

Evaluation of Gingival Depigmentation by Scalpel, Airotor Diamond Bur and Laser: A Comparative Clinical Study

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Abstract

Aim: Aim of this study was to comparatively evaluate gingival depigmentation by Scalpel, Airotor diamond bur, and Laser.

Methodology: The subjects reported to Government Dental College and Hospital, Kadapa with a complaint of gingival hyper pigmentation were selected for this study. Patients who were smokers, subjects with debilitating systemic disease or diseases which can affect wound healing, with periodontitis and attachment loss, and pregnant women and nursing mothers were excluded from this study. In this study, 9 patients with gingival hyper pigmentation were selected and were divided into three groups: Group A were treated by surgical technique, Group B were treated by abrasive Airotor bur, and Group C were treated by diode laser. All the three groups were evaluated and compared using three parameters: Dummett Oral Pigmentation Index at base line; 7days and 30 days, Visual analog scale at 7days and wound healing at 7days and 30 days.

Results: Postoperatively all three techniques showed no significant change with respect to DOPI. No pain was seen with laser as compared to scalpel and airotor bur technique. Scalpel and airotor bur technique showed better wound healing as compared to laser.

Conclusion: Depigmentation with diode laser is a preferable method of choice for effective removal of gingival hyperpigmentation. The only disadvantage is that it is costly and showed delayed wound healing as compared with Scalpel and abrasive bur technique.

Keywords: Depigmentation, Diode Laser, Airotor bur, surgical scalpel.

Introduction

A smile expresses an emotion of joy, sensuality, success, courtesy, and affection and reveals self-confidence and humanity.¹The smile harmony is determined not only by the location, shape, and the hue of teeth but also by the gingival tissues. Gingival tissues play an essential role in what we can consider to be a pleasing smile. Gingiva is one of the most

frequently affected intraoral tissues due to melanin pigmentation.² Oral pigmentation is the discoloration of the oral mucosa or gingival soft tissue due to a wide variety of disorders and conditions, associated with various endogenous and exogenous etiological factors. Melanin is the most common endogenous pigment present in the body. It is non-hemoglobin derived brown pigment produced by melanocytes and also potent cation chelator. Pigmentation is caused by five primary pigments: melanin, melanoid, oxyhemoglobin, reduced hemoglobin, and carotene. Patients may complain that their black gingiva is unaesthetic.³ This problem aggravates in patients with gummy smile or excessive gingival display while smiling and talking. Removal of gingival pigmentation can be achieved by a procedure known as gingival depigmentation. There are various techniques by which gingival depigmentation can be performed, such as scalpel technique, abrasion, cryosurgery, electrosurgery, lasers, and chemical methods, there are methods which are aimed at masking the pigmented gingiva from less pigmented areas; Free gingival graft or acellular dermal matrix allograft.

Methodology

The subjects were selected from the Department of Periodontics, Government Dental College and Hospital, Kadapa. Nine subjects (both males and females) above the age of 18 years who visited the Department of Periodontics, with a chief complaint of gingival melanin hyperpigmentation were selected. The purpose and procedure was explained to the subjects, and written informed consent was obtained.

Inclusion criteria

1. Subjects above the age of 18 years
2. Systemically healthy subjects

3. Subjects who had moderate to severe melanin pigmentation of the gingiva (Dummett and Gupta Gingival Index (DOPI), 1964).

Exclusion criteria

1. Subjects who were smokers
2. Subjects with debilitating systemic diseases
3. Subjects with pathological factors which cause gingival pigmentation
4. Subjects with periodontitis and attachment loss
5. Pregnant women and nursing mothers.

The subjects were evaluated based on the following parameters: DOPI scores (baseline, 7days, and 30days), Visual Analog Scale (7days), and Wound healing index (7 and 30 days). The subjects were distributed into 3 groups: Group A subjects were treated with the scalpel technique, Group B by bur abrasive technique and Group C by diode laser. At baseline DOPI was recorded for all the three groups followed by the procedure. At the end of 7 days, DOPI, VAS and wound healing index were evaluated for all the three groups. And at the end of 30 days, DOPI and wound healing index were assessed for the same three groups.

