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Management of gingival depigmentation using LASER- A case series

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ABSTRACT A pleasing smile forms the main focus of aesthetic dentistry. However, gingival pigmentation can be a major cause of concern for patients, especially those with a gummy smile. Attempts have been made to meet these cosmetic demands by using various methods like a surgical blade, diamond burs, electrosurgery, cryosurgery or a laser , of which depigmentation by lasers has shown minimal discomfort and better patient acceptance. Therefore, in the present case series, laser was used for treating gingival melanin hyperpigmentation with a follow-up of three months with no signs of repigmentation.

KEYWORDS : Gingival hyperpigmentation, Depigmentation, Lasers, Soft tissue depigmentation

Introduction

Hyperpigmentation of the gingiva has always been an esthetic concern to certain patients, especially young females. Melanin pigmentation of the gingiva is completely benign and does not present a medical problem. However "black gums" result in unaesthetic appearance especially in patients having a high smile line (gummy smile). Oral melanin pigmentation is considered to be multifactorial, which can be physiological or pathological and can be caused by a variety of local and/or systemic factors such as tobacco use, genetic, prolonged administration of certain drugs especially antimalarial agents, and tricyclic antidepressants[1]. Various methods such as gingivectomy with free gingival autografts and acellular dermal matrix allografts, electrosurgery, cryosurgery, abrasion with diamond bur, and laser therapy have been used in the treatment of gingival melanin depigmentation with varied degrees of success[2]. Amongst these gingival depigmentation using laser ablation has been recognized as an effective, pleasant, and a reliable technique.

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation[3]. Laser light is a electromagnetic wave generator. The process of lasing occurs when an excited atom is stimulated to emit a photon before the process occurs spontaneously and the high intensity of a single wavelength can be focused into a small spot. The first dental lasers approved by the US Food and Drug Administration, namely the Carbon-dioxide lasers (CO2), the Neodymium-doped yttrium aluminum garnet (Nd:YAG) and the diode lasers were accepted for use only for oral soft tissue procedures in periodontics. Lasers can be classified as soft lasers and hard lasers. Advantages of laser treatment are greater hemostasis, bactericidal effect, and minimal wound contraction[5]. Laser is effectively used to perform gingivectomies, gingivoplasties, free gingival graft procedures, crown lengthening, operculectomy and many more[6]. Compared with the use of a conventional scalpel, lasers can cut, ablate and reshape the oral soft tissue more easily, with no or minimal bleeding and little pain as well as no or only a few sutures. Therefore, aim of this present study was to evaluate effectiveness of diode lasers for treatment of gingival hyper-pigmentation.

Material and Method

A total of 6 systemically healthy patients, 3 males and 3 females within age range of 19 years to 26 years whose chief complaint was un-esthetic smile due to black pigmentation of gingiva (Figure 1) were included (Table-1) from the outpatient Department of Periodontics, Sharad Pawar Dental College, Sawangi (Meghe), Wardha.

The severity of melanin pigmentation of gingiva was recorded using Dummett-Gupta oral pigmentation index (DOPI) as follows:[7]

- Score 0 = No clinical pigmentation (pink gingiva)
- Score 1 = Mild clinical pigmentation (mild light brown color)
- Score 2 = Moderate clinical pigmentation (medium brown or mixed pink and brown).
- Score 3 = Heavy clinical pigmentation (deep brown or bluish black).

Exclusion Criteria:

- Pathological hyperpigmentation
- Compromised general health conditions that would compromise post-operative healing e.g. (uncontrolled diabetes, osteoporosis, blood disorders, uncontrolled periodontal conditions or other oral disorders).
- Use of drugs like bisphosphonates, systemic corticosteroids
- History of alcoholism, smoking or drug abuse.
- Pregnancy and nursing at the time of enrolment.

Prior to initiating the study, the purpose and design of clinical trial was explained to the patients and written informed consent was obtained from every patient. The present study was performed over 6 month's period. In all cases pre-operative photographs and measurements were recorded on cellophane sheet and area of gingival pigmentation was measured on graph. This aided in comparing results and area of re-pigmentation in follow up period.

Surgical procedure

Before use of laser, the operator and the patients wore laser-protective eye glasses. Highly reflective instruments or instruments with mirrored surfaces were avoided. The diode laser used in this

study has fiberoptic delivery system with 980 nm wave length was used in a contact mode. After application of topical anesthesia (2% lignocaine hydrochloride), laser ablation was started from the mucogingival junction working toward the free gingival margin, including the papillae with overlapping motion (Figure 2). The fiber tip was continuously moved across the site to avoid heat accumulation at surgical site. The same procedure was repeated until complete depigmentation was achieved. No periodontal dressing was placed and no antibiotics were prescribed.

