



Research article

Depigmentation of Gingival Smoker's Melanosis Using Scalpel Surgical Technique: A Case Report

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Background: Gingival pigmentation not only has an impact on aesthetics but also causes negative psychological effects. Gingival pigmentation is the coloring of the gingiva due to a variety of lesions and disorders caused by various endogenous and exogenous causes. Smoker's melanosis refers to the pigmentation of the oral mucosa that occurs as a result of tobacco consumption. Gingival depigmentation is a periodontal plastic surgery process that uses a variety of procedures to eliminate hyperpigmentation, including scalpel, cryosurgery, electrosurgery, laser and others.

Objective: To describe surgical procedures that maintain both cosmetic and functional requirements.

Case Report: A 21-year-old man presented with complaints of inflammatory gingival enlargement and Smoker's pigmentation of the maxillary and mandibular gingival melanosis. Surgical therapy was used to improve the appearance of the patient and avoid plaque retention.

Conclusion: The scalpel approach is one of the most cost-effective methods, requiring only a basic armamentarium. It is highly recommended considering the limitations of equipment and that scalpel wounds heal more quickly than those treated with other techniques.

Keywords: smoker's melanosis, depigmentation, surgical scalpel technique, periodontal plastic surgery

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1. Introduction

A beautiful smile is everyone's dream. Creating a beautiful smile can provide a new perspective on one's self-esteem which greatly affects one's self-confidence and the development of social interactions. When it comes to a smile, the normal color, and shape of the gums is considered as one part of a beautiful smile related to self-confidence and can also increase happiness in life. The structure of the gingiva, as well as the form, position, and color of the teeth, contribute to the harmony of a smile [1].

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The color of normal gingiva is described as coral pink, but it can range from pale pink to bluish purple and depending on the epithelium's thickness, degree of keratinization, the magnitude of pigmentation, and underlying vascularity [2]. The primary pigment in the oral cavity's natural physiological coloring is melanin, carotene, reduced hemoglobin, and oxyhemoglobin [3].

Melanin is a natural brown pigment produced by melanocytes in the epithelium's basal layer and the epithelial suprabasal cell layer [4]. Melanin pigmentation is well-documented in the literature, and it is multi-factorial in nature since it can be caused by both physiological and pathological factors, and it can come from the outside (exogenous) or the inside (endogenous). Melanin pigmentation can result from some systemic and/or local conditions, including heredity, smoking, long-term use of drugs, especially antimalarials and tricyclic antidepressants [5]. Pigmentation of mucous membranes can be in the form of increased levels of pigment (hyperpigmentation) or can also be reduced levels of pigment (hypopigmentation). Melanin hyperpigmentation is a common occurrence in the gingiva as a result of aberrant melanin deposition, which can affect people of various races, ages, and genders [6]. Physiological hyperpigmentation most commonly affects the gingiva, where it manifests as bilateral, confined brown pigment bands with a solid, band-like appearance that does not impair the marginal gingiva or interfere with normal tissue structure [5]. The dark coloring of the gingiva is caused by melanocyte hyperactivity, a completely harmless condition that appears undesirable pleasing, to most gummy smile patients [7].

Smoker's melanosis is a term used to describe an abnormality in melanin pigmentation of the oral mucosa that develops after a long period of tobacco use [5]. Tobacco smoke in cigarettes stimulates melanin production by melanocytes resulting in changes in gingival pigmentation [8]. This condition has been reported to affect nearly 22% of smokers and is more prevalent in women [9]. This condition can result in the development of oral pigmentation in light-skinned people and the exacerbation of pigmentation in dark-skinned people [10]. Smoker's melanosis typically manifests as diffuse melanosis of the maxilla and mandible's anterior vestibular gingiva, buccal mucosa, labial commissures, lateral tongue, palate, and/or floor of the mouth [11]. Histological analysis reveals a benign mucosal melanotic lesion compatible with Smoker's melanosis [12].

