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The surgical approach to gingival depigmentation for aesthetics: A Case Report

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Abstrack : Background: Physiological gingival pigmentation is a genetic changes in gingival color resulting from increased production and release of melanin in the gingival tissue and oral mucosa, so the condition becomes one of the important things in aesthetics for patients. **Objective:** This case report aims to see the results of gingival depigmentation surgical procedures in patients with clinical conditions of physiological gingival pigmentation. Case Report: A 27-year-old female patient presented with complaints of brown-black gums on the upper and lower jaw. Gingival depigmentation was performed using a surgical technique using a scalpel to remove pigmentation in the gingival area. **Conclusion:** Gingival hyperpigmentation is often a significant aesthetic problem for patients and requires treatment with a surgical intervention, one of the commonly used methods is gingival depigmentation with a scalpel surgical technique that shows satisfactory results with a relatively simple procedure and a low cost.

Keywords: gingival depigmentation, physiological pigmentation, melanin.

INTRODUCTION

Aesthetic smile is one of the patient's goals from oral treatments. The teeth, lips, and gingiva are important in achieving an aesthetic smile.[1] Currently, the gingival color that is considered healthy and gives an attractive effect to the smile is coral pink, but factors such as the degree of keratinization, gingival thickness, vascularity, and accumulation of melanin, carotin, and oxyhemoglobin pigments in the gingiva cause each individual to have a varying gingival color.[2]

Gingival hyperpigmentation is a condition of gingival discoloration to a darker color (brown or dark brown color) with irregular patches or strips.[3] In general, this occurs due to hyperkeratinization, resulting in hyperactivity of melanocyte cells in the basal layer which results in excess melanin pigment production in the basal and suprabasal layers of the epithelium.[4] This process is known as melanogenesis. [5]

Management of gingival hyperpigmentation is called gingival depigmentation procedures. These procedures can be performed surgically and non-surgically.[4-6] Surgical techniques include conventional techniques using scalpels, electrosurgery, the use of

lasers, gingival abrasion or surgical stripping, cryosurgery, and tissue grafting methods.[4] On the other hand, non-surgical techniques are performed using chemicals such as ascorbic acid, phenol, salicylic acid, glycolic acid, trichloroacetic acid, and alcohol.[5] The choice of an appropriate depigmentation technique is highly dependent on the patient's clinical condition, aesthetic considerations, and the availability of tools and materials. Therefore, an understanding of the various approaches is important for optimal treatment results. This case report describes the management of a patient with physiologic pigmentation using a surgical depigmentation approach using a scalpel for aesthetic appearance.

CASE REPORT

27-year-old female patient complains of a brown-black gingiva on the upper and lower jaws. Anamnesis of this condition began when the patient was in high school. The patient did not smoke, she was denying any systemic disease or medication, and this condition was also experienced by other patients in her family. The patient wanted treatment for her gums as it affected her aesthetics. Clinical examination showed gingival bleeding, average sulcus depth of 2-3 mm, plaque score of 3.4%, supra gingival calculus, gingival pigmentation and good oral hygiene (Figure 1). The patient was diagnosed with generalized biofilm-induced dental gingivitis with physiology hyperpigmentation score 2 (DOPI).

Figure 1. Clinical features of the upper and lower jaw before gingival depigmentation treatment

PROCEDURE

The initial treatment included dental health education, oral prophylaxis and scaling. Stages of initial treatment were evaluated the first week and the fourth week after treatment. The first week's evaluation focused on assessing the plaque score, calculus and gingival tissue condition. The results of the evaluation showed an O'Leary plaque score of <10% with no signs of gingival inflammation. The patient was then indicated for a surgical depigmentation treatment using the scalpel surgical technique.

