



ESTHETIC CORRECTION OF MELANIN PIGMENTATION OF GINGIVA: A CASE REPORT

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ABSTRACT

Gingiva is the most frequently pigmented oral tissue. The degree of pigmentation varies among race as well as among different individuals. It occurs as a diffuse, deep purplish discolouration or as irregular brown and light-brown patches. Gingival pigmentation may occur due to local, systemic, genetic or environmental factors. Although clinically melanin pigmentation of gingiva is not a disease entity, it can pose an aesthetic concern for some patients, particularly those with a high smile line. Gingival depigmentation happens to be the choice of procedure for individuals who demand improved aesthetics. The unsightly hyper pigmented gingiva can be removed or reduced by gingival depigmentation procedure utilizing a variety of treatment modalities. Prior to selection of any surgical technique, the potential causative agent of the pigmentation should be identified and the treatment outcomes and recurrence of the pigmentation which invariably occurs over a variable period of time should be explained to the patient. The selection of any technique depends on individual preference and clinical expertise. This case report delineates two of the commonly employed treatment modalities i.e. the scalpel technique and surgical bur abrasion technique for Gingival depigmentation.

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INTRODUCTION

Gingival Pigmentation is a physiologic entity but it may sometimes be a precursor of severe diseases. It occurs as a diffuse, deep-purplish discolouration commonly presenting as irregularly shaped, brown and light-brown patches occurring in gingiva as early as 3 hrs after birth.¹ The pigment responsible for the normal pigmentation of the skin, gingiva, and remainder of oral mucous membrane is, Melanin, a non-haemoglobin derived brown pigment.

Pigments primarily responsible for causation of most of the pigmentation include Melanin, Melanoid, Oxyhaemoglobin, Reduced haemoglobin, Carotene, Bilirubin and Iron². Of these, melanin is the most common natural pigment responsible for endogenous pigmentation of gingiva.

Melanin hyper pigmentation usually does not present as a medical problem, but is more of aesthetic concern for many patients.

Gingival depigmentation is a periodontal plastic surgery whereby gingival hyperpigmentation is either removed or masked. Several treatment modalities employed for management of gingival hyperpigmentation include scalpel surgical technique, abrasion technique, cryosurgery, electrocautery, lasers, chemical treatment, free gingival grafts or acellular dermal matrix allograft etc².

Gingival depigmentation procedure should be considered in patients with moderate or severe gingival pigmentation, with a high smile line (gummy smile). Selection of the technique should be done based on clinician's experience, patient's affordability and individual preferences.

This case report delineates two treatment modalities (Scalpel method and Bur abrasion method) for gingival depigmentation which are easy and effective in achieving desired aesthetic clinical outcomes.

CASE REPORT

A 19-yr old male patient reported to the Department of Periodontics of SMBT Dental College and Post Graduate Research Centre, Sangamner, with the chief complaint of poor aesthetics resulting from deeply pigmented gums. The patient reported embarrassment while smiling and asked for any cosmetic help that was available to enhance aesthetics.

Intraoral examination revealed prominent bilateral melanin pigmentation associated with healthy periodontium. The gingiva appeared healthy and was free of inflammation. The medical history was inconclusive of any condition associated with pigmentation, suggestive of physiologic pigmentation. Clinical examination included recording patient's smile line and the degree of pigmentation, the prerequisites for planning for gingival depigmentation. Smile line was analysed according to smile line classification given by Libert *et al*. The patient had

