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RESEARCH ARTICLE

GINGIVAL DEPIGMENTATION: A ESTHETIC APPROACH- CASE REPORT AND MINI REVIEW

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Abstract

Smile expresses a feeling of joy, success, sensuality, affection, and courtesy, and reveals self-confidence and kindness. The harmony of the smile is determined not only by the shape, the position, and the color of the teeth, but also by the gingival tissues. Although melanin pigmentation of the gingiva is completely benign and does not present a medical problem, complaints of “black gums” are common, particularly in patients having a very high smile line.

Gingival melanin pigmentation occurs in all races in variable amount caused by melanin granules. The degree of pigmentation varies from person to person. Excessive gingival pigmentation may be a major esthetic concern for many patients.

Melanin, a brown pigment, is the most common cause of endogenous pigmentation of gingiva and is the most predominant pigmentation of mucosa. Gingival hyperpigmentation are major concerns for a large number of patients visiting the dentist. Melanin hyperpigmentation usually does not present a medical problem, but patients usually complain of dark gums as unaesthetic.

Esthetic periodontal plastic surgery is especially rewarding in such individuals with compromised esthetics. The management of excessive gingival pigmentation with as bur abrasion, scraping, partial thickness flap, cryotherapy, electrosurgery and laser.

In this case report describe four surgical techniques (scraping, bur abrasion and scalpel technique) for melanin depigmentation

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Introduction:-

A attractive smile expresses a sentiment of pleasure, victory, cordiality, sociability and civility. The congruence of the smile is resolute not only by the shape, position and color of the teeth but also by the gingival tissues. This demand gets fulfilled not only by having a healthy set of dentition, but also esthetically enhanced gingival component. Gingival melanin pigmentation is one of the issues which determine the smile of an individual.¹

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The colour of gingiva depends on several factors: number and size of blood vessels, thickness of the epithelium, level of keratinization, quantity of pigments. Oral pigmented lesions can have many etiologies, including drugs, heavy metals, genetics, endocrine disturbance, and inflammation.¹

The colour 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. More over color variation may not be uniform and may exists as unilateral, bilateral mottled, macular or blotched and may involve gingival papillae alone or extend throughout the gingival on to other soft tissues.²

Oral discoloration and pigmentation of mucosa or gingiva related with several exogenous and endogenous factors. These Oral pigmented lesions may have various etiologies, including drugs, heavy metals, genetics, endocrine disturbance, and inflammation. Also, chewing tobacco and smoking also stimulate melanin production and cause melanin pigmentation. The strength of the pigmentation is related to the time duration of smoking and amount of cigarettes consumed. This type of oral pigmentation is mostly found in the anterior labial gingiva, affecting female's gender more than male's gender.³

Melanin pigmentation is caused by melanin granules in gingival tissue, which are formed by melanosomes of melanocytes. Melanocytes are primarily located in the basal and supra basal cell layers of the epithelium. The color of the oral melanin pigmentation may differ from light to dark brown or black, depending on the quantity and distribution of melanin in the tissue. In addition, the oral pigmentation is form because of the action of melanocytes rather than the number of melanocytes in the tissue.³

Although physiologic melanin pigmentation is not a medical problem, most of the time patients may complain that their black gums are unaesthetic. Many procedures have been developed for depigmentation of the gingiva, such as scalpel method, Bur abrasion, free gingival graft, Gingivectomy, cryosurgery, and laser surgery.¹

Hence the aim of case report was to compare three different depigmentation techniques for Eliminating melanin pigmentation to improve esthetics and beauty of gingiva.

Clinical Characteristics:-

The gingiva is the most commonly pigmented intraoral tissues. Microscopically, melanoblasts are usually present in the basal layers of the lamina propria. The most common location was the attached gingiva followed in decreasing order in the papillary gingiva, the marginal gingiva, and the alveolar mucosa. The total amount of melanophores in the attached gingival was almost 16 times greater than in the free gingiva. The occurrence of gingival pigmentation was higher on the labial part of the gingiva than on the palatal / lingual parts of the arches. The shade of pigment was classified as very dark brown to black, brown, light brown yellow. Melanin Pigmentation of the oral tissues usually does not present a medical problem, but patients complain of black gums.²

