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Review Article

Development in techniques for gingival depigmentation – An update

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ABSTRACT

Dental esthetic needs of patients are increasing with a greater demand on pleasing look. This demand gets fulfilled not only by having healthy set of dentition but also esthetically improved gingival component. Gingival melanin pigmentation is one of the factors which determine the smile of an individual. Based on the available literature gingival melanin pigmentation can vary depending on whether it is physiological or pathological. Its esthetic importance depends on the skin complexion of the patient and is one of the most important factors for determining the treatment for gingival melanin pigmentation. It is necessary to select an appropriate technique for treating unaesthetic gingival melanin pigmentation of patients and the treatment should cause minimal discomfort and should be effective for a longer period of time. Treatment of gingival melanin pigmentation can be done using scalpel, chemical agents, abrasion, grafts, electro surgery, cryosurgery or lasers. Recent reports on treatment of gingival melanin pigmentation using cryosurgery and lasers show results in terms of ease of use, acceptance and patient comfort to be far superior to other techniques. This literature review is done to classify and explore the recent treatments and future procedures available for depigmentation.

Keywords: *Gingiva, Melanin, Pigmentation, Physiologic, Pathologic, Cryosurgery, Electro surgery, Lasers*

INTRODUCTION

Melanin is non-hemoglobin derived brown pigment, most common of the endogenous pigments. It is a derivative of tyrosine and is synthesized in the Melanocytes. The Melanocytes are embryologically derived from neural crest ectoderm. In the human fetus it enters the epidermis and presumably the oral epithelium from the eleventh week onwards.[1] Once in the epithelium these cells constitute a self-producing population normally situated within the basal layer of the fully developed human epidermis, although they have been observed supra basally in human oral epithelium.[2]

Melanin is a powerful cation chelator and may act as a free radical sink.[3] It is used commercially as a component of photoprotective creams, although mainly for its free radical scavenging rather than its light absorption properties. The pigment is also a potential target for anti-melanoma therapy.[4]

Gingival melanin pigmentation does not usually present as 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.[5–7] Cryosurgery and lasers being the newer and recent applications, these are considered to be more acceptable not only by the clinicians but also by the patients than other traditional methods.

CHARACTERISTICS OF MELANIN PIGMENT

Examination of human Melanocytes with the electron microscope has shown these cells to be similar in epidermis and oral epithelium. The cells differ from adjacent epithelial cells in being dendritic, lacking desmosomes and tonofibrils and in having a well-developed Golgi region and large

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areas of rough endoplasmic reticulum. These latter features are consistent with the secretory role of the cell in the production of melanin. (Fig. 1)

The result of the oxidation of tyrosine via number of intermediate components, including di-hydroxy phenyl alanine (DOPA) is the formation of the dense pigment melanin, which obscures the striations seen on the premelanosome to form the homogeneous, opaque melanosomes.

Initially it was assumed that melanoid was a degradation product of melanin, but more recently it has been shown that such a relationship is highly improbable. Melanoid imparts a clear yellow shade to the skin.[8]

Approximately the number of Melanocytes seen in any given region of the skin is same. Thus the ratio of Melanocytes to basal epidermal cells in caucasoid and blacks varies from approximately 1:4 on the cheek to 1:11 over the thighs and arms. Little data are available for the oral mucosa although Fitzpatrick & Szabo quote an overall figure of 1:7 and a ratio of 1:15 have been found in human gingival epithelium.[1]

Differences in pigmentation of a given region are thus a function of the activity, rather than the number of Melanocytes and even in conditions of hypopigmentation such as albinism where 'amelanotic' Melanocytes are still present. The differences in amount and distribution of these pigments account for the variation in skin color between the sexes and between different parts of the body. In examination of persons of various races,[9] it has been found that color difference between races are based only on the production of various amounts of primary ectodermal melanin and melanoid, the amount of all other pigments being the same in all races.

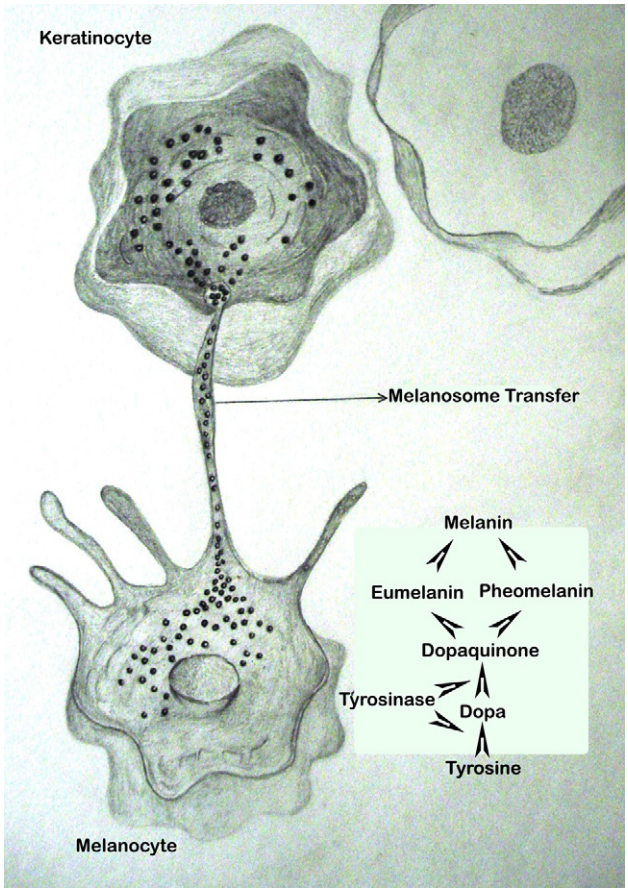

Fig. 1 The basal layer of the gingiva contains Melanocytes-pigment containing cells which give a brownish hue to portions of the gingiva. There are also a few cells in the connective tissue which have taken up melanin granules – melanophores.

CLASSIFICATION

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

(1) Local and ethnic pigmentations
(2) Oral pigmentary manifestations of systemic diseases[10]
(3) Pigmentary disturbances associated with pharmaceutical and other chemicals
(4) Benign and malignant neoplasms of pigmentary origin.

Bradley Grace et al (2004)[11]

Classification based on the distribution of the pigmentation.

Diffuse and bilateral

Early onset: Physiological pigmentation, Peutz jegher's syndrome.

Predominantly adult onset

With systemic signs and symptoms

Addison's disease,[12] Heavy metal pigmentation, Kaposis sarcoma,

No systemic signs and symptoms

Drug induced pigmentation, Post inflammatory, Smokers Melanosis.[13]

Focal

Red – blue – purple
Blanching: Hemangioma, varix
Non blanching: Thrombosis, Hematoma
Blue gray: Amalgam tattoo, Other foreign body tattoo, Blue nevus