Pigmentation that comes from smoking is usually traumatically deposited directly into the submucosal tissue resulting in chronic inflammation, such as gingivitis. The pigmentation is always restricted to the attached gingiva and thus, the apical extension does not extend beyond the mucogingival margin [13]. The Hedin classification (*Gingiva Pigmentation Index*) is used to analyze the degree of gingival pigmentation, evaluating

pigmentation on a scale of 0 to 4 in a subjective manner [12]. As for the pre-operative observation and post-operatively the ideal gingival color can be seen using the *Dummett Oral Pigmentation Index* (DOPI) criteria, which uses natural sunlight to determine how much pigmentation occurs [14].

Gingival depigmentation is a periodontal plastic surgery procedure that removes or reduces gingival hyperpigmentation using various techniques including bur abrasion, surgical scraping, cryotherapy, electrosurgery, and laser therapy have been reported [15]. Clinical expertise, patient capabilities, and personal preferences should all be considered when selecting a technique. The surgical removal of undesirable pigmentation with scalpels was one of the first and most popular techniques used. The procedure entails surgical removal of the gingival epithelium as well as the layer of underlying connective tissue, followed by secondary intention healing of the denuded connective tissue. Melanin pigmentation is absent in the newly formed epithelium. From some of these depigmentation actions, repigmentation can occur, namely the appearance of melanin pigmentation again [12]. The time required for repigmentation varies depending on the technique used and the race of the patient. Although the mechanism is not clear but based on migration theory, melanocytes that are active in the affected tissue will migrate to the treated area.

In addition, there is a possibility that melanocyte cells left in the tissue during surgery can cause the reactivation of these melanocytes, causing repigmentation. Although this repigmentation can occur, the gingival staining process takes a long time so that for some patients this is not a problem [12]. This case report relates to a case of Smoker's melanosis which was found in the maxillary and mandibular labial gingiva using a simple scalpel surgical depigmentation procedure. The effective use of simple instruments but produces aesthetically acceptable results with patient satisfaction. The patient has agreed to publish his case in the interest of science.

2. Case Report

A 21-year-old male patient presented to Prof. Soedomo Dental and Oral Hospital with complaints of enlarged and brownish gums visible on the front of the upper and lower jaws when smiling, which he had only noticed one year before. When the patient smiles broadly, he feels less confident as a result of this condition.

The patient admitted that he had smoked more than 5 years ago with an average of half a pack of cigarettes per day. Neither of the patient's parents had a history of gum staining. Since aesthetic reasons are a major concern, the patient wishes to remove the

enlarged gums and the browning of the gums. The patient has explained the possibility of gum staining again after the surgery and the patient did not mind it.

The first phase of periodontal treatment includes Dental Health Education (DHE), supra and subgingival scaling, and polishing. The first stage of treatment aims to eliminate local factors that cause gingival inflammation, specifically gingival enlargement [16]. If the initial phase fails to eliminate gingival enlargement and hyperpigmentation, the surgical phase can be performed. Gingivectomy and gingival depigmentation are two commonly used surgical techniques for the treatment of gingival enlargement and hyperpigmentation [17]. These techniques have advantages such as simple, visible results and are predictable in terms of removing gingival enlargement and hyperpigmentation [18].

In this case, a gingivectomy and gingival depigmentation with scalpel and gingivoplasty with a Kirkland and Orband knife was performed in order to achieve the highest level of physiological gingiva. To eliminate local factors, DHE, scaling, and root planing were performed on the patient. Patients were told to come back one week after scaling and root planing. A week after the initial treatment for the previous phase of therapy, the patient returned to the Dental and Oral Hospital. The patient's gingiva was examined, and gingival enlargement and hyperpigmented gingiva were found to be persistent. The patient was told to continue with the surgical phase of the treatment. Informed consent for surgery has been requested to be filled by patients and then blood pressure tests before surgery. 120/80 mmHg blood pressure. The periodontal plastic surgery was initiated by an aseptic procedure using povidone-iodine, followed by an infiltration anesthesia of teeth 14 to 24 and teeth 33 to 43 in the mucobuccal folds (pehacaine with adrenaline in a ratio of 1: 100,000).

