

CASE SERIES ON DEPIGMENTATION

Dr Saurabh Prithyani*, **Dr Meenakshi Talati****, **Dr Dipika Mitra*****, **Dr Rohit Shah******, **Dr Silvia Rodrigues******, **Dr Harshad Vijayakar*******

Subject area: Case series

*- Lecturer, saurabh.prithyani@gmail.com- 7208020305

** -Postgraduate student, meenakshitalati@gmail.com -9967822488

***- Professor, drdipikamitra@gmail.com – 9820180406

****- Reader, rohishah17@gmail.com- 9699860609, silvia.rdrqs@gmail.com - 7709315422

*****- Professor and Head, drharshadvijayakar@gmail.com-9820128432

Department of periodontology

TPCT's Terna dental college and hospital, Sector-22, Nerul, Navi Mumbai-400706

ABSTRACT

Gingival pigmentation is a major concern for a large number of patients visiting the dentist. The patients with excessive gingival display and pigmentation are more concerned esthetically. Most pigmentation is caused by five primary pigments out of which melanin has the maximum incidence rate. Melanin hyper pigmentation usually does not present as a medical problem, but patients may complain about their unesthetic black gums. The gingiva is the most frequently pigmented intraoral tissue, with the highest rate observed in the area of the incisors Esthetic periodontal plastic surgery is a boon in patients having “dark gums” and “gummy smile.” This article offers a retrospective case series of gingival depigmentation by epithelial excision using scalpel. Out of the several techniques employed for depigmentation, the surgical technique using scalpel is still the first and most popular technique. This is a case report representing a simple surgical technique of de-epithelization which has been successfully used to treat gingival hyperpigmentation caused by excessive melanin deposition and highlights the relevance of an esthetically pleasing smile especially in smile conscious individuals.

INTRODUCTION:

Pigmented lesions are commonly found in the mouth. Such lesions represent a variety of clinical entities, ranging from physiologic changes (e.g., racial pigmentation) to manifestations of systemic illnesses (e.g., Addison's disease) and malignant neoplasms (e.g., melanoma and Kaposi's sarcoma).¹

The color of healthy gingiva is variable, ranging from a pale pink to a deep bluish-purple hue. Between these limits of normalcy are a large number of pigmentation mosaics which depend

primarily upon the intensity of melanogenesis, depth of epithelial cornification, and arrangement of gingival vascularity. Moreover, color variation may not be uniform and may exist as unilateral, bilateral mottled, macular, or blotched, and may involve gingival papillae alone or extend throughout the gingiva on to other soft tissues.^{2,3}

Most pigmentation is caused by five primary pigments. These include: Melanin, melanoid, oxyhemoglobin, reduced hemoglobin, carotene, bilirubin, and iron.^{4,5,6}

Pigmented gingiva is an esthetic problem to many individuals. Demand for cosmetic therapy is made, especially by fair-skinned people with moderate or severe gingival pigmentation³. A periodontal plastic surgical procedure called the gingival depigmentation is performed whereby the gingival hyperpigmentation is removed or reduced by various techniques. This case series presents six cases of gingival hyperpigmentation where gingival depigmentation procedure was performed either through slicing or scraping technique, with satisfactory clinical outcomes.

MATERIALS AND METHODS:

A total of **six patients with** a chief complaint of black gums were selected in this study and treated by surgical depigmentation procedure. The patients were systemically healthy. The complaints were mainly observed in patients who were esthetically bothered by black gums shown during smiling or talking, patients with gummy smiles, and fair-skinned patients. Dummett-Gupta Oral Pigmentation Index was used to score oral pigmentation.

The index is as follows: -

The patients with Dummett & Gupta Oral Pigmentation Index scores 2 and 3 were included in the study. Dummett & Gupta Oral Pigmentation Index⁵ scoring criteria given by Dummett in 1964 are as follows: 0: No clinical pigmentation (pink gingiva) 1: Mild clinical pigmentation (mild light brown color) 2: Moderate clinical pigmentation (medium brown or mixed pink and brown color) 3: Heavy clinical pigmentation (deep brown or bluish black color)

All patients were treated surgically by slicing technique/ scraping technique using scalpel under local anesthesia. The selection of slicing or scraping is done by the width of the keratinized gingiva available. Either of the two techniques showed similar result with the sole purpose of removing the melanin hyperpigmented areas from the gingiva. The cases were followed up to a maximum of 12 months and minimum of 7 months for analyzing the efficiency of the procedure.