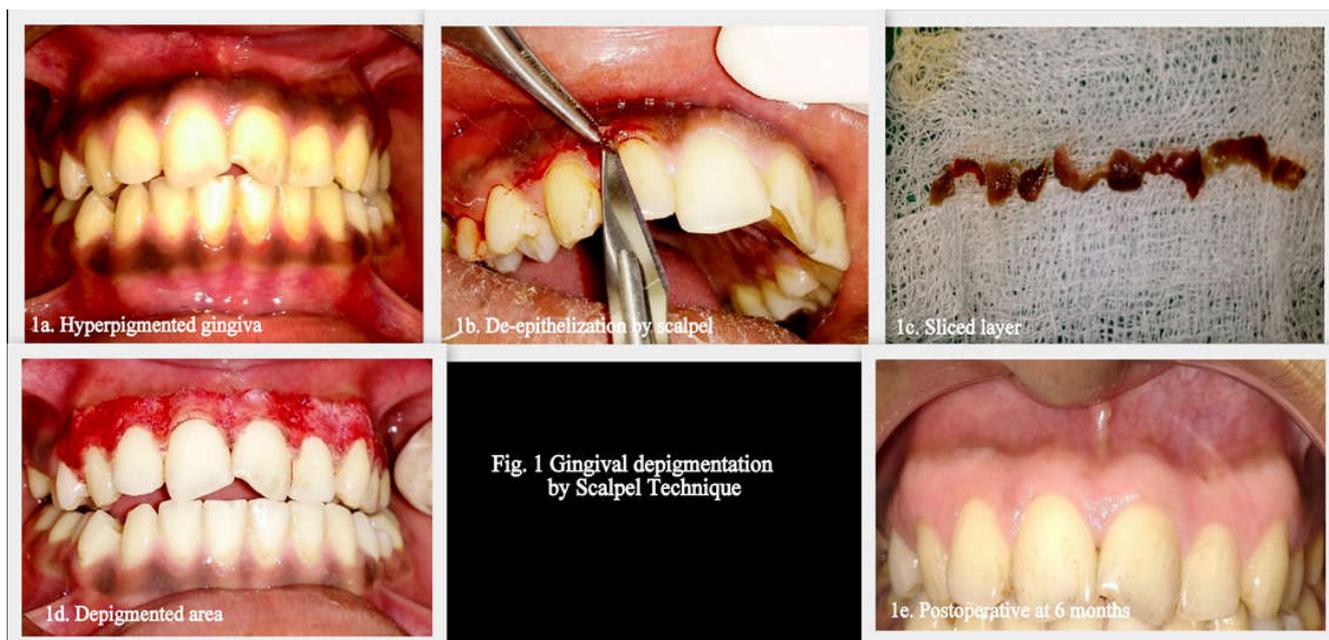
high smile line. The degree of pigmentation was recorded using Dummett-Gupta oral pigmentation index (DOPI). The pigmentation was generalised, diffuse with a DOPI score of 3.(Fig 1a)

Considering the patient's concern regarding his conscious smile and unesthetic appearance, gingival depigmentation was planned. Patient was in good general health, blood investigations showed no contraindications for the surgery. Different treatment modalities available were explained to the patient and the healing outcomes and recurrence of the pigmentation over a variable period of time was also explained to the patient following which a written informed consent was obtained from the patient. Scalpel de-epithelization for depigmentation of maxillary arch and abrasion technique using diamond bur for mandibular arch was planned. Both the techniques were attempted in two different visits.

Complete aseptic precautions were taken while performing the surgical techniques. Standard skin preparations using 10% povidone iodine solution was carried out. About 2 ml of anaesthetic solution Lignox® (2% lignocaine with 1:80,000 adrenaline) was administered as nerve block and/or infiltration. Maxillary arch was treated first utilizing the scalpel technique. Slicing of gingival surface (rising of partial thickness flap) was carefully done using No. 15 and No. 11 blade placed on a straight bard parker handle kept parallel to the gingival surface. (Fig1b) The gingival epithelium and a portion of connective tissue was gently dissected. (Fig 1c) Slicing was followed by scraping to eliminate any remnants of pigmented patches. Exposure of underlying bone was avoided. Special care was taken to deepithelize the free gingival marginal area so as to prevent gingival recession resulting from improper epithelial excision. Bleeding was controlled by application of pressure pack using sterile gauze. The raw area was thoroughly irrigated with saline and providone iodine (1:1) solution. (Fig 1d) The raw surgical site was covered with a periodontal dressing (Coe pack).

At 1week follow up, healing was uneventful and satisfactory without any post-surgical complications. At 2 weeks follow up interval, gingiva appeared to be pink giving a normal appearance with pleasing aesthetic outcome and patient satisfaction. Patient follow up was further maintained for 1 month, 3 months and 6 months for evaluation of healing and to look for any re-pigmentation of treated sites. The results were maintained for more than a period of 6 months. (Fig1e)