Gingivectomy was performed to correct the enlarged gingiva by the external bevel gingivectomy technique. This action begins by measuring the average gingival pocket depth of 3 mm, then marking with a pocket marker to determine the limit points of the gingival cutting, then an incision is made with a No.15 blade from the apical direction from the point boundary towards the corona with an angle of approximately 45°. Then followed by a depigmented gingival procedure performed in the anterior maxillary and mandibular regions. Pigmented areas were carefully scraped away with No. 15 scalpels, followed by gingivoplasty with a Kirkland knife for the gingival margin and an Orban knife for shaping the interdental area, and followed by saline irrigation.

A periodontal pack (Resopack) was applied around the surgical area covering the surgical wound tissue. The purpose of using a periodontal pack to protect the surgical wound from mechanical irritation, such as movement of the lips, tongue, or irritation from

food, is explained to the patient. If the periodontal dressing comes off and bleeding occurs, immediately go to the dentist or the nearest hospital. Antibiotics, analgesics, and mouthwash are prescribed for patients. Patients were told to take their medication as directed, consume soft foods, and brush their teeth carefully, avoiding brushing their teeth in the surgical area for the time being. The patient was requested to visit for a check-up after 1 week for the removal of the periodontal pack and post-operative monitoring.

The patient was directed to have a chlorhexidine mouthwash for 1 week after the periodontal packing was removed. The seventh post-operative evaluation revealed that the gingiva's size and color gradually returned to normal, with the brownish color disappearing. A month post-operative day evaluation revealed good results with no pain or infection and normal gingival color. The results of the treatment make the patients very comfortable and satisfied. The patient has dared to smile with a great deal of confidence. At the final control, the patient was also told to quit smoking and to check up on his teeth and mouth every six months to maintain dental hygiene and health.



Figure 1: Before treatment.



Figure 2: Depigmentation action using a scalpel with a scraping motion.



Figure 3: Gingivectomy of the mandible.



Figure 4: Gingivectomy and depigmentation of the maxilla.



Figure 5: Gingivectomy and depigmentation of the mandible.

3. Discussion

Gingival hyperpigmentation clinically appears as a light-dark brown and sometimes blue-black color mostly located in the anterior labial attached gingiva. The color is often diffuse, symmetrical, dark bands or bands like irregular, irregularly shaped, well-defined patches [19]. It is physiological and must be distinguished from the pathological



Figure 6: Control 1 week postoperative.



Figure 7: Control 1 month postoperative.

conditions that produce pigmentation. Differential diagnosis of oral pigmentation is arranged according to color, configuration, and distribution [20].

A full medical and dental history, extraoral and intraoral examinations, and laboratory tests, if necessary, are needed to determine whether melanin pigmentation is physiological or pathological. Hyperpigmentation is usually clinically visible through a regular border and is small, symmetrical, and uniform in color, also appearing flat or slightly elevated. On the other hand, pathological hyperpigmentation, irregular outlines, color variation, and surface ulceration might be a malignant symptoms. The examination should include the onset and duration of pigmented lesions, number, distribution, size, shape, color, and the onset of hyperpigmentation, the onset of systemic signs and symptoms (e.g., malaise, fatigue, weight loss), the use of prescription and nonprescription drugs, and the smoking habit [20].

In this patient, the etiologic factor of melanin pigmentation is smoking. This is reinforced by the acknowledgment that the patient's smoking history was more than 5 years, the parents did not have a history of pigmentation, and judging by the clinical

examination of pigmented lesions using the Gingival Pigmentation Index, including grade IV smoker's melanosis the lesion grew into a single long continuous band that covered the majority of the gingiva in the front canines and incisors area. The severity of pigmentation was measured using Dummett's oral pigmentation index (DOPI), with grade 3 lesions characterized by dark brown or blue/black tissue (severe clinical pigmentation) supported by the admission of patients who had been smoking for more than 5 years.

