

## Comparison of Clinical Outcomes of Gingival Depigmentation Procedure Using Three Different Surgical Modalities – A Clinical Case Study.

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**Abstract:** *Gingival health and appearance are essential components of an attractive smile. Gingival pigmentation results from melanoblastic activity. 'Black gums' are common esthetic problem particularly in patients who have a very high smile line (gummy smile). Different treatment modalities have been reported for depigmentation of gingiva such as bur abrasion, scraping, partial thickness flap, cryotherapy, electrosurgery and laser. The following clinical study describes three different surgical depigmentation techniques: scalpel surgery, gingival abrasion with electrosurgery, and a diode laser. Better results of depigmentation were achieved with diode laser than conventional scalpel and with electrosurgery with respect to esthetics. The results point out that lasers are an effective and a safe means to removal of hyperpigmentation from the gingiva. Healing was uneventful and no repigmentation occurred and is good enough to achieve esthetic satisfaction and fair wound healing without infection or severe pain.*

**Keywords:** *Gingiva, Melanin, Hyperpigmentation, Depigmentation, Lasers.*

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### I. Introduction

Oral pigmentation is a discoloration of the oral mucosa or gingiva associated with several exogenous and endogenous factors. Oral pigmented lesions can have various etiologies, including drugs, heavy metals, genetics, endocrine disturbance, and inflammation[1,2,3]. Melanin pigmentation often occurs in the gingiva as a result of an abnormal deposition of melanin.

Hyperpigmentation of the gingiva is caused by excessive melanin deposition by the melanocytes located mainly in the basal and the suprabasal cell layers of the epithelium. Brown or dark pigmentation and discoloration of gingival tissue can be caused by a variety of local and systemic factors. Systemic conditions such as endocrine disturbances, Albright's syndrome, malignant melanoma, antimalarial therapy, Peutz-Jeghers syndrome, trauma, hemochromatosis, chronic pulmonary disease and racial pigmentation are known causes of oral melanin pigmentation[4]. High levels of oral melanin pigmentation are normally observed in individuals of African, East Asian or Hispanic ethnicity[5,6].

Clinical melanin pigmentation of the gingiva does not present a medical problem, although complaints of black gums may cause esthetic problems and embarrassment, particularly if the pigmentation is visible during speech and smiling[7,8]. Gingival depigmentation is a periodontal plastic surgical procedure whereby the gingival hyperpigmentation is removed or reduced by various techniques.

Removal of gingival melanin pigmentation should be performed cautiously and the adjacent teeth should be protected, since inappropriate application may cause gingival recession, damage to underlying periosteum and bone, delayed wound healing, as well as loss of enamel[9].

One of the keys to successful periodontal treatment is soft tissue management, clinical outcomes in terms of accuracy and predictability are different for the various techniques such as the scalpel and advanced techniques which include electrosurgery and LASER.

In this study the clinical outcome following depigmentation using three different techniques has been assessed.

## II. Selection Of Patients:

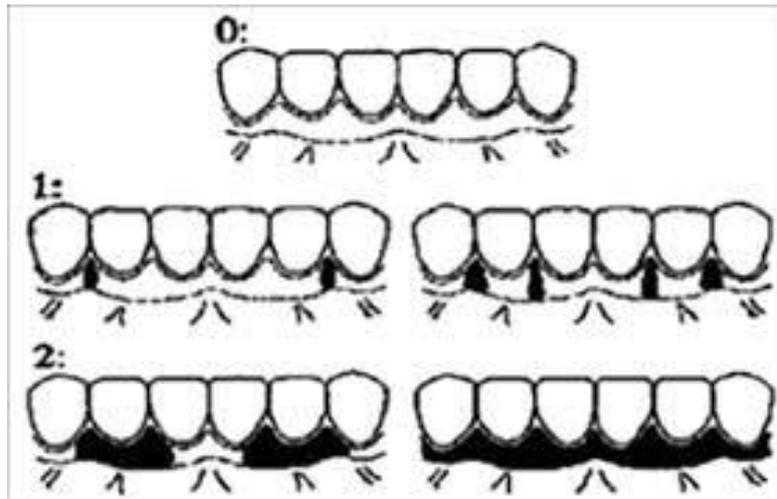
Based on the degree of pigmentation as assessed by Melanin pigmentation index (Takashi et al.)[10]. The degree of melanin pigmentation was determined by melanin pigmentation index based on the following scoring system:

### Melanin pigmentation index

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.



Three patients with melanin pigmentation of gingiva were treated with different gingival depigmentation techniques. Three male patients who reported to the Department Of Periodontics with the chief complaint of 'black' colored gums . Oral examination revealed deeply pigmented gingiva from right first premolar to left first premolar in maxilla. The patients requested for any kind of esthetic treatment, which could make their 'black' colored gums look better. The entire procedure was explained to the patients and written consent was obtained. A complete medical examination, family history and blood investigations were done to rule out any contraindication for surgery. Local anesthesia was infiltrated in the maxillary anterior region from premolar to premolar .(lignocaine with adrenaline in the ratio 1:1,00,000 by weight).

