

Split Mouth Gingival Depigmentation with Scalpel and Diode Laser: A Comparative Study

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Abstract: Melanin pigmentation often occurs in the gingiva as a result of excess deposition of melanin, due to which the gingiva appears black. Though, it is not pathological, many people complain of dark gums as unaesthetic. Gingiva is the most frequently pigmented intraoral tissue, with more pigmentation concentrated in the incisor region which may interfere with the smile line and patient may feel conscious about the appearance. In such patients, aesthetic periodontal plastic surgery can give excellent results. In this context we have attempted a case series of depigmentation in the anterior region. To compare the two techniques clinically, split mouth depigmentation procedure was carried out, using a semi-conductor diode laser and conventionally by scalpel. The laser treatment resulted in no post-operative bleeding and minimal post-operative pain as compared with scalpel technique, although there was no difference in effectiveness and aesthetic outcome.

Keywords: diode laser, melanin depigmentation, scalpel technique

I. Introduction

Smile plays an important role in improving esthetics and radiates health and self-confidence. One of the important aspects in a “smile” is the color of the gingiva. Several factors that determine the color are, number and size of blood vessels, thickness of the epithelium, extent of keratinization, and endogenous and exogenous pigmentation¹. Oral pigmentation is a discoloration of the gingival/oral mucosa, and is associated with several exogenous and endogenous factors¹. Melanin, carotene, reduced hemoglobin and oxyhemoglobin are the main pigments contributing to the normal color of the oral mucosa². Etiological factors are varied, which include drugs, heavy metals, genetics, endocrine disturbances, syndromes such as Albright’s syndrome, Peutz Jegher’s syndrome, and also in inflammation. Adverse habits such as smoking can also stimulate melanin pigmentation, and the intensity of pigmentation is related to the duration of smoking and the number of cigarettes consumed. The pigmentation is mostly localized at the anterior labial gingiva, affecting females more than males³. The present case series describes the comparison between two surgical depigmentation technique – The scalpel technique and the diode laser surgery.

1.1 Techniques

Different techniques for depigmentation are³:

1. Scalpel technique
2. Cryosurgery
3. Electrosurgery
4. Lasers

Nd: YAG(neodymium-doped yttrium aluminum garnet) laser,

Er: YAG (erbium-doped yttrium aluminum garnet) laser,

Carbon dioxide (CO₂) laser

5. Chemical methods including acoustic agents – not used nowadays

- a. 90% phenol and 95% alcohol

- b. Ascorbic acid

6. Method aimed at masking the pigmented gingival from less pigmented gingival areas

- a. Free gingival graft

- b. Acellular dermal matrix allograft

II. Case Report

Five patients [four male, one female], aged 19–25 years who, visited the Department of Periodontology, A.J Institute of Dental Sciences, Mangalore with the chief complaint of “dark gums” were selected for this procedure. The patient’s dental history revealed that the blackish discoloration of gingiva was present since birth, suggestive of physiologic melanin pigmentation. Clinical examination revealed pronounced

bilateral melanin pigmentation associated with a healthy periodontium. Their medical history was non-contributory. The patients were in good general health and there were no contraindications for the surgeries. All depigmentation areas were graded from 1 to 2 according to the "Takeshi et al" scale of grading gingival depigmentation.

2.1 Clinical evaluation

Melanin pigmentation index (Takashi *et al.*)⁴

The degree of melanin pigmentation was determined by melanin pigmentation index with the scoring given as follows: [Figure A]

Score 0: No pigmentation

Score 1: Solitary unit(s) of pigmentation in papillary gingiva without extension between neighbouring solitary units

Score 2: Formation of continuous ribbon extending from neighbouring solitary units.

2.2 Surgical Procedure

The surgical procedure was performed under local anaesthesia. (Lignocaine with adrenaline in the ratio of 1:100,000 by weight). At the right maxillary anterior region from central incisor to canine diode laser of 810nm with 3.5W in continuous mode was used. Exposure parameters were set using the recommended guidelines, followed by careful removal of epithelium containing melanin layer (Figure C). There was absolutely no bleeding during and after the procedure.

