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Case Report

Management of Gingival Hyperpigmentation by Scalpel Surgery and Bur Abrasion

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Abstract

Natural Smile is the key to beauty . Dark gum is the most aesthetic problem that affects the smile of a large group of people especially those with high smile lines . These dark gingiva are considered natural melanin pigments contributing to the endogenous pigmentation of the gingiva . Aesthetics dentistry is a crucial and challenging era for all dentists. The gingival depigmentation procedure is a plastic periodontal surgery in which the gingival epithelium is scrapped with different techniques to remove the dark colour of the gingiva. The aim of this study was to shed light on the treatment modalities of gingival hyperpigmentation using scalpal surgery and/or bur abrasion techniques.

Objective: The main concern of all dentists is to help patients feel satisfaction and self-confidence while talking and smiling. Treatment modalities for this condition include the surgical scalpel method , cryotherapy , electrotherapy and laser irradiation . In the present case series, the scraping technique was used which is simple, effective, and yields good results along with good patient satisfaction.

Methods: Gingival depigmentation of a 19-year-old female patient was performed under local anesthesia with the scraping technique using a 15 no. Bard-Parker blade and in another case using a diamond bur at high speed for depigmentation .

Discussion: The advantages of the procedure show psychological satisfaction to the patient. This case report describes the procedure for depigmentation of gingiva by surgical intervention which was successful and the patient was satisfied with the result **Conclusion:** Depigmentation of gingiva is a minimally invasive technique that can be performed at any dental clinic by using 15 no. The Bard-Parker blade with scraping technique which is simple, easy to perform, cost-effective, and above all, causes less discomfort and is esthetically acceptable to the patient.

Keywords :

Mucogingival Surgery; Plastic Periodontal Surgery. Aesthetics Gingival Surgery, Melanin Pigment, Scalpel Surgery, scraping/slicing gingiva, Depigmentation, Bur Abrasion, Laser, Cryotherapy, Electrocautery , Cosmetic Gingival Surgery.

Introduction:

The gingival colour differs from person to another. It varies from pale pink to dark brown. Gingival brown pigmentation is the most common natural pigment contributing to endogenous pigmentation of the gingiva. Melanin pigmentation is a naturally occurring chemical that makes skin dark. These melanin granules are produced by melanoblasts in the basal layer in the gingival epithelium. Gingival hyperpigmentation is considered a genetic trait irrespective of age and sex; it is termed physiological or racial gingival pigmentation. The distribution and intensity of colour are different not only among different races but also in different areas of the same oral cavity ^[1].

Although natural pigments do not consider a medical disease, they are unacceptably aesthetics due to dark complexion especially among those with a gummy smile. Pigmentation is more common in the gingiva of dark-skinned individuals due to the deposition of higher quantities of melanin, which may not be aesthetically suitable. These melanin patches present on the gingiva can cause adverse psychological effects. Therefore, it becomes important to apply a proper method for the removal of excessive melanin pigmentation and converting the appearance of gingiva from dark colour to pink colour ^[2].

There is another type of hyperpigmentation of the gingiva that is considered pathological hyperpigmentation. Various skin diseases can cause pathological hyperpigmentation. Pathological hyperpigmentation caused by smoking, ingestion of heavy metals, Kaposi's sarcoma, endocrine disorders and drugs induced a variety of medications including chloroquine, quinine, minocycline, zidovudine, chlorpromazine, ketoconazole, quinine, minocycline, zidovudine, chlorpromazine, HIV, etc. This pigmentation does not need to be treated. It is symptomless, and only seeks treatment if the patient has psychogenic problems so the systemic condition of patients should be pursued or the cause should be removed to reach a desirable outcome before deciding to perform any other depigmentation methods ^[3].

Dummet (1960) proposed the following explanation for gingival pigmentation. The color of the healthy gingiva varies, ranging from a pale pink to a deep bluish-purple hue. Between these limits of normalcy is a large amount of pigmentation that depends primarily upon (i) the intensity of melanogenesis, (ii) the depth of epithelial cornification, and (iii) the arrangement of gingival vascularity. Dummet proposed the Dummet Oral Pigmentation Index (DOPI) assessment: 1964 • Score 0: Pink tissue (No clinical pigmentation) • Score 1: Mild light brown color (Mild clinical pigmentation) • Score 2: Medium brown or blue-black tissue (Heavy clinical pigmentation) • Score 3: Deep brown or blue-black tissue (Heavy clinical pigmentation) ^[4].