The surgical procedure begins with checking vital signs and informed consent of the patient. Oral prophylaxis and extraoral and intraoral work area asepsis using povidone-iodine were performed. The anesthetic was performed with an infiltration technique, followed by depigmentation surgery using scalpel blade no. 15 with scrapping technique on all pigmented areas until the pigmented layer was removed. The surgical area was cleaned using sterile saline and surgical suction from blood and saliva. Control bleeding by pressing sterile gauze or tampons. The surgical area was irrigated with saline and dried with sterile gauze, then covered with a periodontal pack (Figure 2). After the procedure was completed, the patient was given antibiotics, analgesics, mouthwash, and post-surgical instructions were explained. Follow-up was done 1 week after the procedure. The results showed a satisfactory condition with coral pink gingival tissue without pigmentation. The patient's healing process was fast with no significant pain, so the patient was satisfied and comfortable (Figure 3).

(A)  (B) 

(C)  (D) 

(E) 

Figure 2. (A-C) The Surgical Depigmentation of Gingiva. (A) Asepsis procedure (B) Infiltration anesthesia in the work area (C) Surgical procedure using a scalpel with gingival scrapping technique (D) The results of depigmentation surgery (E) Use of a periodontal pack to protect the surgical area.

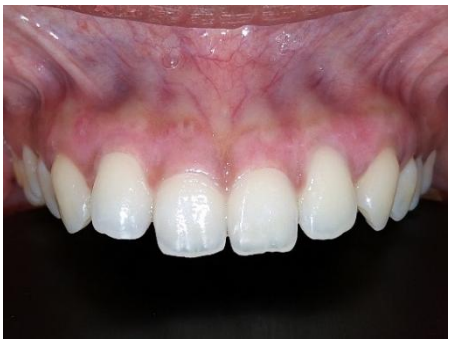

Figure 3. One week post gingival depigmentation surgery control

DISCUSSION

Physiological pigmentation in the gingiva results from melanin deposits that occur in the basal layer of the gingival epithelium, without being associated with pathological processes.[4] The melanin pigment is the result of melanogenesis, which is the process of

melanin synthesis by melanocyte cells located in the basal layer of the epithelium. Melanin is synthesized in melanosomes located in melanocytes and plays an important role in determining the physiological color of gingival tissue.[6]

The process of melanogenesis is initiated by the activation of melanocytes by stimulating factors such as UV light, endocrine factors, and hormones,[6] which will then form organelles called melanosomes.[7] In melanosomes, the enzyme tyrosinase (TYR) will hydroxylate tyrosine to L-3, 4-dihydroxy phenylalanine (DOPA) which is then oxidized to DOPA quinone.[6,7] DOPA quinone will react with cysteine to produce 3- or 5-cysteinyl DOPAs, then undergo oxidation and polymerization to produce pheomelanin (yellow-red pigment). DOPA quinone will also react without cysteine by cyclizing to DOPAchrome, which will then spontaneously release carboxylic acid to produce 5,6-dihydroxindole (DHI). DHI rapidly oxidizes and polymerizes, forming DHI-melanin pigment. DOPAchrome will also react with tautomerase (TYRP2/DCT) to form DHI-2-carboxylic acid (DHICA). DHICA will be catalyzed by TYR and TYRP1 and form DHICA-melanin. DHI and DHICA then undergo oxidation and polymerization to form eumelanin.[8] Melanosomes will then move from melanocytes to overlying skin cells called keratinocytes and will produce dark pigmentation.[9]

Excess melanin accumulation occurs physiologically and pathologically.[10,11] Factors that trigger excess melanin production are endogenous factors such as genetics, systemic endocrine imbalances and pharmacotherapeutics, and exogenous factors including heavy metals, UV light, cigarettes and tobacco.[5,12] The condition of physiologic gingival hyperpigmentation is also called racial pigmentation. It occurs in any individual without gender predilection. The lesions are symmetrical, and persistent, and do not alter the shape of the gingiva.[10]

One of the indices that can be used to measure the level and intensity of gingival hyperpigmentation is the Dummet Oral Pigmentation Index (DOPI). The assessment criteria are as follows: 0- No clinical pigmentation (coral pink gingiva), 1- Mild clinical pigmentation (light brown color), 2-Moderate clinical pigmentation (medium brown color or mixture of pink and brown), 3-Severe clinical pigmentation (dark brown or bluish black color).[13] In the study of Peeran et al. (2014) cited by Muruppel et al. (2020), other

gingival hyperpigmentation criteria can also be graded according to a score of 0-10 according to the associated pathological factors (Table 1).[12]