On the left side, Bard-Parker handle with a #15 blade was used for depigmentation (Figure D) Pressure was applied with a sterile gauze moistened in saline to control haemorrhage. High volume suction was used near the tissues. On completion of depigmentation, a periodontal dressing was placed over the surgical area and oral hygiene instructions were given to the patients. The patients were advised to use chlorhexidine mouthwash twice daily for 2 weeks postoperatively. Post-operatively the patients were prescribed, Non-steroidal anti-inflammatory drugs, (Imol plus twice daily for three days). Patients were recalled after 1 week for re-evaluation. Wound healing was uneventful on both the sides (Figure E). Post-operative follow up after 1 month showed the areas were completely healed, with no signs of repigmentation (Figure F). Presently after 2 months, the patient is still on follow-up visits. Depigmentation was not carried out for mandibular anterior region because they were of no aesthetic concern for the patient.

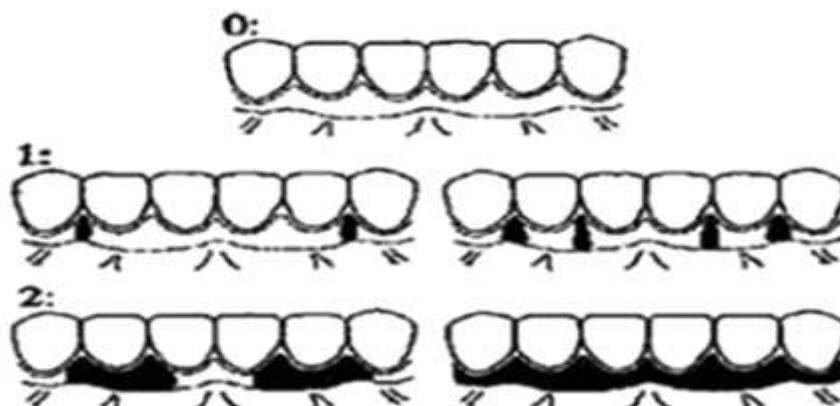


Fig. A Melanin pigmentation index (Takashi *et al.*)



Fig. B Pre-operative



Fig. C LASER Technique



Fig. D Scalpel Technique



Fig. E 1 week post-operative



Fig. F 1 month post-operative

III. Discussion

Aesthetics has become the prime importance in this fast pace and self-conscious society and gingival hyperpigmentation is one of the most demanded periodontal aesthetic treatment. Gingival hyperpigmentation is caused by excessive deposition of melanin located in the basal and suprabasal cell layers of the epithelium. Melanin pigmentation is the result of melanin granules produced by melanoblasts intertwined between epithelial cells at the basal layer of the gingival epithelium. The degree of pigmentation varies from one person to another and depends on variety of factors especially the melanoblastic activity. Although melanin pigmentation of the gingiva is completely benign and does not present a medical problem, complaints of “black gums” are common, particularly in patients having a very high smile line (gummy smile)³.

Various treatment modalities have been carried out in the past for correction of pigmented gingiva with variable success⁶. One of the first, and still popular, techniques to be employed is the surgical removal of undesirable pigmentation using scalpels. The procedure essentially involves surgical removal of gingival epithelium along with a layer of the underlying connective tissue and allowing the denuded connective tissue to heal by secondary intention. The new epithelium that forms is devoid of melanin pigmentation⁷. With the advent of new technology in dentistry, lasers have taken over and have been used to ablate the cells containing and producing melanin pigment with appreciable success. Numerous laser systems such as the CO₂, Nd: YAG, Er: YAG, and diode lasers have been successfully used for gingival depigmentation⁶.

3.1 Advantages & Disadvantages

There are many advantages of LASER (Light Amplification by Stimulated Emission of Radiation) over surgical procedure, according to *Wigdore et al* (1995) they are⁴:

- Dry and bloodless surgery
- Instant sterilization of surgical field
- Reduced bacteraemia
- Reduced mechanical trauma
- Minimal post-operative swelling and scarring
- Minimal post-operative pain

In this case, all the above-mentioned advantages were experienced. LASERS can be used in patients to reduce fear and anxiety. Also, less chair side time is required when comparing to the traditional techniques and hence results in more patient cooperation. There is increased coagulation and a necrotic slough is formed over the surface of the soft tissues⁴.

However, LASER's have got few disadvantages and the following are:

- Expensive
- Technique sensitive
- Need of protective eye wear for doctor, patient as well as the assistant

IV. Conclusion

In this current case series both scalpel and laser was found to be effective in the treatment of gingival hyperpigmentation. The use of diode laser appears to be a safe and effective alternate method, but further well-conducted randomized trials should be carried out to make the absolute conclusion.

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