## III. Case Description

### III a. Case 1: Depigmentation by Conventional method

A scalpel surgery was planned to perform the depigmentation(Fig1). A Bard Parker handle with a No. 15 blade was used to remove the pigmented layer. Pressure was applied with sterile gauze soaked in local anesthetic agent to control hemorrhage during the procedure. After removing the entire pigmented epithelium along with a thin layer of connective tissue with the scalpel, the exposed surface was irrigated with saline(Fig2). Care was taken to see that all remnants of the pigment layer were removed. The surgical area was covered with a periodontal dressing.



Figure 1 Pre-Operative



Figure 2 Intra Operative -Scalpel



Figure 3 Depigmentation by Conventional method

### III b. Case 2: Depigmentation by Electrocautery

Electrocautery was used for depigmentation of the upper right anterior gingiva till second premolar(Fig4). A loop electrode was used for deepithelizing the gingiva. It was used in a light brushing strokes and the tip was kept in motion all the time. Keeping the tip in one place could lead to excessive heat build up and destruction of the tissues(Fig 5). Finally a perio-pack was placed over the wound area and oral hygiene instructions were given(Fig6). Pack was removed after one week and the area debrided.



Figure 4 Pre Operative



Figure 5 Intra Operative



Figure 6 Depigmentation by Electrosurgery



Figure 7 Post Operative after Healing

### III c. Case 3: Depigmentation by LASER

Topical anesthetic gel was applied to the surgical field (Fig8). Special eye glasses were worn by the patient and the staff to fulfill with the FDA laser safety rules. The properly initiated tip of the diode laser unit (Picasso, AMD laser technologies, USA; wavelength 810 nm) angled at an external bevel of 45 degrees and at energy settings of 0.5-1.5 watts continuous wave (CW) was used with small brush like strokes back and forth with gradual progression deeper along the same initial laser incision to remove the tissue (Fig9). A 400  $\mu$ m strippable fiber was used with a power setting of 1.5 watts initially in pulsed wave mode (PW) set at 0.20 ms of pulse duration and 0.10 ms of pulse interval for the de-epithelialization procedure.

After removal of the overlying epithelial tissue, power setting was increased to 2 W to attain rapid ablation for removing the pigments present deep beneath the basement membrane and minimize the hemorrhage from the connective tissue. During the procedure, any tissue tags left out after laser ablation were wiped with sterile gauze soaked in saline every 3-5 min and thorough inspection was done to confirm no pigmented areas were left out (Fig10). The surgical area was covered with a periodontal dressing.



Figure 8 Pre Operative



Figure 9 LASER in use



Figure 10 Immediate Post op



Figure 11 Post Operative after Healing

### IV. Interpretation

Though there could be individual variation in the healing capacity and degree of melanin pigmentation, role of epithelial turnover the following interpretations were made based on clinical examination, patient compliance and post operative level of patient comfort and wound healing.

Wound healing was evaluated based on the following scores: A. Complete epithelization, B. Incomplete epithelization, C. Ulcer, D. Tissue defect or necrosis.

### V. Results:

Because the patient was under anesthesia, evaluation of pain was done 1 day postoperatively. Healing was uneventful in 1<sup>st</sup> week with pink color comparable to nearby non-treated area, resulting in a significant improvement in esthetic appearance (Fig3,7,11). Patient's acceptance of the procedure was good and results were excellent as perceived by the patient.

There is enhanced healing following depigmentation with the use of electrocautery and LASER when compared to that of the scalpel.

## VI. Discussion:

There are wide variations in gingival color in normal healthy persons. Degree of vascularization, the thickness of the keratinized layer and the amount of the pigment-containing cells will determine the color of the gingiva. Till date very little literature has been published regarding clinical methods of treatment of pigmented gingiva. The techniques that were tried in the past to treat gingival pigmentation include chemical cauterization, gingivectomy<sup>6</sup>, scalpel scraping procedure and abrasion of gingiva. The recent techniques of gingival depigmentation in practice are cryotherapy,<sup>11,12</sup> free gingival autograft<sup>13</sup> and laser<sup>14</sup> therapy and these have achieved satisfactory results.

Electrosurgery has its own limitations in that its repeated and prolonged use induces heat accumulation and undesired tissue destruction<sup>15</sup>.

Although healing of laser wound is slower than scalpel wound, laser wound is a sterile inflammatory reaction. The treated gingiva and mucosa do not need any dressing when it is treated with laser. So reepithelialisation will be faster.

Though the initial result of the depigmentation surgery is highly encouraging, repigmentation is a common problem. The exact mechanism of repigmentation is not known. Different studies shows variation in the timing for early repigmentation. It takes about 1.5-3 years to return to the full clinical baseline repigmentation. This variation may be due to the different techniques performed or due to the patient's race.

## VII. Conclusion :

More number of clinical studies on oral soft tissues using these three different surgical modalities need to be carried out to obtain conclusive results on the clinical and biological efficiency.

### Conflict Of Interest:

No potential conflict of interest relevant to this article was reported.

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