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"Management of gingival hyperpigmentation with scalpel, rotary abrasion and laser: A case series"

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ABSTRACT:

Aim: To compare the scalpel, burabrasion, and laser techniquesused in the treatmentof gingival hyperpigmentation.

Background: Gingival pigmentationoftenoccurs as a resultof an abnormal deposition of melanin due to which the gumsmayappear black. Although it does not present as a medical problem, it is a major aestheticconcern for manypeople. Depigmentationproceduressuch as scalpelsurgery, gingivectomywithfreegingival autografting, electrosurgery, cryosurgery, chemical agents, abrasion with a diamond bur, Nd: YAG laser, diode laser, and CO2 laser havebeenemployed for the removalof melanin hyperpigmentation.

Case description: The followingcase series aimed at comparingthree different techniquesused in the management of gingival hyperpigmentation: scalpelsurgery, abrasion with a rotary diamond bur, and a diode laser.

Clinical significance: Several patients consider gingival pigmentation as unaesthetic, whichmayhave a negative psychologicalimpact, particularly in patients withhighsmileline. The gingival depigmentationis considered as periodontal plastic procedurewhereby gingival hyperpigmentation is removed by varioustechniques.

Keywords: Laser, Rotary abrasive burs, Scalpeltechnique.

I. INTRODUCTION:

Gingival hyperpigmentation can be defined as a darker gingival colour beyond what is normally expected.[1] Although it is a benign condition and not considered a medical problem, it can be of cosmetic concern to many patients having a very high smile line.[2]Oral melanin pigmentation is considered to have a multifactorial origin, it can be Physiological or pathological. There is a wide range of variations in melanin pigmentation associated with oral mucosa. Darker-skinned persons more frequently have oral melanin pigmentation due to the deposition of higher quantities of melanin than a person with a fair complexion.[3] Melanin,a nonhemoglobin-derived brown pigment produced by melanoblast, is the most common natural pigment contributing to endogenous pigmentation of the gingiva. It is formed by cells called melanocytes which are dendritic cells of neuroectodermal origin in the basal and spinous layer of the gingival epithelium.[4] Melanin pigmentation may appear as early as 3hours after birth in the oral tissues.[5] The attached gingivae are the most frequently pigmented intraoral tissues (27.5%). Melanin pigmentation is mostly localized at the anterior labial gingiva.[6]The intensity and distribution of oral pigmentation are variable, between races, between different individuals of the same race, and within different areas of the same mouth. The degree of pigmentation depends on a variety of factors especially melanoblastic activity, genetic constitution, hormones, and UV radiation.[7]

There are two types of gingival pigmentation; Physiologic (racial): Melanin non-hemoglobin-derived brown pigment (most common) and pathologic: which may be due to drug-induced.[8]Gingival depigmentation can be defined as a periodontal plastic surgical procedure whereby the gingival hyperpigmentation is removed or reduced by various techniques.[9]Different techniques for depigmentation have been described in the literature: Scalpel technique, Cryosurgery, Electrosurgery, Lasers – Nd: YAG laser, Er: YAG laser, CO2 laser, diode laser, Chemical methods including acoustic agents, bur abrasion method, radiosurgery, methods which aimed at masking the pigmented gingiva such as free gingival graft and acellular dermal matrix allograft.[10]

The present case series describes three simple and effective surgical depigmentation techniques – The scalpel technique, the rotary abrasive technique, and a diode laser surgeryfor gingival depigmentation.

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Case description:

The cases were selected based on Dummett–Gupta oral pigmentation index (DOPI) (Dummett, 1971)[8]

Dummett–Gupta oral pigmentation index (DOPI):

1. No clinical pigmentation (pink gingiva)
2. Mild clinical pigmentation (mild light brown color)
3. Moderate clinical pigmentation (medium brown or mixed pink and brown)
4. Heavy clinical pigmentation (deep brown or bluish-black)

Depigmentation with the scalpel technique:

A 21-year-old female patient visited the Department of Periodontics, Government Dental College, Mumbai with the chief complaint of "black" colored gums[Figure.1].Intraoral examination revealed moderate clinical pigmentation of the gingiva in both arches indicative of a score of 3 according to the DOPI[8] scoring system. Considering the patient's concern, a depigmentation procedure with a scalpel was planned accordingly. The procedure was explained to the patient and written consent was obtained. Blood investigations were carried out and reports were within normal physiologic limits.Local anesthetic infiltration of 2% lignocaine containing adrenaline at a concentration of 1:80,000 was injected in the maxillary anterior region from the right first premolar to the left first premolar. After the administration of the local anesthetic, a Bard Parker handle with a No.15c blade was used to remove the pigmented layer [Figure.1]. The pressure was applied with sterile gauze soaked in a local anesthetic agent to control bleeding during the procedure. The surgical area was irrigated with saline and then it was covered with a periodontal dressing (CoePack).

