management of pain. After 1 week, The healing was uneventful with a considerable improvement in aesthetics. The patients follow up was done up to 3 months. After 3 months all techniques were equally effective, and there was no sign of repigmentation of any part of gingiva treated with above mentioned depigmentation method. The healing was good with a considerable improvement in aesthetics (Fig 6).



Fig. 4: Electrosurgery



Fig. 5: Bur abrasion method



Fig. 6: Post operative - Three month follow up

DISCUSSION

The color of gingiva in health may vary ranging from pale pink to deep bluish purple hue. Within these limits

of normalcy, there are a large number of pigmentation mosaics that primarily rely upon the intensity of melanogenesis, vascularity of gingiva and the depth of epithelial cornification. Melanin pigmentation is caused by the deposition of melanin by active melanocytes that are mainly situated in the basal layer of the outer epithelium. Gingival depigmentation can be done for esthetic reasons. Demand for gingival depigmentation is increasing day by day with increasing esthetic concerns of patients and increasing awareness towards oral health care.⁶

Removal of the pigmented layer has been performed by surgical treatment (scalpel surgical technique, bur abrasion, cryosurgery, electrosurgery, lasers) and chemical treatment (90% phenol, 95% alcohol). Each technique has its own advantages and limitations (Pontes et al. 2006). A limitation of chemical cauterization and cryosurgery is that the depth of penetration cannot be controlled. The selection of the technique for depigmentation of the gingiva should be based on clinical experience, patient's affordability and individual preferences.⁷

In this case report, we have used four techniques for gingival depigmentation like scalpel, bur, electrosurgery and laser methods. Although similar results were achieved with all four techniques, we found advantages and limitations with each of them.

We found more amount of bleeding and patient discomfort with the scalpel and also with the round bur method but the healing achieved was relatively faster with these methods as compared to LASER and Electro cautery. Moreover, the placement of periodontal dressing for 7-10 days is mandatory with these methods. There was no or minimal amount of bleeding with LASER and Electrosurgery methods and also there was ease of handling, however, the healing was slightly delayed. It can be theorized by the fact that the protein coagulum formed on the wound surface acts as a biological wound dressing by sealing the ends of sensory nerves. This is in accordance with a few studies which claim that laser therapy has the advantage of easy handling, short treatment time and hemostasis. The other disadvantage of electrosurgery is the unpleasant smell produced when it comes in contact with the tissues.

LASER offers better patient compliance and shorter treatment time, but LASER needs expensive and sophisticated equipment that is not easily available everywhere. CO2 lasers remove a thin layer of epithelium cleanly thus causing minimum damage to the periosteum and the underlying bone. The laser wound is a sterile inflammatory reaction but it heals slower than the scalpel wound. A dressing is not needed when the gingiva and mucosa are treated with LASER. So, there will be faster re-epithelialization. Atsawasuwan et al. have reported good results with Nd: YAG LASER.⁸

Oringer (1975) has explained the superior efficacy of Electrosurgery as compared to scalpel has been explained on the basis of his 'exploding cell theory.' According to

this theory, it is predicted that the electrical energy leads to molecular disintegration of melanin cells present in basal and suprabasal layers of the operated and the surrounding sites. Thus, Electrosurgery has a strong influence on retarding migration of melanin cells from the locally situated cells. However in the present case report, there was no difference in the recurrence of pigmentation between scalpel and electrosurgical technique. Also, it has been found that electrosurgery requires more expertise than Scalpel surgery. Here again, the results were in contrast to the present study where dissection of the partial thickness flap by scalpel required more surgical expertizes than electro surgery. Electrosurgery, however, causes prolonged or repeated application of current to tissue which induces the accumulation of heat and undesired tissue destruction. Thus, one should avoid contact with periosteum or alveolar bone and vital teeth.⁹ Electrosurgery produces latent heat, which causes damage to the nearby tissues. Gingivectomy and bone denudation are invasive surgical procedures that cause patient discomfort and inadvertent loss of marginal bone.

A study by Oswaldo et al. in 1993 showed that gingival surgical procedures performed solely for cosmetic reasons offer no permanent results and pigment recurrence has been documented to be 24 days to 8 years following the surgical procedure. This repigmentation may be due to the epidermal melanocyte unit that denotes the symbiotic relationship between a melanocyte and a pool of associated keratinocytes. EMU serves as the focal point for the metabolism of melanin within mammalian epidermis. The labeling of the EMU is better done as the KLM unit (melanocytes, keratinocytes, and Langerhans cells). Different studies have shown variation in the timing of early signs of repigmentation, and it may be related to the technique performed and patient's race. Further research is required on this aspect. Research should also focus on finding ways for preventing the recurrence and, till then, repeated depigmentation is the only available means of treating unesthetic gingival pigmentation.

CONCLUSION

Esthetic periodontal plastic surgery is a godsend in patients having "dark gums" and "gummy smile." This case report describes the depigmentation of the melanin pigmented gums using surgical scalpel technique (scraping), bur abrasion technique, electrosurgery & laser surgery. Scalpel technique is still the most widely used techniques employed for correction of gingival hyperpigmentation. They found minimum discomfort and maximum patient satisfaction, with no signs of recurrence after a 3-month follow-up period. During the follow-up periods, all the four techniques produced comparable results with regard to healing, no recurrence was reported in any of the procedures documented here. The cases are being tracked to notice signs of recurrence, as repigmentation may occur post depigmentation. There is still scant literature regarding the control on

repigmentation after its treatment. Therefore, research should focus on finding its permanent solution, till then, repeated depigmentation and regular follow-up is the only available option currently.

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