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Management of Physiologic Gingival Hyperpigmentation Using Scalpel Technique: A Case Report

Abstract:
Gingival hyperpigmentation caused by excessive melanin deposition in gingival tissues is a common aesthetic concern, particularly in individuals with a high smile line. Although physiologic gingival pigmentation is benign and asymptomatic, patients often seek treatment for cosmetic reasons. Various treatment modalities such as scalpel surgery, electrosurgery, cryosurgery, and laser therapy have been proposed for gingival depigmentation. Among these, the scalpel technique remains widely used due to its simplicity, cost-effectiveness, and predictable outcomes. The present case report describes the management of physiologic gingival hyperpigmentation in a 20-year-old male patient using the scalpel surgical technique. Surgical stripping of the pigmented gingival epithelium was performed after oral prophylaxis. Healing occurred uneventfully by secondary intention, resulting in significant aesthetic improvement.

Key-words: Gingival hyperpigmentation, Gingival depigmentation, Melanin pigmentation, Scalpel technique, Periodontal surgery.

Introduction:

Gingival pigmentation is primarily caused by deposition of melanin pigment produced by melanocytes present in the basal and suprabasal layers of the gingival epithelium[1]. Melanin is synthesized from the amino acid tyrosine through the enzymatic action of tyrosinase and stored in intracellular organelles known as melanosomes[2].

Physiologic gingival pigmentation is commonly observed in individuals with darker skin tones and is considered a normal physiologic variation rather than a pathological condition[1]. However, excessive gingival pigmentation may present an aesthetic concern, particularly when visible in the anterior region or in patients with a high smile line[3].

Various techniques have been proposed for gingival depigmentation including scalpel surgery, electrosurgery, cryosurgery, and laser therapy[4]. Each method has its own advantages and limitations. Among these, the scalpel surgical technique remains widely used because of its simplicity and cost-effectiveness[5].

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The present case report describes the management of physiologic gingival hyperpigmentation using the scalpel surgical technique in a young patient.

Case Report:

Patient Information:

A 20-year-old male patient reported to the Department of Periodontology after being referred from the Department of Orthodontics and Dentofacial Orthopaedics for oral prophylaxis prior to orthodontic treatment.

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Chief Complaint:

The patient did not report any specific complaint related to gingival pigmentation. He had initially sought orthodontic consultation for correction of misaligned lower anterior teeth.

History of Present Illness:

The patient reported noticing misalignment of his lower anterior teeth and visited the orthodontic department for treatment. During routine clinical examination prior to orthodontic therapy, generalized gingival pigmentation was observed in the anterior region.

Medical and Dental History:

The patient's medical, dental, drug, and family histories were non-contributory.

Clinical Examination

Intraoral Examination:

Intraoral examination revealed diffuse brownish-black pigmentation of the gingiva, particularly in the maxillary anterior region. The pigmentation appeared as irregular patchy areas with well-defined borders [Fig.1].

The variation in pigmentation intensity was attributed to the amount, distribution, and depth of melanin deposition within the gingival tissues. The pigmentation was more prominent in the anterior region and gradually faded in the posterior areas.

Fig. 1: Pre-operative view showing diffuse gingival hyperpigmentation in the maxillary anterior region.

Investigations:

Routine haematological investigations were advised to rule out systemic causes of pigmentation.All findings were within normal limits.

Diagnosis:

Based on clinical findings and patient history, the diagnosis was established as: physiologic gingival hyperpigmentation (Dummet hyperpigmentation index).

Treatment Plan:

The treatment plan consisted of the following steps:

1. Full mouth oral prophylaxis using ultrasonic scaling.
2. Oral hygiene instructions and reinforcement of proper brushing technique.
3. Surgical gingival depigmentation using the scalpel surgical technique.

Informed consent was obtained from the patient prior to performing the procedure.

Surgical Procedure:

Under local anesthesia, the pigmented gingival epithelium was removed using a sterile scalpel blade. A split-thickness epithelial excision procedure was performed, in which the pigmented epithelial layer along with a thin layer of underlying connective tissue was surgically removed [Fig. 2].

Care was taken to ensure complete removal of the pigmented epithelium while preserving the underlying periosteum. The exposed connective tissue surface was allowed to heal by secondary intention. Haemostasis was achieved by applying gentle pressure with sterile gauze.

The scalpel technique is considered a simple and effective method for gingival depigmentation and has been widely used in periodontal practice[6].