Melanin has been intensively studied now a day, because it is the most significant pigment of the human skin. Melanin is a high molecular weight which is insoluble in water and most organic solvents. Melanin is formed only in the cytoplasm of melanin forming cells, or the melanocyte. These are dendritic or branched cells found at the epidermal dermal junction of the skin and the mucous membrane, in the leptomeninges of the central nervous system, in the uveal tract and in the retina of the eye. The melanocytes are located in the intercellular epidermal spaces and form intricate patterns by their long processes. The grade of pigmentation depends on a variety of factors, especially the activity of melanocytes.²

It also appears that the degree of gingival pigmentation of the gingiva and skin is reciprocally related. Commonly most of the study found that Fair skinned individuals are expected to have non pigmented gingiva, but, in darker skinned persons, the chance of having pigmented gingiva is extremely high. The prevalence of highest rate of gingival pigmentation has been observed in the area of the incisors and decreases considerably in the posterior areas.

Etiological factors^{4,5}

1. Endogenous
2. Exogenous

Most pigmentation is caused by 5 primary pigments.

1. Melanin
2. Melanoid
3. Oxyhemoglobin
4. Reduced hemoglobin
5. Carotene

Others include:

1. Bilirubin
2. Iron

Color of the gingiva is determined by several factors:-

1. Number and size of blood vessels
2. Epithelial thickness
3. Quality of Keratinization
4. Pigments within the epithelium

Mechanism of Melanin ^{6:-}

Melanocytic Stimulating Hormone (MSH) increases the skin pigmentation by stimulating the dispersion of melanin granules in melanocytes, thus causing darkening of the skin. Secretion of this hormone is stimulated by MSH stimulating factor. Glucocorticoids have an inhibiting effect on MSH, when there is adrenal insufficiency; there is reduced glucocorticoids secretion increase in MSH increase melanin pigmentation.

Classification:-

Classification and Differential Diagnosis of Oral Pigmentation: ^{7,8}

Localized pigmentation:-

Amalgam tattoo - Graphite or other tattoos - Nevus - Melanotic macules - Melanoacanthoma - Malignant melanoma - Kaposi's sarcoma - Epitheloid oligamatoses - Verruciform xanthoma

Multiple or generalized pigmentations:-

1. Genetics Idiopathic melanin pigmentation (racial or physiologic) - Peutz-Jegher's syndrome - Complex of Myxomas - Carney syndrome - Leopard syndrome etc
2. Drugs – Smoking, betal - Anti-malarial - Anti microbial (minocycline) - Chlorpromazine - ACTH - Zidovudine – Ketoconazole - Methyldopa - Heavy metals (Gold, Silver, Bismuth, Mercury, Lead, Copper) - Balulphan - Menthol
3. Endocrine - Addison's disease - Albright's syndrome – Acanthosis Nigrecans - Pregnancy - Hyperthyroidism
4. Post-inflammator - Periodontal disease - Postsurgical gingival Repigmentation
5. Others - Hemochromatosis - Generalized neurofibromatosis - Goucher's disease - HIV - Thalassaemia - Nutritional deficiencies

The cases were selected based on Dummett–Gupta Oral Pigmentation Index (DOPI): (Dummett 1971) ⁹

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).

The smile line classification (Liebart and Deruelle 2004) ¹⁰

1. Class 1: Very high smile line – more than 2 mm of the marginal gingiva visible.
2. Class 2: High smile line – between 0 and 2 mm of the marginal gingiva visible.
3. Class 3: Average smile line – only gingival embrasures visible.
4. Class 4: Low smile line – gingival embrasures and cemento-enamel junction not visible.

Gingival pigmentation can be classified according to melanin index categories. ¹⁶

1. Class 0: No pigmentation.
2. Class 1: Solitary unit(s) of pigmentation in papillary gingiva without extension between neighboring solitary units.

