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RESEARCH ARTICLE

DIFFERENT TREATMENT MODALITIES FOR ESTHETIC APPROACH- A CASE SERIES

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ABSTRACT

Gingival hyperpigmentation due to melanin deposition is seen as a genetic trait in most of the population irrespective of age and gender hence it is termed physiologic or racial gingival pigmentation. Excessive gingival pigmentation is a major esthetic concern for many people visiting the dentist. Though, it is not a medical problem but many people are unhappy with their unaesthetic gingival appearance and find the discoloration to be very unappealing and detracting from their smile and speech. The problem can be treated by number of surgical techniques selection of which might be based on clinical experiences and individual preferences, of the operator. Esthetic periodontal plastic surgery is especially rewarding in such individuals with compromised esthetics. The cases are reported here on the cosmetic correction of "black gums" and "gummy smile."

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INTRODUCTION

Melanin pigmentation is known to be caused by melanin granules within the gingival epithelium, which is produced by melanocytes, mainly located intertwined between the basal and the suprabasal cell layers of epithelium, often observed to a greater degree at the incisors (Page *et al.*, 1977). It is the most common non-hemoglobin-derived brown physiologic natural pigment. Active melanocytes convert tyrosine, through a series of intermediate stages mediated by the enzyme tyrosinase, to melanoprotein (melanin). Most pigmentation is caused by these primary pigments- These are: melanin, melanoid, oxyhemoglobin, reduced hemoglobin, carotene, bilirubin, and iron (Page *et al.*, 1977; Dummet and Barens, 1971). Gingival health and appearance are essential components of an attractive smile.Though, it is not a medical problem, usually, this condition is a cosmetic issue but many patients may consider their black gums to be unaesthetic. Dark color gingiva is aggravated in patients with a "gummy smile" or excessive gingival display while smiling.

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(Roshnaand Nandakumar, 2005). The smile lines can be analyzed according to the following classification-(Liebart*et al.*, 2004).

Class 1. Very high smile line -more than 2 mm of the marginal gingiva visible or more than 2 mm apical to the cemento-enamel junction visible for the reduced but healthy periodontium. This could be gummy smile.

Class2. High smile line between 0 and 2 mm of marginal gingiva visible or between 0 and 2 mm apical to the cemento-enamel junction visible for the reduced buthealthy periodontium.

Class3 . Average smile line- only gingival embrasures visible.

Class4 . Low smile line- gingival embrasures and cemento-enamel junction not visible

The etiology behind this pigmentation, includes genetic factors, tobacco use, systemic disorders, (endocrine disturbance, Albright's syndrome, malignant melanoma, Peutz-Jeghers syndrome, Cushing's syndrome, acromegaly), hemachromatosis, chronic pulmonary disease, Addison's syndrome and antimalarial therapy, tricyclic antidepressants,

specific agents (dental amalgam, chewing/smoking of tobacco, betel nut chewing, lead, silver), drugs (Busulfan, Chlorpromazine, Minocycline, Quinacrine), deficiency disorders (Vitamin B12 deficiency) (Eisen, 2000). Oral Pigmentation Index scoring criteria given by Dummett in 1964 are as follows: (Shah, 2012).

- 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)

The gingival color of normal healthy person is typically coral pink to pale pink (Roshnaand Nandakumar, 2005) depending upon the factors that includes vascularity, thickness, keratinization and gingival pigmentation. Gingival depigmentation is a periodontal plastic surgical procedure whereby the gingival hyperpigmentation is removed or reduced by various techniques. The foremost indication for depigmentation therapy is the demand by a person for improved esthetics.The techniques that have been tried in the past to treat gingival hyperpigmentation include chemical cauterization, electrosurgery, Gingivectomy, scalpel scraping procedure,acellular dermal martrix allografts and abrasion with diamond bur (Almas and Sadig, 2002; Bergamaschi *et al.,*1993).The latest techniques of gingival depigmentation like cryotherapy, (Tal *et al.*,1987) free gingival autograft (Tamiziand Taheri, 1996) and laser therapy (Yousuf *et al.*, 2000; Atsawasuwan *et al.,*2000) have achieved satisfactory results. Recently laser ablation has been recognized as one of the most effective, comfortable and reliable techniques. But due to the high cost of the laser equipment and technique sensitivity, it is not being frequently used. Presented here are the cases of gingival hyperpigmentation in which different techniques were used in different patients to treat the condition and to compare the clinical efficacy of them.