After one month, the mandibular arch was treated by abrasion technique using diamond bur. Strict aseptic protocol was followed during the surgery. Standard skin preparation using povidone iodine solution was carried out. The area was infiltrated with local anaesthetic solution Lignox® (2% lignocaine with 1:80,000 adrenaline) A medium sized round diamond bur was used to abrade the pigmented area. A medium sized bur was selected so as to prevent the small pits that might result on usage of small diamond bur. Light feather strokes with minimal depth of penetration and minimal pressure was employed. Care was taken not to hold the bur at one place for too long as it may lead to thermal trauma and thereby permanent damage to the underlying tissues. Bleeding was kept in check by application of pressure utilizing sterile saline soaked gauze. The surgical site was re-evaluated for any remnants of pigmented patches which were then removed. The surgical area was thoroughly irrigated with saline and povidone iodine (1:1) solution (Fig.2b). The raw area was maintained with periodontal dressing (Coe pack). Patient was prescribed with analgesics for pain management. Patient was recalled after one week. Healing was uneventful and satisfactory without any complications. On intraoral examination at two weeks, gingiva appeared to be pink, firm and healthy giving a normal appearance with pleasing aesthetic outcome. Patient was asked to report for follow up every month to evaluate healing and to look for re-pigmentation of treated sites. No recurrence of pigmentation was observed at 6 months in both anterior segment of maxillary and mandibular arch (Fig 1e, Fig 2c).



Analgesics were prescribed for the management of postoperative pain and 0.12% chlorhexidene gluconate mouthwash for 2 weeks post operatively.



Fig. 2 Gingival depigmentation by bur abrasion technique

Evaluation of wound healing was done based on following scores:

- Score 1: - Complete epithelization
- Score 2: - Incomplete epithelization
- Score 3: - Ulcer
- Score 4: - Tissue defect or necrosis.

RESULTS

In the above mentioned case, maxillary arch was treated with scalpel technique and mandibular arch was treated with bur technique. Both the sites exhibited uneventful healing with no evidence of infection, haemorrhage or post-operative pain. No significant differences in wound healing were appreciated in two techniques. The results were excellent as perceived by the patient. Patient acceptance of bur technique was better as compared to the scalpel technique. The treated sites also showed no evidence of recurrence of pigmentation after 6 months at treated sites.

Table 1 Clinical evaluation of wound healing

Method	Immediately	1 Week Post Op	3 Month Post OP	6 Months Post OP
Scalpel technique	3	1	1	1
Abrasion technique	3	1	1	1



DISCUSSION

Oral pigmentation occurs in all races of humans. Gingival pigmentation may appear as early as 3 hours after the birth.¹ There are no significant differences in oral pigmentation between males and females. The normal colour of gingiva ranges from pale pink to deep purple hue. The colour of gingiva is defined by the vascular supply, the thickness and degree of keratinization of the epithelium and the presence of pigment containing cells. Physiologic pigmentation is probably genetically determined, but as Dummett suggested, the degree of pigmentation is also related to mechanical, chemical, and physical stimulation.³

Dummett & Gupta Oral Pigmentation Index (1964) scored the gingival pigmentation as-

- No clinical pigmentation (pink gingiva)
- Mild clinical pigmentation (mild light brown colour)
- Moderate clinical pigmentation (medium brown or mixed pink and brown colour)
- Heavy clinical pigmentation (deep brown or bluish black colour)

Melanin is the most common natural pigment responsible for endogenous pigmentation of gingiva. It is the non-haemoglobin-derived brown physiologic (ethnic/racial) pigment produced by melanocytes and present in the basal layer of the epithelium. Active melanocytes convert tyrosine, through a series of intermediate stages mediated by the enzyme tyrosinase, to melanoprotein (melanin).⁴ The melanin (accumulated in the melanosome) is then transferred outward to the basal and prickle cell layers. Various stimuli can result in an increased production of melanin at the level of mucosa, including trauma, hormones, radiation, and medications.⁵

Pigmented lesions might be the result of certain developmental disorders (pigmented cellular nevus, labial and oral melanotic macule, Forbes-Albright syndrome, polyostotic fibrous dysplasia, neurofibromatosis, Peutz-Jeghers syndrome, racial pigmentation, chloasma). Specific agents (dental amalgam, chewing/smoking of tobacco, betel nut chewing, lead, silver) may result in pigmentation.⁶⁻¹²

Pigmentation may be due to certain drugs (Busulfan, Chlorpromazine, Minocycline, Quinacrine), Deficiency disorders (Vitamin B12 deficiency), Endocrine disorders (Addison's disease, Cushing's syndrome, acromegaly), Hyperthyroidism, and Neoplastic disorders (compound nevus, malignant melanoma) or may be due to functional/physiologic variants.⁶⁻¹²

Liebert analysed the smile lines and classified them as-¹³

Class 1-Very high smile line – more than 2mm of the marginal gingival visible during smile.