Gingival depigmentation is a periodontal plastic surgical procedure whereby the hyperpigmentation is removed or reduced by various modalities techniques, which are classified into two categories: methods to remove pigments and methods that mask the pigment. Removal of pigment can be done by surgical and nonsurgical or chemical methods. Surgical methods mainly include bur abrasion, scalpel surgery, electrocautery, laser ablation, cryosurgery, radiosurgery, gingivectomy, gingivectomy with free gingival autograft, application of chemical agents, abrasion with diamond bur, Nd: YAG laser, semiconductor diode laser and CO₂ laser. Nonsurgical methods mainly refer to chemical cauterization. The methods that mask gingival pigments include gingival grafting procedures and the use of acellular dermal matrix allografts. All these treatment modalities have their own advantages and disadvantages ^[5].

The selection of the technique should be based on clinical experiences and individual preferences. One of the first and still popular techniques to be employed is the surgical removal of undesirable pigmentation using scalpels. The procedure essentially involves surgical removal of 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 melanin pigmentation ^[6].

The depigmentation procedure by using the scalpel technique is simple, easy to perform, noninvasive, and cost-effective. According to Almas and Sadiq, the scalpel wound heals faster than other techniques ^[7].

The bur abrasion method is a technique using a diamond bur at high speed to denude the gingival epithelium layer. This method was found to have difficulty controlling the depth of de-epithelialization. Moreover, bleeding and postoperative pain are predicted ^[8].

Cryosurgery was performed by using the effect of low temperature on living tissues in which cells were killed by freezing. The biological effect of physical factors such as cold behaves like ionizing radiation and the maximum lethal effect is obtained when they are applied to cells undergoing mitosis. Most vital tissues freeze at approximately -2°C, and ultra low temperature (below -20°C) result in total cell death. In this technique, liquid nitrogen is circulated so as to cool the tip of the cryoprobe, which is to be applied to the lesion. Hence, freezing occurs by conduction. This technique is slower than the spray technique. The depth of penetration of the ice ball is difficult to estimate, and prolonged freezing could cause excessive tissue destruction ^[9].

The laser technique for gingival depigmentation is recognized as one of the most effective, comfortable, and reliable techniques. In the laser studies, repigmentation was treated by using a CO₂

laser, a diode laser or –an Er : YAG laser . Laser treatment of pigmentation is based on the principle of selective photothermolysis. It was declared that laser light must be at a wavelength that is specific and well absorbed by the particular chromophore being treated. Melanin is the ideal target chromophore for the diode laser. The results declare that the diode laser has the highest clinical effect for melanin depigmentation ⁽¹⁰⁾.

Electrocautery is another effective method when compared to the scalpel. It has many advantages such as the absence of bleeding and patient discomfort. Electrosurgery has a strong influence in the retardation of the migration of melanin cells from locally situated cells, reducing the chance of repigmentation. Electrocautery application for a prolonged time leads to the accumulation of heat in tissues with tissue destruction, so to overcome this disadvantage, soft tissue lasers can be used instead ⁽¹¹⁾.

Case Report:

Case 1

A 23-year-old female patient visited the Department of Oral Medicine, Periodontology in Outpatients clinic at Alazher University, complaining of dark gums. History revealed that it was present since childhood suggestive of physiological melanin pigmentation. The Patient was systemically healthy without any habits. The Patient's oral hygiene was good. The Dummett Oral Pigmentation Index (DOPI) (4) was used to assess the intensity of gingival pigmentation. The criteria used were 0: pink tissue, 1: mild, 2: medium brown and 3: deep brown or blue/black tissue.

Case Management

Treatment included surgical and nonsurgical intervention. Nonsurgical intervention included smoking cessation counselling. Surgical intervention consisted of gingival scraping of the affected areas. Phase I therapy was carried out during the initial visit.

A conventional scalpel surgical technique was planned. After obtaining informed patient consent, depigmentation procedure was performed after topical application of local anesthetic gel (2% Lignocaine®). Local infiltration anesthesia was administered. At the maxillary anterior region from the canine to the canine (anterior esthetic segment), a conventional/traditional technique was used, where in a combination of diamond burs, and a 15c surgical blade was used. Bur abrasion was used on most keratinized gingiva, and a scalpel was used where the epithelium was very thin; anterior gingival margins

The burs and blade were carefully used to remove the clinically visible pigmentation while maintaining gingival contours and leaving a thin layer of connective tissue over the alveolar bone preserving the periosteum, and avoiding bone exposure or damaging teeth. The pigmented epithelium was excised with a split thickness flap. Tissue hydration was maintained by copious irrigation with water. Microbial contamination was controlled by irrigation with a chlorohexidine gluconate rinse 0.12%. Hemostasis was achieved using direct pressure with 4 × 4 gauze. The patient tolerated the procedure well and was satisfied with the immediate esthetics. The depigmented area was covered with a peri-odontal dressing (COE –PAK, GC America Inc., ALSIP, IL, USA). Postoperative instructions were given to the patient, and nonsteroidal anti-inflammatory in the form of diclofenac sodium was given twice daily for 3 days. An oral chlorhexidine rinse was prescribed for use twice a day for 2 weeks. The Patient was recalled after 1-week for re-evaluation. The Patient experienced pain on the scalpel treated site for 3 days postoperatively. After 1-week, the pack was removed, and the surgical area was examined. At the 1-month postoperative follow-up, the patient heal without any postsurgical complications. The gingiva appeared pink, healthy, and firm giving a normal appearance. The patient was very impressed with such a pleasing esthetic outcome.