3. Class 2: Formation of continuous ribbon extending from neighboring solitary units.

Depigmentation procedures:-

Roshni & Nandakumar in 2005 classified different gingival depigmentation methods as:¹¹

Methods aimed at removing the pigmented gingiva:-

Surgical Methods:-

1. Scalpel surgical technique,
2. Bur abrasion method,
3. Electrosurgery,
4. Cryosurgery,
5. Lasers,
6. Radiosurgery.

Chemical Methods:-

Methods aimed at masking the pigmented gingiva:-

1. Free gingival graft.
2. Acellular dermal matrix allograft.

Case Report:-

A 23 year old male patient reported in the department of Periodontology at Maharana Pratap college of Dentistry, Gwalior with chief complaint of discoloration of teeth and black gums. After Oral examination we found pigmented gingiva from right premolar to left premolar region in maxillary and mandibular arch with DOPI 3 (Moderate clinical pigmentation (medium brown or mixed pink and brown)) and smile line class 3 (Average smile line – only gingival embrasures visible).

The patient requested for esthetically better gums and oral hygiene, a scrapping technique using Kirkland knife for maxillary right premolar to left premolar region and one side of mandibular was scalpel technique planned by 15 no. Blades to perform incisional and another side by rotary abrasive technique using tapered bur for the depigmentation. The entire procedure was explained to the patient and written consent was obtained. Complete medical examination, family history and blood investigations were done.

Use Local anesthesia as infiltrated in the maxillary and mandibular anterior region from premolar to premolar, concentration of LA was lignocaine 1: 200000. A Kirkland knife (scraping method), 15 no. Blade (slicing or scalpel method) and bur (abrasion method) were used to remove the pigmented layer. After removing the complete pigmented epithelium with a thin layer of connective tissue, the operative surface was irrigated by saline. Periodontal dressing perio pack was placed at the operative site.

Prescribed medicament for patient was amoxicillin 500mg tds + aceclofenac 100mg + paracetamol 325mg bd for 3 days. Antimicrobial therapy done by using of Chlorhexidine mouth wash advice and gargle twice a day for 2 weeks. The healing process was proceeding normally and satisfactory in first maintenance phase.

Surgical procedure:-

Scrapping Technique (fig.1, 2, 3, 4, 5 and 6)

It was a most common procedure for depigmentation. After infiltrating the area with local anesthesia Kirkland knife is used to scrape the epithelium, underlying pigmented layer carefully with proper contouring. For this technique gentle pressure and light strokes use in all required direction after removing adequate amount of tissue layer the raw surface is irrigated, cleaned and dressing is given for 1 week. Care must be taken to remove all remnants of the pigment layer, avoid exposing the underlying bone and maximum exposure of connective tissue.¹²

Scalpel technique:- (Fig.: 7, 8, 9, 10, 12, 13, and 14)

It was one of the first techniques described for gingival depigmentation and still the most popular treatment modality. This technique was first exemplified by Dummet and Bolden in 1963. This technique is contraindicated and very sensitive for thin gingival areas, as removal of pigmented gingival epithelium may lead to gingival recession.¹⁵

After administering local anesthesia, the uppermost layer of the gingiva was incised using 15 numbers. The blade was held parallel to the long axis of the teeth with Minimum and gentle pressure. Bleeding was controlled with a wet sterile gauze pressure pack. Surgical areas were enclosed with a periodontal pack and post-operative instructions were given to patient for minimized further discomfort. Analgesics were prescribed. After one week the pack was removed and the surgical area was examined. The healing was satisfactory. Further evaluation was done after 3 months.¹

Scalpel surgical technique is the most common technique that involves surgical removal of the gingival epithelium along with a layer of the underlying connective tissue and allowing the denuded connective tissue to heal by secondary intention. The new epithelium that forms is devoid of pigmentation. Care must be taken to remove all remnants of the pigment layer and avoid exposing the underlying bone. Advantages are simple, effective, economical, rapid healing. Major weakness may be unpleasant hemorrhage during or after surgery, and chances of infection.¹³

Bur Method:- (Fig.: 7, 8, 11, 12, 13, and 14)

This technique first recognized by Ginwalla et al in 1966. It is a relatively simple and versatile technique and requires minimum time and effort. Technique involves de-epithelisation of pigmented areas of the gingiva by using high speed rotary instruments after adequate local anesthesia.¹⁵