Post-surgical instructions were given to the patient and she was prescribed analgesics for use when required. The patient was advised to use 0.2% chlorhexidine gluconate mouthwash 12 hourly for 14 days. The patient was recalled after 1 week. The healing process was uneventfuland satisfactory. The patient had no complaints of post-operative pain or bleeding. The gingiva appeared healthy and no repigmentation was observed at the end of 1 and 3 months. [Figure.1]

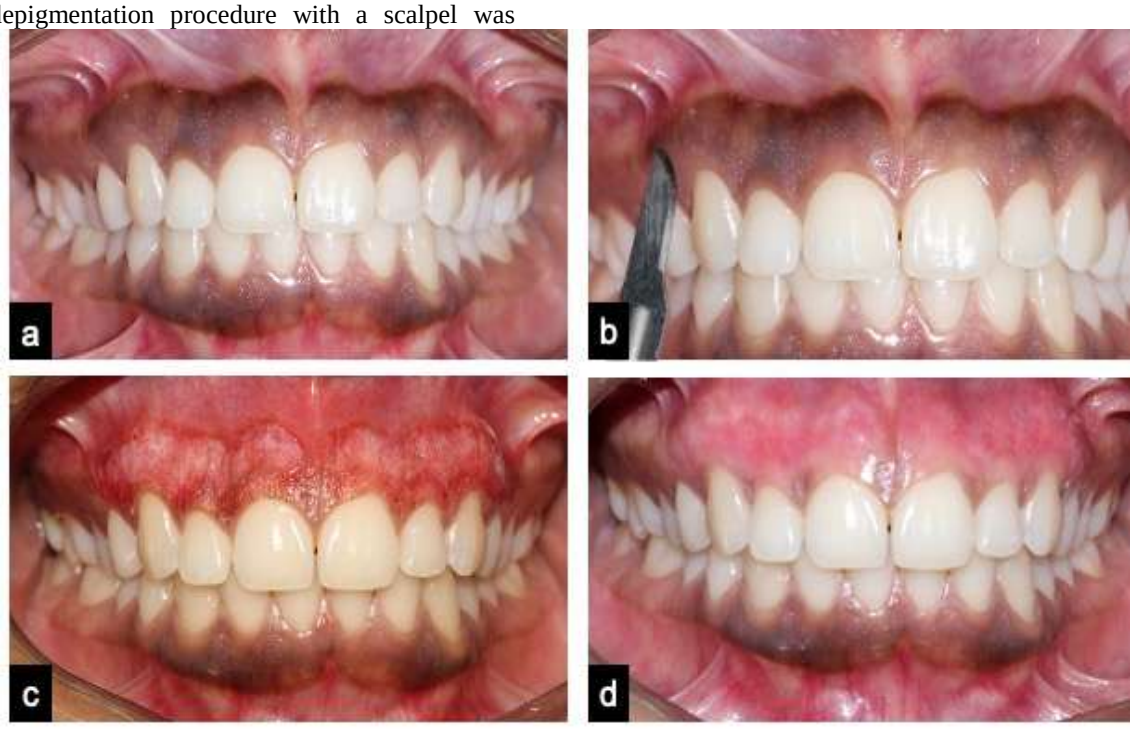

Figure 1: a.)Preoperative image showing moderate clinical pigmentation b)Depigmentation done using scalpel c)Postoperative image d) Follow up after 3 months

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Depigmentation with rotary acrylic abrasive:

A 23-year-old female patient reported to the Department of Periodontics with the complaint of "black-colored gums [Figure 2]." Oral examination heavy clinical pigmentation of the gingiva in both arches was observed indicative of a score of 4 according to the DOPI[8] scoring system. Bur abrasion method using flame-shaped diamond bur was planned to perform the depigmentation. The patient's medical history was non-contributory. The entire procedure was explained to the patient and written consent was obtained.

