

Periodontal Cosmetic Surgery - Concept of Gingival Depigmentation

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Abstract

A smile is more than a method of communication and is a means of socialization and attraction. 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. Gingival pigmentation is well documented in the literature and is considered to be multifactorial. This problem aggravates in patients with gummy smile. There are various treatment modalities for managing this quality of life hampering, esthetic problem including chemical, surgical, cryotherapy, radiotherapy, not the least LASER. The most important factor for determining the treatment for gingival melanin pigmentation is the type of pigmentation, patient acceptance of treatment procedure, its prevalence and its esthetic importance depending on the skin complexion of the patient.

Key words: Gingiva, Depigmentation, Esthetics, Physiologic pigmentation, Melanin.

Introduction

A smile expresses a feeling of joy, success, sensuality, affection and reveals self-confidence and kindness. Gingival health and appearance are essential components of an attractive smile. Oral melanin pigmentation is well documented in the literature and is considered to be multifactorial, whether physiological/pathological and can be caused by a variety of local and or systemic factors.¹

Classification

Dummett and Barrens (1971) in their review divided oromucosal pigmentation in the following categories.²

- I Local and ethnic pigmentations
- II Oral pigmentation manifestations of systemic diseases
- III Pigmentation disturbances associated with pharmaceutical and other chemicals
- IV Benign and malignant neoplasms of pigmentation origin.

Gingival melanin pigmentation is measured using the following index.

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Gingival pigmentation index: (Dummett Oral Pigmentation index DOPI³)

Score 0: Absence of any pigmentation

Score 1: Spots of brown to black pigmentation

Score 2: Localized brown to black pigmentation (not diffuse)

Score 3: Diffuse brown to black pigmentation (diffuse involving marginal and attached gingiva)

Gingival melanin pigmentation of the gingiva is completely benign and does not present a medical problem, but patients may complain that their black gums are unaesthetic. This problem aggravates in patients with a "gummy smile" or excessive gingival display while smiling or talking.^{4,5,6}

The smile lines can be analyzed according to the following classification⁷.

Class 1: Very high smile line -more than 2 mm of the marginal gingiva visible or more than 2 mm apical to the cemento-enamel junction visible for the reduced but healthy periodontium. This could be "gummy smile".

Class 2: High smile line - between 0 and 2 mm of marginal gingiva visible or between 0 and 2 mm apical to the cemento-enamel junction visible for the reduced but healthy periodontium.

Class 3: Average smile line- only gingival embrasures visible.

Class 4: Low smile line- gingival embrasures and cemento-enamel junction not visible.

Report of the Case

A female patient of 22 years of age reported with a chief complaint of dark gums and which exposed during smiling and talking. Dark gingiva and gummy smile was affecting the social life and in a greater way her quality of life. After complete evaluating her medical history and preliminary investigation it was diagnosed as racial pigmentation. Melanin pigmentation is a physiological pigmentation. We planned for surgical scalpel method for depigmentation.



Fig 1: Pre Operative



Fig 2: Per-Operative



Fig 3: Post Operative

Various Other Methods Used

	Gingival abrasion	Split thickness excision technique	Free gingival graft	Cryosurgery	LASER
Local anesthesia	Required	Required	Required	Not required	Not usually
Technique	Non invasive	Invasive	Invasive	Non invasive	Non invasive
Ease of performing	Technique sensitive	Technique sensitive	Technique sensitive	Technique sensitive	Relatively easy
Discomfort/pain	Minimal	Minimal	Mild to moderate	No discomfort	Pricking pain
Periodontal dressing	Necessary	Necessary	Necessary	Not necessary	Not necessary
Healing	1-2 weeks	1-2 weeks	2-3 weeks	Within a week	Within a week
Final appearance	Papillary gingiva shows pigmentation	Complete	Ghost like appearance (Hypopigmented areas)	Complete depigmentation	Complete depigmentation
Repigmentation	Seen (9 months)	Not seen (duration can vary from 33 to 120 days)	Not seen	Recurrence 1-3 months	Not seen
Cost	Cost effective	Cost effective	Cost effective	Expensive	Cost effective

Chemical methods:

Most commonly used are phenols and alcohol. The treatment was not acceptable to the clinicians or the patients. In 1951 Hirschfield and Hirschfield⁸ used a mixture of phenol (90%) and alcohol (95%) to burn out the pigmented gingiva by destroying tissue down to and slightly below the basal layer of the mucous membranes.