Case 1

A 23year old male patient reported in department of Periodontology, ManavRachna Dental College,Faridabad with the chief of blackish gums since when he was 12 years.The patient's history revealed that the blackish discoloration of gingiva was present since birth suggestive of physiologic melanin pigmentation.The medical and family history was non-contributory. No relevant findings were observed on extraoral examination. On Intraoral examination generalized blackish pigmentation of gingiva was seen though it was healthy and completely free of any inflammationbut patient also had a high maxillary labial frenum attachment (Figure 1).

Figure 1. Pre Operative

Considering the patient aesthetic and various cost factors different techniques were explain to the patient to carry out the treatment. After patient's approval for the treatment, a written consent was taken.Blood investigation was carried out to rule out any contraindication for surgery if there.Finally seeing the aesthetic of the patient depigmentation procedurealong with treatment for abbrentfrenal attachment i.efrenectomy was planned. Local anesthesia was administered in the maxillary anterior region and blade no.15 was used to scrap the area to remove all the remnants of the melanin pigments along with frenectomy was done. The edges of the diamond shaped wound were sutured by using 5-0 black silk with interrupted sutures and finally a perio-pack was placed over the wound area. All post operative instructions were explained to the patient.Analgesic was prescribed for the management of pain. Pack was removed after one week along with suture removal. On recall visit there was no sign of inflammation and healing was satisfactory. After six month post –operative examination well epithelialized gingiva, which was pink and pleasant was observed (Figure 2).Patientis kept on future follow-up.

Figure 2. Post Operative

Case 2

A 24 year old male patient visited to the department of periodontology complaining of dark colored gums. The medical and family history was non-contributory. No relevant findings were observed on extraoral examination. On Intraoral examination patient was having very high smile line that revealed the deeply pigmented gingival in maxillary anteriors (Figure 3).

Figure 3. Pre Operative

Written consent was obtained and he was also informed about the recurrence rate of repigmentation.

Patient was treated surgically by slicing technique/scraping technique using scalpel under local anesthesia by using no 15 BP blade by maintain the normal architecture of the gingiva. Bleeding was controlled by using pressure pack with sterile gauze.The raw surface was thoroughly irrigated with saline and povidone iodine (1:1) to remove any loose tissue tags (Figure 4).

Figure 4. After gingival de-epitheiation

Care was also taken to remove any remnants of the pigmented areas that were left out. Care was taken to include the epithelium at the tip of interdental papilla and at the muco gingival junction on the other end. A periodontal pack was placed and oral hygiene instructions given. Analgesic was prescribed for the management of pain. Pack was removed after 1 week and examination at 6 months revealed fully epithelialized pink gingival (Figure 5).

Figure 5. Post Operative

Figure 6: Pre Operative

Case 3

A 24 year old male patient visited to the department complaining of the dirty teeth. On intra oral examination gingival pigmentation was seen (Figure 6). Patient was told about the depigmentaion procedure and patient was motivated. Different techniques were explained to the patient and after thatelectrocautery technique was finalized. After local anesthesiawas given depigmentaionby electrocautery for maxillary anterior teeth was done after taking a written informed consent. A diamond shaped electrode was used in a light brushing stroke for de-epithelizing the gingival (Figure 7).

Figure 7. After gingival de-epitheiation

Minimal bleeding with a clean field increased the efficacy of the procedure. Enough care was taken to avoid contact with the periosteum and vital teeth. Finally a perio-pack was placed over the wound area and oral hygiene instructions were given. Pack was removed after one week and the area debrided. Three month post-op examination showed well epithelialized gingiva, which was pink and pleasant.

Case 4

A 16 year oldfemale patient visited to the department complaining of the dirty teeth. On intra oral examination gingival pigmentation was seen (Figure 8).

Figure 8. Pre Operative

Patient was told about the depigmentaion procedure and patient was motivated. Different techniques were explained to the patient.The medical and family history was non-contributory.