Local anesthesia was infiltrated in the maxillary anterior region from premolar to premolar. A high-speed handpiece with copious saline irrigation with diamond burwas used for removing the pigmented layer[Figure 2]. Minimal pressure was applied with feather-light brushing strokes. The pressure was applied with sterile gauze soaked in a local anesthetic agent to control bleeding during the procedure.The surgical area was covered with a periodontal dressing(Coe-Pak).Post-surgical instructions were given to the patient and she was prescribed analgesics for use when required. The patient was advised to use 0.12% chlorhexidine gluconate mouthwash 12 hourly for 2 weeks and oral hygiene instructions were given. The patient was recalled after 1 week. The patient had no complaints of postoperative pain or bleeding. At the end of 3 months, the gingiva appeared healthy and a slight amount of repigmentation was noted. [Figure 2].

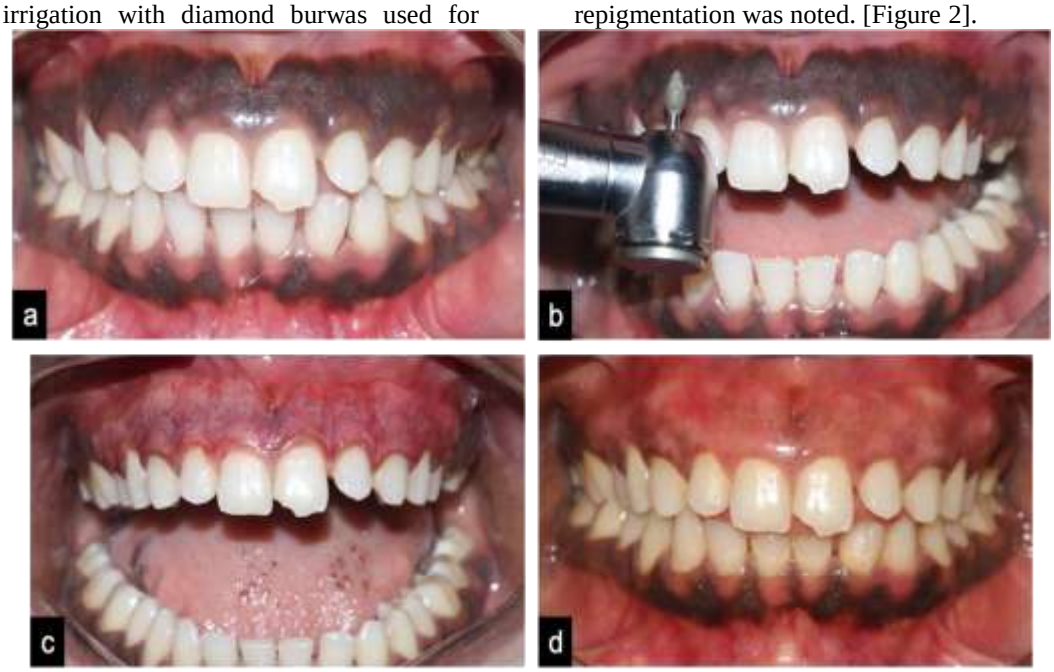

Figure 2: a.)Preoperative image showing moderate clinical pigmentation b)Depigmentation done using diamond bur c)Postoperative image d) Follow up after 3 months

Depigmentation with laser:

A 23-year-old female patient visited the Department of Periodontics, Government Dental College, Mumbai. She complained of dark gums [Figure 3] and requested any cosmetic treatment which would remove the pigmentation. Her medical history was non-contributory. The laser-assisted depigmentation of the gingiva in the anterior region was planned. Before starting the procedure, both the patient and the staff were protected from the laser by wearing the manufacturer's spectacles. The topical anesthetic gel was applied to the concerned area. A diode laser in contact mode was used with small brush-like strokes [Figure 3].During the procedure, any tissue tags left out after laser ablation were wiped with sterile gauze soaked in saline every 3-5 min, and a thorough inspection was done to confirm no pigmented areas were left out. The surgical area was covered with a periodontal dressing. The patient was prescribed analgesics for use when required andnecessary post-operative instructionswere given.Neither pain nor bleeding complications were observed during and after the procedure. The patient was reviewed at 1 week. The post-operative healing was uneventful the ablated wound healed completely in 1 week. The patient was recalled after 1 month and 3 months for evaluation of any repigmentation [Figure 3]. Gingiva was pale pink and healthy in appearance with satisfactory aesthetics and there was no incidence of any recurrence.