Clinical Parameters

Dummett Oral Pigmentation Index (Dummett and Gupta, 1964) (DOPI).⁴

The assessment was based on the following scale:

- Pink tissue (No clinical pigmentation)
- Mild light brown tissue (Mild clinical pigmentation)
- Medium brown or Mixed brown or pink tissue (Moderate clinical pigmentation)
- Dark brown or blue-black tissue (Heavy clinical pigmentation)

Visual analog scale (VAS) for Pain (Lagdive et al., 2009)

The visual analog scale (VAS),⁵ was used to evaluate the subjective pain level experienced by the patient. The VAS consisted of a straight line of 100mm long, anchored at the left end by the descriptor “no pain” and at the right end by “unbearable pain.” The patients were asked to mark the severity of the pain.

If the score was:

- 0. = no pain
- 1-3. = slight pain
- 31-6. = moderate pain
- 6.1-10. = severe pain.

Wound healing

Wound healing was evaluated as per the list of clinical observations and patient responses proposed by (Ishii et al., 2000) and (Kawashima et al., 2003).

Each parameter was evaluated as follows:

- Complete epithelialization
- Incomplete epithelialization
- Ulcer
- Tissue defect or necrosis.

Group A

After adequate local anesthesia, hyperpigmented gingival areas (Fig: 1) were de-epithelialized with a scalpel blade (no. 15) by the Scrape technique (Fig: 2). Depigmentation of gingiva was carried out from the mucogingival junction towards the tip of the interdental papilla⁶. Coe-Pak dressing was placed on the operated site (Fig:3), and post-surgical instructions were given to the subjects along with analgesics. The patients were then recalled postoperatively at 7 days and 30 days (Fig: 4 & 5).



Fig: 1 Baseline



Fig: 2 Depigmentation with No: 15 blade

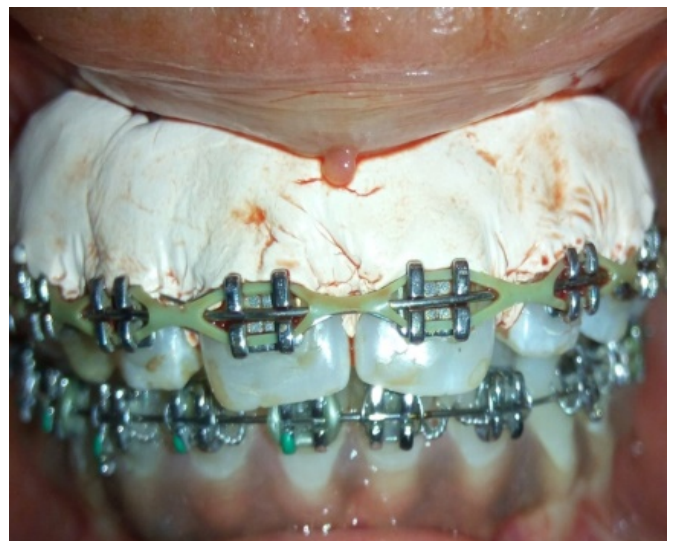


Fig: 3 Placing Coe-pak



Fig 4 :After 7 days



Fig 5: after 30 days

Group B

After adequate local anesthesia, pigmented gingival area (Fig: 6) was de-epithelialized with a high speed handpiece with a rotary abrasive bur to remove the pigmented layer (Fig: 7). The water supply of the handpiece was closed, and external irrigation was done for better vision. Pressure was applied with sterilized gauze soaked in local anesthetic agent to control hemorrhage during the depigmentation procedure. After completely removing the pigmented epithelium along with a thin layer of connective tissue with the rotary abrasive bur, the exposed surgical site was cleaned with povidine iodine solution or saline⁷(Fig: 8). While using the rotary bur, slight pressure was applied with light brushing strokes. Post-surgical instructions were given to the subjects along with analgesics. The patients were then recalled postoperatively at 7 days and 30 days (Fig 8&9).