Case 2

The same female patient had the same chief complaint of black gingiva in the lower jaw. The procedures were performed with the same method as in the previous case. The wound healed well after 4 weeks. No pain or bleeding complications were found. The gingiva became pink and healthy within 4 weeks

Case 3

A 32-year-old medically healthy male patient presented on January, 2021 to the outpatient clinic in the faculty of dentistry at Alazher University with a chief complaint of pigmented gingiva. On average, the patient smoked 3 cigarettes a day. The extra-oral exam was unremarkable and the patient had a medium-dark skin complexion. Intraoral examination revealed good oral hygiene, healthy gingiva and remarkable pigmentation on the mandibular anterior attached gingiva. The Periodontal diagnosis was healthy periodontium with pigmented gingiva. The patient completed the informed consent process that included risks, benefits, and alternatives both verbally and writing.



A) Preoperative clinical photo



B) Depigmentation in the upper jaw from right 4 to left 4



B) Application of periopack after surgical depigmentation



D) Healing in upper jaw after 1 month



E) Lower jaw surgical depigmentation



clinical photograph show another patient with



gingival depigmentation in lower jaw by bur abrasion

Result

No clinical significance was seen in the comparison between the techniques in efficiency and depigmentation. The results of this study indicated that both scalpel and bur abrasion were efficient for depigmentation of the gingiva. Neither procedure resulted in any postoperative complications, and the gingiva healed uneventfully. The choice of technique to be used mainly depends on the gingival biotype and the degree of pigmentation.

Discussion

The scalpel surgical technique is one of the first, and still popular, techniques to be applicable to the surgical removal of undesirable pigmentation. The scalpel technique is a common, cost-effective form of treatment with mild or moderate postoperative pain. A comparison between scalpel and bur abrasion yielded successful results with no clinical difference in wound healing, reappearance of gingival pigmentation or intensity. Slight bleeding or pain was reported with both methods^[11].

Microabrasion and scalpel surgery are effective in restoring the original gingival color. Recurrence of pigmentation is a concern and is observed in 50% of cases 2–4 years posttreatment^[12].

The procedure essentially involves surgical removal of 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 melanin pigmentation. An attempt was made to surgically remove the gingival pigmentation in the maxillary and mandibular quadrants of the patient. In this particular case, the scalpel method of depigmentation gave satisfactory results from both clinical and patient prediction. However, scalpel surgery causes unpleasant bleeding during and after the operation, and it is necessary to cover the surgical site with periodontal pack dressing for 7–10 days. The area healed completely in 10 days with a normal gingival appearance. We found that the scalpel technique was simple and easy to apply and required minimal time and effort^[13].

Melanin pigment recurrence has been documented to occur following the surgical procedure, within a 24 day to 8-year period. According to a study by Perlmutter et al gingival surgical procedures performed solely for cosmetic reasons offer no permanent results. Repigmentation refers to the clinical reappearance of melanin pigment following a period of clinical depigmentation. The mechanism suggested for spontaneous repigmentation is that melanocytes from the normal skin proliferate and migrate into the depigmented areas, so to prevent recurrence, they should be cleared entirely from free gingiva and interdental papillae^[14,15].

Conclusion

Gingival pigmentation varies depending on whether it is physiological or pathological. The most important factor for determining the treatment for gingival melanin hyperpigmentation is the psychological needs of patients, patient acceptance of the treatment procedure and its esthetic outcome. Treatment of melanin pigmentation can be performed by using older methods, such as gingival abrasion by scalpel surgery depigmentation/bur abrasion, cryotherapy, laser techniques or electrocautery. Although the scalpal method shows the advantage of being a simple and easy technique, also shows the disadvantages, such as being time consuming, being painful, and requiring the application of periodontal dressings. The recurrence rate of gingival pigmentation was faster with the scalpel technique than with other techniques.

Summary

The significance of this case report is to provide a new information. As a limited number of studies have discussed the management of gingival depigmentation performed by surgical technique of scalpel and/or bur abrasion, which has the advantages of minimal chair time, bleeding, postoperative pain, and rapid healing. Patient satisfaction with esthetics was very good.

Recommendations

Long-term follow-up is needed to ensure stability and lack of recurrence

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) gave her consent for her images and other clinical information to be reported in the journal.

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