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Figure 3: a.)Preoperative image showing moderate clinical pigmentation b)Depigmentation done using laser c)Postoperative image d)follow up after 3 months

II. DISCUSSION:

Patient demand for cosmetic rehabilitation for gingival hyperpigmentation has been increasing. The removal of unsightlygingival pigmentation can be done through several treatments to create a pleasant and confident smile. Gingival depigmentation can be considered a periodontal plastic procedure whereby the gingival hyperpigmentation is eliminated or removed by several techniques varying from the scalpel, electrosurgery, and cryosurgery to lasers. The technique selection should be based on clinical experiences, patient affordability, and individual preferences with a primary indication of demand for improved aesthetics.[11]Out of all the available treatment options, this case series focuses on the use of scalpel, laser, and diamond bur abrasion technique in gingival hyperpigmentation cases with satisfactory results.

The scalpel technique is also called split thickness epithelial excision[12] and surgical stripping.[13] It involves the surgical excision of gingival epithelium along with underlying connective tissue using a scalpel and allowing the denuded area to heal by secondary intention[14] Siti Sopiatin et al.[15] concluded that conventional management of gingival hyperpigmentation is still the best choice as it is very effective and requires minimum time and effort. When compared to abrasion and laser techniques, it is more economical for the patient. However, its disadvantage is mainly due to bleeding during and after an operation, postoperative pain, and discomfort.

The first case using therotary abrasion method was reported by Ginwalla et al. in 1966.[16] It is a relatively simple, safe, and non-aggressive method. However, it is associated with various drawbacks such as technique sensitivity, increased treatment duration, post-treatment pain,need for the placement of periodontal dressing, and high recurrence rate.[17] Exposure of underlying alveolar bone can occur with highspeed and/or increased pressure.[18] Thinner gingival biotype and narrow papillary areas contraindicate the use of this technique.[19]

Lasers exhibit enhanced haemostatic activity, good visibility at the surgical site, and fewer post-operative complications such as pain, bleeding, oedema, infection, and impaired wound healing.[20,21] It has ease of access to the interdental papilla and a low rate of recurrence.[21] It is safe to use in the patient thin gingival biotype, and the healing of the wound is relatively faster. Although better aesthetic results can be achieved by lasers, it requires sophisticated equipment, occupies large space, and is an expensive method.[22]

Relapse or gingival repigmentation is a critical concern in the management of hyperpigmented gingiva. According to migration theory, active melanocytes from the adjacent pigmented tissues migrate to treated areas, causing repigmentation. repigmentation was reported with nearly all methods. Bur abrasion has the highest rate of repigmentation by 8.89%, followed by laser 1.16%, then electrosurgery 0.74, then cryosurgery 0.32, and then diode laser 0.19% while repigmentation rate following scalpel technique may occur after 7 years.[22]

The results achieved in our study proved that all the 3 techniques are effective for the management of gingival pigmentation. The highest repigmentation recurrence rate and duration were recorded by using the abrasion technique when compared to scalpel and laser techniques. Laser treatment is more convenient for patients, as it is minimally invasive, convenient, fast, and safe upon following the manufacturer's instructions, and no severe pain intra- and post-operatively has been recorded. Better results were obtained using the laser technique when compared to the scalpel and rotary abrasion method when the recurrence rate was considered. However, the cases were followed for only 3 months. Further research with longer follow-up periods along with histological studies to observe the cause and the factors affecting the rate of regimentation are needed.

III. CONCLUSION:

Gingival depigmentation using the scalpel method has the lowest rate of repigmentation compared to laser and abrasion methods. However, the application of a diode laser appears to be a safe and effective alternative for the treatment of gingival hyperpigmentation. Its benefits include ease of usage, effectiveness in the treatment of thin gingival biotypes, convenience in dental clinics, and decreased trauma for the patient. Although diode laser showed excellent results, the scalpel technique still serves as a gold standard for depigmentation.

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