Table 1. Classification of gingival pigmentation by Peeran et al. (2014) cited by Muruppel et al (2020)[12]

Index of Pigmentation Lesions	Clinical Features of Gingival Melanin Pigmentation
Score 0	Gingival tissue showing coral pink color without gingival pigmentation, and/or pigmented lesions
Score 1	Melanin gingival pigmentation is mild, solitary/diffuse, involving the anterior gingival area, with or without posterior gingival involvement
Score 2	Moderate to severe melanin pigmentation of the gingiva, solitary/diffuse, involving the anterior gingiva with or without posterior gingival involvement
Score 3	Gingival melanin pigmentation of the posterior gingiva only
Score 4	Pigmentation associated with tobacco use: smoker's melanosis, etc.
Score 5	Gingival pigmentation due to exogenous pigments such as bismuth, amalgam tattoos, betel, beverages, food coloring, silver, topical drugs, idiopathic, etc.
Score 6	Gingival pigmentation due to other endogenous pigments: bilirubin, ecchymosis, hemochromatosis, hemosiderin, petechiae, etc.
Score 7	Gingival pigmentation associated with medications: antimalarial drugs, minocycline, oral contraceptives, etc.
Score 8	ingival pigmentation associated with other causes: such as Addison's disease, Albright syndrome, basilar melanosis with incontinence, hereditary hemorrhagic telangiectasia, HIV, etc
Score 9	Non-cancerous pigmented lesions: such as hemangioma, nevus melanositic,etc
Score 10	Pigmented cancer lesions: Kaposi Sarcoma, Malignant melanoma, Angiosarcoma, etc.

As an alternative, several alternative non-conventional techniques such as the use of laser, cryosurgery, and electrosurgery have been developed.14 The use of laser can provide good bleeding control, reduce postoperative pain, and accelerate the healing process, although it is relatively expensive and requires special expertise.

Gingival hyperpigmentation is not considered a problem medically, but the condition often causes patient complaints regarding their confidence level, so many patients request gingival hyperpigmentation treatment for aesthetic purposes.[12] Gingival

depigmentation treatment can be performed non-surgically with chemical methods, or surgically with scalpels, diamond burs, cryosurgery, electrosurgery, and lasers. Among the various techniques available, conventional surgical procedures with scalpels are still considered the gold standard so they are often chosen in clinical practice. This is because the conventional surgical technique is easy to perform, relatively short procedure time, has an affordable cost and can provide optimal control of the tissue during the procedure. However, this technique has disadvantages such as high bleeding risk, postoperative pain, and relatively longer healing time compared to other techniques.[15] As an alternative, several alternative non-conventional techniques such as the use of laser, cryosurgery, and electrosurgery have been developed.[14] The use of laser can provide good bleeding control, reduce postoperative pain, and accelerate the healing process, although it is relatively expensive and requires special expertise. Cryosurgery has the advantage of minimal bleeding and pain but is often less accurate and takes longer to perform. Meanwhile, electrosurgery can also reduce bleeding and speed up the procedure time, but its use can cause excessive thermal damage to the surrounding tissue.[15]

In the recent evolution of laser technology, various types of laser therapy have been tested in the dental field and have significant positive effects on gingival hyperpigmentation, including diode laser, Nd: YAG, Er, Cr:YSGG, Er: YAG, and CO2 lasers.[1,14] The use of laser ablation technology is more efficient than the conventional scalpel approach, especially in controlling bleeding during surgery and reducing post-operative pain.[12] The non-invasive, minimal bleeding, reduced pain, and time-efficient methods have been shown to improve the general patient experience, as well as enable dentists to achieve satisfactory results.[1]

CONCLUSION

Gingival hyperpigmentation, as in the case of physiologic pigmentation, is one of the aesthetic aspects that often concerns patients. The gingival depigmentation using conventional surgical technique with a scalpel performed in this report shows that it is an effective treatment option, with the advantages of simple technique, minimal equipment, affordable cost, and ease of implementation. The main objective of achieving aesthetic reduction of the gingival area was successfully achieved with excellent clinical outcomes post-surgery.

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