Ascorbic acid (AS-G gel) was used by Yashuko *et al* for depigmentation and found that it significantly inhibited tyrosinase activity and melanin formation in B16 mouse melanoma cells. They concluded that AS-G has potential for the treatment of gingival melanin pigmentation.

Surgical methods:

1. *Gingival abrasion technique*

In this technique a medium grit football shaped diamond bur is used at high speeds to denude the epithelium. The procedure requires 45 min to 1 h for completion. Procedural discomfort, placement of periodontal pack, duration of procedure, recurrence of pigmentation and technique sensitivity are few of the drawbacks of this procedure.

2. *Scalpel surgical technique or split thickness epithelial excision technique*

This procedure essentially involves surgical removal⁹ of gingival epithelium along with a layer of the underlying connective tissue and allowing the denuded connective tissue to heal by secondary intention. Delicate scarring, exposure of the alveolar bone at areas where the gingiva is thin and repigmentation can be few of the disadvantages of the procedure¹⁰.

3. *Free gingival grafting*

Described by Tamizi, Taheri (1996)¹¹ for treating severe physiologic melanin pigmentation requires replacement with an unpigmented free gingival autograft. The result of this procedure showed no evidence of repigmentation even after 4.5 years.

4. *Acellular dermal matrix allograft*

Acellular dermal matrix with partial thickness flap has been used in the elimination of gingival melanin pigmentation. It can be a substitute for gingival autograft¹².

Lasers:

Lasers have become widely used in medicine and surgery since the development of the Ruby laser by Maiman in 1960. Laser ablation for gingival depigmentation has been recognized as one of the most effective, pleasant, and reliable techniques. Different lasers have been used for gingival depigmentation, including Carbon dioxide (CO₂) (10,600 nm), Diode (820 nm), Neodymium-doped:

Yttrium, Aluminum, and Garnet (Nd:YAG) (1064 nm), Erbium (Er)-doped:YAG (2940 nm) and Erbium- and chromium-doped: yttrium, scandium, gallium, garnet (Er, Cr: YSGG) (2780 nm) lasers.

Cryosurgical procedure:

The dose of cryogen and the choice of delivery method depend on the size, tissue type, and depth of the lesion. The area of the body on which the lesion is located and the required depth of freeze also should be considered. Additional patient factors to consider includes the thickness of the epidermis and underlying structures, the water content of the skin, and local blood-flow¹³.

1. Dipstick method
2. Spray technique
3. Cryoprobe technique

Radiosurgery:

Radiosurgery uses a 4 MHz radio signal to produce a fine microsmooth incision with no overt lateral heat being sent to the surrounding tissues. A superficial effect is sufficient to remove pigmentations. Touching the pigmented areas lightly with the No. 135 ball shaped electrode or tapping the area with the No. 134 L-shaped electrode when the Ellman Surgitron or Radiolase II is operating will successfully treat a case with gingival melanin pigmentation. This method at least required two sittings for completion within 2 weeks of treatment¹⁴.

Conclusion

Based on the available literature gingival melanin pigmentation can vary depending on whether it is physiological or pathological, based on the location, color or it can be traumatic. The most important factor for determining the treatment for gingival melanin pigmentation is the type of pigmentation, patient acceptance of treatment procedure, its prevalence and its esthetic importance depending on the skin complexion of the patient.

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