SURGICAL TECHNIQUE:

Scalpel surgical technique or slicing technique was used for the procedure. The area of melanin hyper pigmentation (area of interest) was scrubbed with betadine followed by lip retraction, administration of local anaesthesia and then the area of interest was marked by two vertical and horizontal lines for demarcating it from the uninvolved area. This procedure of outlining the area was strictly performed by asking the patient to smile, so as to know the exact extension of the unesthetic looking gums. For marking the extensions, an indelible pencil or back of the surgical

blade can be used [Figure 1]. After following complete aseptic precautions, surgical technique was performed. Standard skin preparation was carried out by 10% povidone iodine solution and temporary draping was done. Local infiltration was done using local anesthetic solution Lignox® (2% lignocaine with 1:200,000 adrenaline). To retract the lips, either a cheek retractor was used or the help of an assistant was taken. Petroleum jelly was applied over the lips. Special care was taken to prevent injury to the lips for slicing the tissue. No. 15 or no. 11 surgical grade blade on a bard parker handle was used.

The procedure was performed either through scraping epithelium with underlying pigmented layer (in attached gingival area) or through slicing the pigmented epithelial layer from the underlying connective tissue, i.e., raising partial thickness flap and excising the flap from its base denuding the connective tissue epithelial excision [Figure 2]. A uniform layer of the epithelium was sliced from the underlying connective tissue to prevent nicks, cuts, and underlying alveolar bone exposure. Special care was taken in the free gingival margin area as improper epithelial excision might lead to gingival recession in that area. The raw surface was thoroughly irrigated with saline and povidone iodine (1:1) to remove any loose tissue tags.

The area of interest was re-examined for the remaining melanin pigmented patches. After thorough examination, the area was wiped with saline-soaked gauze.



Figure 1 [PRE-OPERATIVE]



Figure 2 [INTRA-OPERATIVE]



Figure 3 [1 MONTH FOLLOWUP]



Figure 4 [12 MONTH FOLLOWUP]

RESULTS:

Depigmentation procedure was performed in **six** patients, by surgical removal of the pigmented epithelium through scalpel. This procedure was performed either by slicing epithelium from underlying tissues or by scraping (melanin pigmented) epithelium. No complications with either the surgical procedure or anaesthesia or postoperative healing were encountered. No recurrence till date with this technique has been reported. None of the cases required a secondary intervention. In all the cases, complete resolution of the chief complaint and patient satisfaction was achieved.

DISCUSSION

Gingival depigmentation is discoloration of the gingiva due to wide variety of lesions or conditions. The color of healthy gingiva is variable, ranging from pale pink to deep bluish-purple hue. Between these limits of normalcy are a large number of pigmentation mosaics which depend primarily upon the intensity of melanogenesis, depth of epithelial cornification, and gingival vascularity.^{6,7}

The pigmented lesions^{8,9,10} might be the following.

Developmental disorders (pigmented cellular nevus, labial and oral melanotic macule, Forbes–Albright syndrome, polyostotic fibrous dysplasia, neurofibromatosis, Peutz–Jeghers syndrome, racial pigmentation, chloasma), functional/physiologic variants, specific agents (dental amalgam, chewing/smoking of tobacco, betel nut chewing, lead, silver), 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).^{11,12,13,14,15}

Out of these varieties, melanin is the most common of the endogenous pigments seen in the gingiva of Indian population. It is the most common non-haemoglobin derived brown physiologic (ethnic/racial) pigment produced by melanocytes and present in the basal layer of the epithelium.⁶ 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

A variety of treatment modalities have been employed for esthetic correction of gingival pigmentation which can be achieved either by removal of the pigmented layer or by masking of the pigmented gingiva.

Removal of the pigmented layer has often been tried in the form of surgical treatment (scalpel surgical technique,^{16,17} bur abrasion, cryosurgery,^{18,19,20,21} electrosurgery, lasers²²⁻²⁸ and chemical treatment (90% phenol, 95% alcohol). Masking of the pigmented gingiva can be achieved by free gingival grafts (FGGs)²⁹ or acellular dermal matrix allografts.³⁰ But some of the treatment modalities have their own limitations.²¹

Lasers, electrosurgery, and cryosurgery are not cost effective.^{21,31} Depth of control is a limitation of chemical cauterization and cryosurgery. Electrosurgery produces latent heat, causing damage to the surrounding tissues. Gingivectomy and bone denudation are invasive surgical procedures causing patient discomfort and bone loss. FGG is a surgical procedure that requires two surgical sites (donor and recipient), has color-matching problems, and causes delayed healing of recipient site.