Class 2- High smile line- 0- 2 mm of marginal gingival visible during smile.

Class 3- Gingival embrasures visible only during smile.

Class 4- Gingival embrasures and cemento-enamel junction not visible during smile.

Patients with hyperpigmented gingiva especially the ones with high smile line seek treatment for the poor esthetic appearance. Several treatment modalities are available for management of hyperpigmented gingiva which include either removal or masking of the pigmented layer. The treatment modalities

include chemical cauterization, scalpel technique, abrasion technique, electrocautery. Recent techniques widely used in clinical practices include cryotherapy, free gingival autograft and laser therapy which has achieved quite satisfactory results. The selection of a technique for depigmentation is based on clinician's experience, patient's affordability, and preferences.

Scalpel depigmentation is simple, effective, and economical of all the other techniques. Scalpel technique offers the advantage of faster wound healing. Demerits of scalpel technique are excessive bleeding in the operating area, postoperative pain, and discomfort.¹⁴ To overcome these difficulties, electrocautery procedure has been employed in the field of dentistry.

Electrocautery is effective when compared to the scalpel, and it has been explained through exploding cell theory in the year 1975 by Oringer.¹⁵ Electrocautery correctly termed as electrosurgery refers to the use of electricity to heat an iron which can be used as a hot cautery.¹⁶ According to Çiçek and Ertas, 2003, electrosurgery has many advantages such as the absence of bleeding and patient discomfort.¹⁷ The prolonged use of cautery induces heat accumulation and tissue destruction. Thus, to overcome the disadvantages of electrocautery, soft tissue lasers were used in dentistry

Maiman invented the first laser device in 1960, based on theories derived by Einstein in the early 1900s. Lasers have been approved for soft tissue management in periodontium because of their excellent and effective soft tissue ablation and haemostatic features.¹⁸ Lasers used for gingival depigmentation include Nd:YAG, Er:YAG, Co2 laser etc. Laser therapy offers advantages such as minimal wound contraction, bactericidal effect, greater haemostasis, bloodless field during surgery, and minimum damage to the periosteum and underlying bone. Moreover, periodontal dressing is not required for the treated gingiva and mucosa.¹⁹

Abrasion technique using diamond bur offers the advantage of less chair side time as compared to the scalpel technique. However, using the bur at a same place for long time should be avoided as it would result in thermal trauma and thereby damage to the underlying structures. Also caution should be taken as inappropriate application may result in gingival recession, damage to underlying periosteum and bone, delayed wound healing, as well as loss of enamel.²⁰

Despite the initial excellent results with depigmentation techniques, re-pigmentation is a common problem.

Clinical trials have suggested that it takes 1.5-3 years to return to full baseline re-pigmentation however time period may vary from different pattern of clinical conditions.²¹

The exact mechanism behind re-pigmentation is still not known, however, the "Migratory theory" seems to be favoured. According to this theory active melanocytes from normal skin and hair matrix seem to proliferate and migrate into the depigmented areas.²⁰

In the present case, healing outcomes were excellent with both the techniques. However, patient was more comfortable with the bur abrasion method. In above discussed case, re-pigmentation was not appreciated at 6 months of follow up with either technique. The present case will be followed up for a longer period of time to study the repigmentation patterns. Further research is needed to determine the factors responsible and the length of time required for re-pigmentation.

CONCLUSION

The increasing concern regarding esthetics in the population demands for efficient techniques to treat gingival hyperpigmentation. Periodontal plastic surgery is a "boon" for patients with hyperpigmented gingiva especially the ones with high or very high smile line. As gingival pigmentation occurs as a result of various local, systemic and environmental factors, the causative agent should be identified and eliminated if possible and the need for a surgical intervention for aesthetic purpose should be planned only on patient demand. Re-pigmentation of the tissues over a variable period of time should also be clearly addressed and informed to the patient. Many modalities exist to treat hyperpigmentation but the selection of any technique depends upon individual preference, clinical skill and affordability by the patient. More research should focus on techniques that ensure long term predictability of any procedure and finding a solution for preventing the recurrence of pigmentation.

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