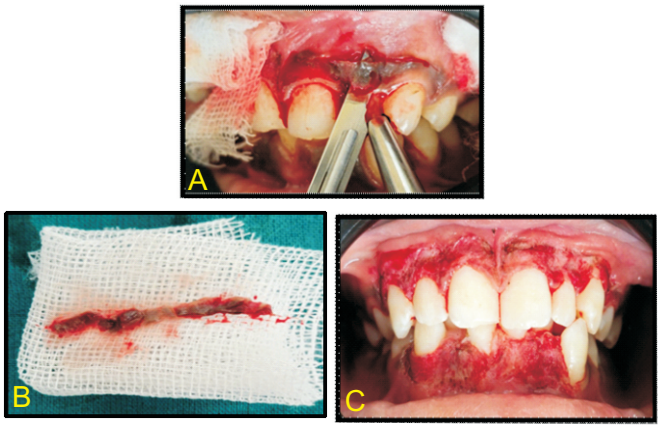

Figure 2: (a) Surgical removal of pigmented gingival epithelium using scalpel technique. (b) Removed segment of pigmented epithelium. (c) Immediate post-operative.

Postoperative Care:

The patient was prescribed antibiotics and analgesics, **twice daily for 5 days.** The patient was also advised to rinse with**0.2% chlorhexidine gluconate mouthwash twice daily for 14 days**. Postoperative instructions were provided regarding oral hygiene and dietary precautions.

Results:

Healing was evaluated during follow-up visits. At day 7, partial epithelialization of the surgical site was observed with minimal inflammation and at day 21, complete healing of the gingival tissue was noted with restoration of healthy pink gingiva and significant reduction in pigmentation [Fig. 3].The patient reported satisfaction with the aesthetic improvement.

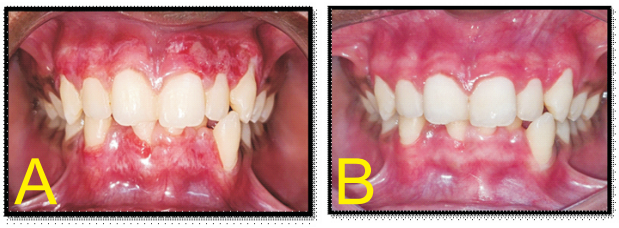

Fig. 3: Healingat (a) 7-day follow-up. (b) 21-day follow-up.

Discussion:

Gingival hyperpigmentation is primarily caused by increased production and deposition of melanin pigment by melanocytes located in the basal layer of the gingival epithelium[1]. Although physiologic pigmentation does not represent a pathological condition, it may become a significant aesthetic concern for patients, particularly when present in the anterior region and associated with a high smile line. Consequently, many patients seek treatment to improve the appearance of their gingiva[3].

Various treatment modalities have been described for the management of gingival hyperpigmentation, including scalpel surgical technique, electrosurgery, cryosurgery, and laser therapy[4]. Each technique offers certain advantages and limitations. Laser-assisted depigmentation has gained popularity because of its ability to provide a relatively bloodless surgical field and improved patient comfort. However, the high cost of equipment and limited availability in some clinical settings may restrict its routine use[6].

The scalpel surgical technique remains one of the most used methods for gingival depigmentation due to its simplicity, affordability, and effectiveness[5]. The procedure involves removal of the pigmented gingival epithelium along with a thin layer of underlying connective tissue, allowing healing by secondary intention. This results in regeneration of a new epithelial layer that generally exhibits reduced melanin pigmentation[2].

Despite its advantages, the scalpel technique may be associated with intraoperative bleeding and mild postoperative discomfort. However, these limitations can be effectively managed with appropriate surgical technique and postoperative care. In the present case, the procedure resulted in satisfactory aesthetic improvement with uneventful healing during the follow-up period[5].

Regimentation remains a potential concern following depigmentation procedures. It is believed to occur due to migration of melanocytes from adjacent pigmented tissues into the treated area[3]. The time required for regimentation varies among individuals and may range from several months to years[7]. Adjunctive measures such as the use of antioxidants, particularly vitamin C, may help reduce melanogenesis by inhibiting tyrosinase activity and thereby limit recurrence of pigmentation[8].

In the present case, healing progressed satisfactorily and a noticeable improvement in gingival aesthetics was achieved by the 21-day follow-up. The patient expressed satisfaction with the outcome of the procedure.

Conclusion:

Within the limitations of this case, the scalpel surgical technique proved to be a simple, economical, and effective method for the management of physiologic gingival hyperpigmentation. The procedure resulted in satisfactory aesthetic improvement with uneventful healing. Proper case selection, surgical technique, and postoperative care are essential for achieving favourable clinical outcomes and minimizing the risk of regimentation.

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