Out of all the available treatment options, this case series focuses on the use of scalpel surgical technique (scraping/ slicing) in gingival hyperpigmentation cases with satisfactory results. This technique is simple and versatile requiring minimum armamentarium most easily available in all dental clinics. Though the initial result of the depigmentation surgery is highly encouraging, repigmentation is a common problem.

Repigmentation after depigmentation has been reported following the use of different techniques. The mechanism of repigmentation is not understood, but according to “migration theory,” active melanocytes from adjacent pigmented tissues migrate to treated areas causing repigmentation. Perlmutter and Tal described repigmentation after 7-8 years.¹⁴ On the contrary, a study by Oswald et al . in 1993 showed that gingival surgical procedures performed solely for cosmetic reasons offer no permanent results. But pigment recurrence has been documented to occur, following the surgical procedure, within 24 days to 8 years long period. This repigmentation is attributed to the epidermal melanocyte unit also. The epidermal melanin unit (EMU) denotes the symbiotic relationship between a melanocyte and a pool of associated keratinocytes. EMU, rather than the melanocyte alone, serves as the focal point for melanin metabolism within mammalian epidermis. The EMU is better labelled the KLM unit (melanocytes, keratinocytes, and Langerhans cells). There is little information on the behaviour of melanocytes after surgical injury. The timing of early signs of repigmentation varies among studies and may be related to the technique performed and patient’s race.

Further research is required on repigmentation to study the factors affecting rate and length of time required for recurrence of pigmentation. Research should also focus on finding a solution for preventing the recurrence and till then, repeated depigmentation should be done to eliminate the unsightly pigmented gingival.

In the present study, cases were followed for a period of maximum 12 months and no recurrence was observed. However, the cases are being followed up to study the factors affecting the rate and length of time required for repigmentation and to study the repigmentation patterns.

Scalpel surgical technique is highly recommended in consideration of the equipment constraints that may not be frequently available in clinics (Almas and Sadiq, 2002).¹⁶ It is known that the healing period for scalpel wounds is faster than in other techniques. However, scalpel surgery may cause unpleasant bleeding during and after the operation, and it is necessary to cover the exposed lamina propria with periodontal dressing for 7-10 days (Almas and Sadiq, 2002).¹⁶

Thus, gingival depigmentation procedure is performed solely as a part of the periodontal plastic procedure for cosmetic enhancement. This procedure will not be of permanent value because pigmentation tends to return to baseline values (Begamaschi O, 1993).¹⁷ The same surgical technique can be repeated if signs of repigmentation appear in the concerned area.

This case series describes a simple and effective surgical procedure for the treatment of gingival melanin hyperpigmentation, resulting in improved esthetics and cosmetic appearance. This treatment procedure can be performed as a normal chair-side procedure by all general dentists for the cosmetic correction of hyperpigmented gums.

CONCLUSION:

Excessive gingival display and gingival hyperpigmentation are the major concerns for a large number of patients visiting the dentist. Esthetic periodontal plastic surgery is a boon in patients having “dark gums” and “gummy smile.” This case series of **six** patients describes the depigmentation of the melanin pigmented gums (not a medical problem) using surgical scalpel technique (slicing/scraping). Scalpel technique is one of the first and still popular techniques employed for correction of gingival hyperpigmentation. The results obtained in all the patients were minimum discomfort and maximum patient satisfaction, with no signs of recurrence after a 12-month follow-up period. The cases are being tracked to notice signs of recurrence, as repigmentation may occur post depigmentation; with altered time durations as reported by multiple authors. There is still paucity of literature regarding the control on repigmentation followed by treatment of gingival hyperpigmentation. Therefore, research should focus on finding a solution for preventing recurrence and, till then, repeated depigmentation should be done to eliminate the unsightly pigmented gingiva.

REFERENCES:

1. Dummett CO. Clinical observation on pigment variations in healthy oral tissues in the Negro. *J Dent Res* 1945;24:7-13.
2. Dummett CO, Barrens G. Oromucosal pigmentation: An updated literary review. *J Periodontol* 1971;42:726-36.
3. Dummett CO. Oral tissue color changes (I). *Quintessence Int* 1979;10:39-45.