For these depigmentation techniques with a round or tapered diamond bur used on the surface of pigmented gingival layer and moved with feather light strokes without giving any pressure. It was not kept in one place for a long time as it may result in thermal trauma and permanent harm to underlying tissue. Medium size round bur was used because small bur might produce small pits rather than surface abrasion. The bleeding was controlled and checked for any pigmented area remained and removed it to prevent relapse. The bleeding was stopped by applying pressure with a wet gauze piece on the denuded epithelium. Removal of gingival melanin pigmentation should be performed cautiously and the neighboring teeth should be protected, since the incorrect application may cause gingival recession, hurt to underlying periosteum and bone, Cause delayed wound healing, as well as loss of enamel. After one week the pack was removed and the surgical area was examined. And follow-up was done after 3 months.¹

The process of healing with gingival abrasion technique using diamond bur is like to the scalpel technique. In this technique epithelium is removed by high speed bur abrasion under local anesthetic agent. It is also simple, safe and non-aggressive method that can be easily performed and readily repeated, if needed, to eradicate any residual pigmentation or re- pigmentation. Also, these techniques do not require any sophisticated equipment and are hence economical. Pre- and postsurgical care is similar to that of the scalpel technique. However, extra care should be taken to control the speed and pressure of the hand piece bur so as not to cause undesirable abrasion or pitting of the tissue.¹³

Depigmentation By Three Different Method.



Fig.1:- Preoperative



Fig.2:- LA Administration



Fig.3:- Scarpping (Kirkland knife)



Fig.4:- Removal of pigmentation



Fig.5:- Perio pack



Fig.6:- Post-operative (7 day)



Fig.7:- Preoperative



Fig.8:- LA administration



Fig.9:- Incisanal (Scalpal)



Fig.10:- Remvoned pigmanted layer



Fig.11:- Depigmentation by bur



Fig.12:- Depigmented tissue



Fig.13:- Perio pack



Fig.14:- Post operative (after 7 days)

Discussion:-

Gingiva has been the most common area of the intraoral tissues that pigmented as compared to other tissue, in addition to being most willingly seen during inspections. Melanin is the essential pigment that colors the tissues. It appears as early as three hours after birth in the oral tissues and in some cases is the only sign of pigmentation on the body.¹

Melanin pigmentation is regularly occurring by melanin deposition by active melanocytes located mainly in the basal layer of the oral epithelium. Pigmentations can be removed for esthetic reasons. Different treatment technique has been used for this aim. The selection of a technique for depigmentation of the gingiva should be based on clinical skill, patient's affordability and individual preferences.

Most of the previous study found that the healing period for scalpel wounds is faster than other techniques; however, scalpel surgery causes unpleasant bleeding during and after the surgery, and it is necessary to cover the lamina propria with periodontal packs for 7 to 10 days.¹⁴

The process of healing in bur method is similar to the scalpel and scraping technique. It is also comparatively simple, safe and non-aggressive method which can be easily performed and readily repeated, if essential, to eradicate any residual repigmentation. Also, these techniques do not require any classy equipment and are hence economical. Pre- and post-surgical care is similar to that of the scraping and scalpel technique. However, extra care should be taken to control the speed and pressure of the bur so as not to cause unwanted abrasion or pitting of the tissue. Feather light brushing strokes with minimum pressure and copious saline irrigation should be used without holding the bur in one place.¹⁴

Scraping and Scalpel technique - The use of Scraping and Scalpel technique for depigmentation is the most economical and popular as compared to other techniques, which require more advanced armamentarium. And healing period for scalpel wounds is faster than other techniques. But Scraping and Scalpel technique both surgery causes unpleasant bleeding during and after the operation.¹

All Result was satisfactory, but in the bur technique more postoperative discomfort and pain was observed compared to scraping and scalpel technique.

Need of future study:-

Recently newer equipment is discovered for depigmentation procedure. These are also good for decrease melanin pigmentation and lighten color of skin as well as oral epithelium but there are little study to approve these statements so there are more chances for future study for better results of depigmentation procedure.

Conclusion:-

The rising esthetic concern requires the removal of unsightly pigmented gingival areas to create a pleasant and confident smile, which altogether may alter the personality of an individual. This could be easily attained by using any of the above three methods used in this case report. The methods used here produced desired results, and above all, the patients were satisfied with the outcome, which is the ultimate goal of any therapy that is carried out.

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