Clinical Assessment of swelling and bleeding was done immediately after termination of laser ablation, after 1week and 3 months postoperatively. The VAS (Visual analog scale) [8] was used to measure the intensity of pain experienced during and after treatment. The VAS consisted of a horizontal line 100 mm long, anchored at the left end by the descriptor "no pain" and at the right end by "unbearable pain." The patient placed a mark to coincide with the level of pain. The distance of this point, in millimeters, from the left end of the scale was recorded and used as the VAS score. Scores were calculated as: 0 =no pain; 0.1 to 3.0 cm (1 to 30 mm) = mild pain; 3.1 to 6.0 cm (31 to 60 mm) = moderate pain; 6.1to 10 cm (61 to 100 mm) = severe pain

Patients were advised not to traumatize the area during the healing period which is 4 -7 days after treatment

Results:

During and after laser therapy, there was no pain or bleeding at the surgical site. At 1 week, the treated gingiva showed fast epithelization with a healthy appearance, but immature healing, in all cases. At 1 month, complete healing with tissue maturation was observed and the gingiva exhibited normal appearance. No post-operative infection or scarring, gingival recession or deformity occurred in any of the patients on first or subsequent visits. A total of 3 months after laser therapy, the appearance of gingiva was healthy and pink in color without any re-pigmentation (Figure 3).

From the VAS evaluation no pain was perceived from the patients in the follow up period. There was no statistically significant change in prevalence of pain immediately after treatment compared to pain during treatment (Table-2).

Discussion

Melanin pigmentation of the gingiva is seen in all races, at any age and without gender predilection. Although it does not present a medical problem, complaints of black gum and a demand for depigmentation is common. Many techniques have been tried for depigmentation. Use of laser ablation has been recognized as one of the most effective, comfortable and reliable techniques for gingival depigmentation. Diode laser used in this study offers the advantage of a successful and safe application, being able to prevent bleeding, limit postoperative inflammation and pain and favour healing of gingival mucosa [9]. The procedure was done in contact mode allowing good tactile sensation and precision while operating. Using the contact mode was reported to achieve precise irradiation, good tactile sensation and reduced thermal effect in a clean operating environment [10,11]. The lack of bleeding after laser treatment can be attributed to the property of lasers to coagulate blood vessels and thereby assist in providing a relatively dry surgical field [12]. It was theorized that the protein coagulum formed on the wound surface as a result of irradiation might act as a biological wound dressing sealing the ends of sensory nerve endings. The lack of swelling after laser treatment is possibly related to the direct vasomotor effects and/or deactivation of local pro-inflammatory mediators by the diode laser light causing microvessel narrowing [13]. Successful treatment following laser ablation of hyper-pigmented areas was evident by the uneventful healing of the gingiva resulting in a healthy pink firm appearance.

Conclusion

In conclusion, within the limitations of this study, the use of a diode laser was shown to be a safe and effective treatment modality to provide optimal aesthetics with reduced discomfort to the patients during the treatment for gingival hyper pigmentation. As the success of depigmentation procedure does not only rely on the amount of depigmentation achieved but also by the time taken for repigmentation to appear, and because the postoperative follow-up period of this study was short, further studies with prolonged follow up is advised.

Figures with Legends:

Figure 1: Pre operative photograph

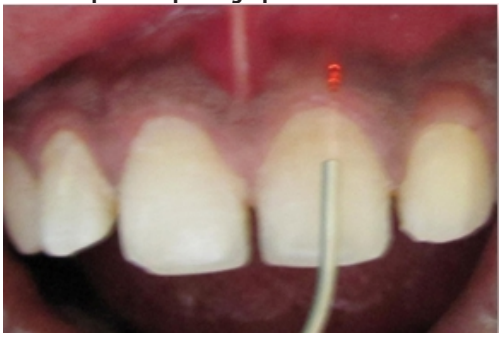

Figure 2: Laser application for depigmentation

Figure 3: Post operative photograph 3 months after depigmentation

Table-1 Patient characteristics

Female: Male ratio	3:3
Mean age	21.17± 3.47 yrs
Area	Maxillary anterior region

Table - 2

Dummett oral pigmentation index (DOPI) for intensity of pigmentation pre-surgical and post-surgical measurements (Average of 6 patients)		
Method of surgery	Pre surgical	Post surgical
Laser	3	0
Pre-surgical and post-surgical surface area of pigmentation (Average area of gingival pigmentation)		

Pre-surgical Surface area in sq mm	Post-surgical Surface area in sq mm (3 months post operative)	
$149mm^2$	0	
VAS score		
During surgery	Immediate post surgical	1 week after surgery
0.4	0.84	0.04

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