4. Cicek Y, Ertas U. The normal and pathological pigmentation of oral mucous membrane: A review. *J Contemp Dent Pract* 2003;4:76-86.
5. Dummett CO, Barends G. Pigmentation of the oral tissues: A review of the literature. *J Periodontol* 1967;38:369-78.
6. Carranza AC, Saglie FR. Clinical features of gingivitis In: Carranza FA. *Glickman's clinical periodontology*. Philadelphia: WB Saunders Company; 1990. p. 109-25.
7. Marsh PD. Dental plaque: Biological significance of a biofilm and community life-style. *J Clin Periodontol* 2005;32 Suppl 6:7-15.
8. Brocheriou C, Kuffer R, Verola O. [Pigmented lesions of the oral cavity] *Ann Pathol* 1985;5:221-9. 9. Patsakas A, Demetriou N, Angelopoulos A. Melanin pigmentation and inflammation in human gingiva. *J Periodontol* 1981; 52:701-4.
10. Porter SR, Flint SR, Scully C. *Oral Diseases*. In: Dunitz M, Editor. 2nd ed, London 1996. p. 1-371. 11. Laskaris G. *Color atlas of oral diseases in children and adolescents*. New York: Thieme Stuttgart; 1999. p. 1-337.
12. Amir E, Gorsky M, Buchner A, Sarnat H, Gat H. Physiologic pigmentation of the oral mucosa in Israeli children. *Oral Surg Oral Med Oral Pathol* 1991;71:396-8.
13. Weathers DR, Corio RL, Crawford BE, Giansanti JS, Page LR. The labial melanotic macule. *Oral Surg Oral Med Oral Pathol* 1976;42:196-205.
14. Perlmutter S, Tal H. Repigmentation of the gingiva following surgical injury. *J Periodontol* 1986;57:48-50.
15. Tamizi M, Taheri M. Treatment of severe physiologic gingival pigmentation with free gingival autograft. *Quintessence Int* 1996;27:555-8.
16. Almas K, Sadig W. Surgical treatment of melanin-pigmented gingiva; An esthetic approach. *Indian Dent Res* 2002;13:70-3.
17. Bergamaschi O, Kon S, Doine AI, Ruben MP. Melanin repigmentation after gingivectomy: A 5-year clinical and transmission electron microscopic study in humans. *Int J Periodontics Restorative Dent* 1993;13:85-92.
18. Tal H, Landsberg J, Kozlovsky A. Cryosurgical depigmentation of the gingiva. A case report. *J Clin Periodontol* 1987;14:614-7.
19. Tal H. A novel cryosurgical technique for gingival depigmentation. *J Am Acad Dermatol* 1991;24(2 Pt 1):292-3.
20. Tal H, Littner S, Kozlovsky A. Depigmentation of human gingiva: Clinical observations after surgical and cryosurgical procedures. *Compendium* 1988;9:22-5.

21. Kathariya R, Pradeep AR. Split mouth de-epithelization techniques for gingival depigmentation: A case series and review of literature. *J Indian Soc Periodontol* 2011;15:161-8
22. Steigmann S. Treatment of melanin-pigmented gingiva and oral mucosa by CO₂ laser. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;90:14-5.
23. Özbayrak S, Dumlu A, Ercalik-Yalcinkaya S. Treatment of melanin- pigmented gingiva and oral mucosa by CO₂ laser. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;90:14-5.
24. Yousuf A, Hossain M, Nakamura Y, Yamada Y, Kinoshita J, Matsumoto K. Removal of gingival melanin pigmentation with the semiconductor diode laser: A case report. *J Clin Laser Med Surg* 2000;18:263-6.
25. Atsawasuwan P, Greethong K, Nimmanon V. Treatment of gingival hyperpigmentation for esthetic purposes by Nd:YAG laser: Report of 4 cases. *J Periodontol* 2000;71:315-21.
26. Tal H, Oegiesser D, Tal M. Gingival depigmentation by erbium: YAG laser: Clinical observations and patient responses. *J Periodontol* 2003;74:1660-7.
27. Nakamura Y, Funato A, Wakabayashi H, Matsumoto K. A study on the removal of the melanin pigmentation of dog gingiva by CO₂ laser irradiation. *J Clin Laser Med Surg* 1992;10:41-6.
28. Nakamura Y, Hossain M, Hirayama K, Matsumoto K. A clinical study on the removal of gingival melanin pigmentation with the CO₂ laser. *Lasers Surg Med* 1999;25:140-7.
29. Tamizi M, Taheri M. Treatment of severe physiologic gingival pigmentation with free gingival autograft. *Quintessence Int* 1996;27:555-8.
30. Novaes AB Jr, Pontes CC, Souza SL, Grisi MF, Taba M Jr. The use of acellular 31. American Academy of Periodontology. *Lasers in Periodontics. J Periodontol* 2002;73:1231-9.