Fig. 6 :Base line



Fig.7: Depigmentation with Bur



Fig.8: After placing Coe-pak



Fig. 9: After 7 days



Fig.:10 After 30 days

Group C

After adequate local anesthesia, the gingival depigmentation (Fig: 11) was carried out with a diode laser of 810 nm wavelength. The laser beam was operated with the following parameters: continuous wave mode, initiated tip, power setting of 1 W (Fig: 12). Laser safety protocols were followed as per Food and Drug Administration guidelines (FDA).⁸The diode laser tip was used in contact mode on the gingival pigmented area. The ablation was performed using paintbrush strokes from the mucogingival junction to the free gingival margin. Sterilized gauze soaked in saline was used to remove the char formed over the surface of the depigmented area (Fig 13 & 14). Comprehensive examination was carried out to make sure that all pigmented epithelium was removed. The procedure was performed with caution to avoid damage to the adjacent tooth surface and the adjacent tissues during ablation. At the gingival margin region, care had to be taken to reduce the power setting to avoid damage to the tooth surface. Post-surgical instructions were given to the subjects along with analgesics. The patients were then recalled postoperatively at 7 days and 30 days (Fig 15 & 16).



Fig.11: Base line



Fig. 12: Depigmentation with laser



Fig.13: Depigmentation with laser



Fig.14: After 7 days



Fig.15: After 30 days.

Results

1. Group A: Depigmentation done with Surgical scalpel method
2. Group B: Depigmentation done with Abrasive bur technique
3. Group C: Depigmentation done with Diode laser technique

All three groups were evaluated and compared based on three parameters, DOPI (baseline, 7days, and 30 days), VAS (7 days), and wound healing (7 days and 30 days).

Sr No	Group	DOPI			WOUND HEALING		
		BASE LINE	7 TH DAY	30 TH DAY	7 TH DAY	7 TH DAY	30 TH DAY
1	Group1	4	0	0	2	B	A
2	Group1	3	1	0	4	A	A
3	Group1	3	0	0	3	A	A
1	Group2	3	0	0	2	A	A
2	Group2	2	0	0	2	A	A
3	Group2	3	0	0	1	B	A
1	Group3	3	0	0	2	B	A
2	Group3	3	0	0	1	B	A
3	Group3	3	0	0	1	A	A

Table 1: Comparison between three groups

Discussion

Gingival colour is determined by the vascularization; keratinized layer thickness and number of pigment containing cells. Gingival hyperpigmentation is frequently caused by melanin deposition by active melanocytes located mainly in the basal layer of the

oral epithelium. The intensity and distribution of gingival pigmentation is variable not only between races but also between different individuals of the same races and within different areas of the same mouth, and there is no gender prediction. Physiologic pigmentation is genetically determined,⁹ but as Dummet has indicated the degree of pigmentation is partially related to mechanical, chemical, and physiological stimulation. Nowadays there’s an increased demand for esthetics, so pigmented gingival tissue is considered as an esthetic problem. Different techniques are being used for gingival depigmentation, the selection of gingival depigmentation should be based on clinical experience, patient affordability, and individual preferences. In the present study, we selected different depigmentation techniques such as scalpel, airtor, and diode laser to compare the clinical efficiency of these techniques. In this study, three parameters were evaluated and compared within all the three groups.

The DOPI (at baseline, 7 days and 30 days), VAS for pain (at 7 days), and wound healing (at 7 days and 30 days) were assessed. Group A was treated with scalpel technique, in this group it was seen that on 7th day, 2 out of 3 showed complete epithelialization, and same results were seen in the group B, who were treated with bur abrasive technique. In group C who were treated with diode laser, 2 out of 3 subjects showed incomplete epithelialization. On 30th day postoperatively, all three groups showed complete epithelialization. According to this study, laser group showed incomplete epithelialization when compared with scalpel and airtor bur techniques. The results here were also in agreement with the study done by Mani et al (2009).¹⁰ All patients treated with diode laser and airtor bur reported slight pain when compared with scalpel technique. The subjects reported significantly more

pain with scalpel technique compared with diode laser and airotor bur techniques.

Conclusion

The depigmentation of the hyperpigmented gingiva will create a pleasant and confident smile and fulfills an increased demand for facial esthetics which altogether may alter the personality of an individual. This could be easily attained by using different depigmentation techniques. Each technique has its own advantages and disadvantages. The application of diode laser appears to be safe and effective alternative procedure for the treatment of gingival melanin pigmentation. Disadvantages of diode laser are requirement of very costly equipment and highly specialized technique. More studies and data are required on comparative techniques for long term predictability and success.

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