Oral melanosis grows dramatically after the first year of smoking, according to epidemiological studies, if there is a reduction in smoking, the pigmentation will eventually disappear. Silverman and Eversole in 2001 also stated that the longer you smoke, the higher the melanin content in the tissue, the more the possibility of melanosis in the oral cavity [21]. The heat effect of tobacco smoke on the oral tissues causes this disease, as does the direct effect of nicotine, which activates melanocytes along the basal epithelial cells to create melanosomes, resulting in enhanced melanin deposition [22]. The tar in cigarettes that settles on the teeth can cause the tooth surface to become rough and easily attached to the plaque so that bacteria in plaque induce inflammation of the gingiva [23].

When smoking, inhaled smoke is absorbed by capillaries through the pulmonary alveolar epithelium and enters the systemic circulation, whereas direct exposure of inhaled cigarette smoke to the periodontal tissues causes periodontal microvascular vasoconstriction and gingival fibrosis, which are frequently observed in smokers [24]. It is widely accepted that fibrosis is frequently observed in the gingiva of smokers. Nicotine increases the production of connective tissue growth factor protein in gingival fibroblasts and promotes periodontal fibrosis [25].

Regardless of their medical condition, smoking patients show an increase in the thickness of the epithelial base and stratum corneum. The increased epithelial thickness may contribute to the reduction of clinical signs of inflammation in the gingival tissue [25]. Thus, it can be concluded that the gingival enlargement that occurs besides being induced by plaque and calculus is also modified by the influence of smoking which causes an increase in thickness and fibrosis in the gingiva.

The surgical technique with the scalpel was one of the first techniques described for the treatment of depigmented gingiva and is still the most popular. This technique was first proposed by Dummett and Bolden in 1963 [26]. The disadvantage of using surgical technique with the scalpel is that it can cause bleeding during and after surgery, which can be avoided by using a periodontal pack/periodontal bandage to close the wound on the exposed gingiva. After obtaining adequate local anesthesia, the pigmented gingival

epithelium, as well as the underlying connective tissue layer, is removed using blades no 15 and 11. It is critical to avoid leaving any pigment residue on the exposed area. Wound closure with a periodontal pack is required after adequate hemostasis. The healing process is generally smooth, and complete epithelial healing takes 7 to 14 days [27].

According to Malhotra et al, the use of a scalpel in gingivectomy and gingival hyperpigmentation produced satisfactory results [27]. This technique is simple and versatile, requiring only a small set of tools that are commonly found in dental clinics. With close proximity to ideal gingival conditions, the combination of gingivectomy and gingival depigmentation can treat gingival enlargement and gingival hyperpigmentation perfectly

On the 14th postoperative day, the control results revealed coral pink gingiva with pigmentation intensity measurements recorded using Dummett's oral pigmentation index (DOPI) lesions, including grade 0 no pigmentation lesions. In previous case reports, melanin hyperpigmentation with surgical techniques predicted repigmentation within months and up to 7 years postoperatively in some patients regardless of the technique used. The rate and incidence of repigmentation are increased in patients who smoke [28]. Therefore, patients are advised to stop smoking. In addition to preventing the occurrence of repigmentation, it is also for the health of the patient's body.

4. Conclusion

The scalpel surgical technique is highly recommended because it is simple, easy to perform, inexpensive, causes little discomfort, and is aesthetically pleasing to the patient. The combination of gingivectomy and gingival depigmentation with a scalpel, according to Kirkland and Orban, has advantages such as forming a good contour and shape of the gingiva and speeding up the surgical process. Scalpel surgical technique can restore gingival aesthetics and healing is quite good without excessive infection and pain.

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