No relevant findings were observed on extraoral examination.Depigmentation in maxillary anterior teeth was done using a diode laser of 980 nm wavelength(dentsply Picasso). After applying topical anesthesia, the laser was used in continuous mode. Melanin pigmented gingiva was ablated with a flexible, hollow-fiber delivery system in the contact mode under standard protective measures. The tip was used moving brush stroke to prevent heating of the tissue (Figure 9).

Figure 9. After gingival de-epitheiation

Remanents of the ablated tissue were removed using sterile gauze damped with saline. This procedure was repeated until the desired depth of tissue removal was achieved. Laser was found to be a good and safe choice for removal of pigmented gingiva. Patient was kept on recall.

DISCUSSION

Gingival pigmentation 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. Oral pigmentation occurs in all races of humans. There are no significant differences in oral pigmentation between males and females. The intensity and distribution of pigmentation of the oral mucosa may be variable, not only between races, but also between different individuals of the same race and within different areas of the same mouth (Page *et al.*, 1977). Physiologic pigmentation is probably genetically determined, but as Dummett suggested, the degree of pigmentation is also related to mechanical, chemical, and physical stimulation (Dummett, 1960). In today's period esthetic is what the patient wants, whether it is by treatment of hyperpigmentation or there is any abbrentfrenal attachment which can either create a diastema or a limited lip movement.
To treat these abnormality there are various treatment modality. In this case report frenectomy is done to treat the high frenal attachment and depigmentation is done to enhance the esthetics.

Selection of a technique should be based on clinical experience, individual preferences and patient affordability. This case report compares different techniques commonly used to treat depigmentation and compiles the advantages and disadvantages of each technique**.** Scalpel surgical technique is highly recommended for depigmentation which does not require any sophisticated instruments.The procedure essentially involves surgical removal of the gingival epithelium alongwith a layer of the underlying connective tissue under adequate local anesthesia and allowing the denuded connective tissue to heal by secondary intention. However, it results in unpleasant hemorrhage during or after surgery. Hence, it is necessary to cover the laminapropria with periodontal dressing for 7- 10 days (Almas and Sadig, 2002). Electrosurgery requires more expertise than scalpel surgery. Prolonged or repeated application of current to tissue induces heat accumulation and undesired tissue destruction. Contact with periosteum or alveolar bone and vital teeth should be avoided. Electrosurgery has advantages of minimal bleeding and a cleaner work field. According to Oringer's "Exploding cell theory," it is predicted that electrical energy leads to the molecular disintegration of melanin cells of the operated and surrounding sites. Thus, electrosurgery has a strong influence in retarding migration of melanin cells (Gnanasekharand Al-Duwairi, 1998). Depigmentation with lasers achieves good results and experienced less pain postoperatively compared to the scalpel group. This is in accordance with other studies which claim that laser therapy has the advantage of easy handling, short treatment time, hemostasis, decontamination and sterilization effect and also does not require even a periodontal dressing.However, laser surgery does have some disadvantages. Delayed type of inflammatory reaction may occur with mild post-operative discomfort lasting up to 1–2 weeks. Epithelial regeneration (re-epithelialize) is delayed (lack of wound contraction) as compared to conventional surgery. Moreover, expensive and sophisticated equipment makes the treatment very expensive. Another disadvantage is loss of tactile feedback while using lasers (Atsawasuwan *et al.,* 2000; Kathariyaand Pradeep, 2011).

Various other techniques which includes are by the means of Cryosurgery, free gingival graft can also be used to eliminate the pigmented areas. These treatment modalities, however, are not widely accepted or popularly used. Chemical agents such as 90% phenol and 95% alcohol have been used in combination. However, these agents are quite harmful to the oral soft tissues (Kathariyaand Pradeep, 2011). 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. On the contrary, a study by Oswaldo 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 (Shah, 2012).

Conclusion

This case report describes effective surgical procedures for the treatment of gingival melanin hyperpigmentation resulting in improved esthetics. Immediate post operative results showed a bleeding surface with scalpel while no such bleeding occurred with laser and electrosurgery. Patient was more satisfied with laser and electrosurgery because of bloodless field surgery. Depth of penetration need to be considered in electrosurgery and also the high cost of laser.Though the result obtained in all the patients were minimum discomfort and maximum patient satisfaction with no signs of recurrence after 1yearof follow up. Thus it can be concluded that all three modalities produce satisfied result in long term.

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