Original Article

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Hyperpigmentation and Melasma: Causes, the Efficacy of Cosmelan Treatment

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Abstract

Introduction: hyperpigmentation is a frequent complaint, making up about 8.5% of all calls to dermatologists. They can be congenital, with different types of inheritance or acquired due to external factors, systemic diseases. This article will focus on acquired hyperpigmentation associated with elevated melanin levels. Particularly it should be emphasized aspects of therapy, with particular attention to melasma, post-inflammatory hyperpigmentation, periorbital pigmentation. **Results:** Within a week, the appearance of the treated skin is noticeably improved. Skin type has a big influence on the effect of the treatment. People with skin phototype IV and V (dark skin) may notice that the effect will start faster because after 8-10 days. People with phototype I and II notice the disappearance of spots from 8 to 21 days. The overall effect of Cosmelan treatment should be up to 30 days. **Conclusion:** If we approach the correction of pigment formation from these positions, it becomes obvious that the effect in the skin should be as complex, soft and gentle as possible. Otherwise, there is a risk of getting not only a local reaction opposite to the desired one, but also harm the patient, aggravating the existing cosmetic defect and social psychological maladjustment of the personality.

Keywords: Cosmetology, Dermatology, Post-Inflammatory Hyperpigmentation, Hyperpigmentation, Melisma.

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Introduction

Skin pigmentation abnormalities is one of the topical problems of dermatocosmetology. This is a diverse etiologically and pathogenetically diverse group of diseases and syndromes that are resistant to traditional therapy. The color of human skin depends on the presence of pigment coloring substances in it, the main of which is melanin. The role of melanin in skin pigmentation, even in white and unburned people, is very significant, as can be easily seen by looking at the skin of patients with albinism or vitiligo. Therefore, local hyper and hypomelanosis are serious cosmetic defects, often traumatizing the human psyche.[1–3]

In order for cosmetic intervention to be harmless and effective, it is necessary to have a good understanding of the mechanism of action of the agents used and the processes that can be affected in each case. Melanocytes are large process cells that are located among basal keratinocytes and synthesize melanin in a series of successive oxidative reactions: the conversion of tyrosine with the participation of the tyrosinase enzyme through dioxyphenyl lanin into DOPA quinone, then in DOPA chromium with the formation of dihydroxyindolylhydroxycarboxylic acid and dihydroxyindolylcarboxylic acid. The oxidation products of the latter polymerize with the formation of brown and black pigments; eumelanins. In black skin, melanin is distributed evenly throughout the epidermis from the basal to the stratum corneum, and inside each keratinocyte - in the form of large elliptical melanosomes that reliably cover the cell nucleus. In the skin of Europeans, melanosomal complexes are mainly concentrated only in the basal layer and irregularly in keratinocytes.[4,5]

In the practice of a dermatocosmetologist, post-inflammatory hyperpigmentation is not uncommon. During inflammation, nitric oxide (NO) appears in the skin, which is synthesized by macrophages from the amino acid arginine. Macrophages also produce large amounts of reactive oxygen species - superoxide and hydrogen peroxide. When NO reacts with reactive oxygen species, extremely toxic molecules are formed. It has been shown under in vitro conditions that in the presence of dihydroxyindole and dihydroxyindolylcarboxylic acid, NO induced oxidative reactions, such as the oxidation of alpha tocopherol, are inhibited.

With the consumption of nitric oxide, the accumulation of dark pigment occurs.[6] There is no generally accepted classification of pigmentation disorders, they are described

under the names ”dyschromias” and ”melasma”, grouped according to various characteristics: by origin - congenital and acquired, primary and secondary; prevalence - localized and generalized; color intensity - hyper, hypo and achromia. To characterize the pathology of skin coloration associated with a violation of the synthesis of only melanin, the term ”melanosis” should be used, accepted in international practice and recognized by WHO.[7]

The word melasma (melasma) comes from the Greek, where melas means black. It manifests itself as a symmetrical acquired hypermelanosis with spots ranging from brown to bluish-gray shades, with uneven borders and located in areas more exposed to ultraviolet radiation - the face, neck, less often the arms, and the chest area. It occurs in all populations, but more often in individuals with high phototypes living in areas of intense ultraviolet radiation. The main factors causing melasma are ultraviolet radiation and genetic predisposition. Ultraviolet radiation induces melanocortin in melanocytes and keratinocytes.[8,9]

Materials and Methods

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Results and Discussion

Recent histological and immunohistochemical studies have shown that skin melasma has pronounced signs of chronic sun damage. During sun exposure, physiological reactions occur, triggered by interactions between keratinocytes, mast cells, fibroblasts, the vascular system of the skin and melanocytes, causing skin inflammation, which plays an important role in hyperpigmentation. Other causes of melasma: pregnancy, use of oral contraceptives (COCs), endocrine disorders, hormone intake. In addition, the use of certain cosmetics and drugs, such as anticonvulsants and photosensitizing agents, are also among the possible causes or aggravating factors for hyperpigmentation. Melasma is usually classified into epidermal type (70% of patients), in which pigmentation is enhanced by exposure to ultraviolet (UV) radiation, and dermal type (10 to 15%), in which pigmentation does not change under UV exposure in a clinical trial, and mixed (20%). However, recent studies have questioned this classification. A biopsy of skin with melasma showed that the level of pigment deposition does not always correspond to the intensity of UV exposure, with most of the lesions having both dermal and epidermal components.

The affected areas show an increased density of dermal and epidermal melanin, in addition to pronounced solar elastosis, compared to adjacent normal skin. The goal of melasma treatment is to reduce the proliferation of melanocytes, inhibit the formation of melanosomes and promote their degradation. Photoprotection is very important for treatment and must be strictly observed, as lesions are exacerbated by solar radiation as well as visible light. Post-inflammatory hyperpigmentation is characterized by increased pigmentation that occurs after the inflammatory process of the skin.

Figure 1: The patient suffered from Melasma 4 Fitzpatrick phototype, 2 weeks after Cosmelan treatment

People with high phototypes are more prone to this skin condition because they already have a higher basal amount of epidermal melanin. Similarly, this hypermelanosis tends to be more intense in this group. The most common causes are: acne, atopic dermatitis, allergic contact dermatitis or trauma secondary to irritants, psoriasis, lichen planus, medications and currently cosmetic procedures. Histology shows deposits of melanin both in free form and within melanophages located in the upper dermis and around blood vessels. The exact mechanism of the pathogenesis of post-inflammatory hyperpigmentation is still not entirely clear, but it is believed that it is more related to the nature of the triggering inflammation, because darkening is greater in chronic and recurrent inflammatory processes, as well as in those that damage the basal layer. It is likely that hyperpigmentation is caused by increased melanogenesis or an abnormal distribution of melanin produced, possibly as a result of cytokines, inflammatory mediators, and reactive oxygen species. These agents can act by stimulating the growth of melanocytes and proliferation of dendrites, as well as increasing tyrosinase activity.

Cosmelan treatment

The program COSMELAN includes plant and chemical components that guarantee the maximum level of tyrosinase suppression:

- Complex-tyrosinase inhibitor: a complex of 6 active ingredients, guaranteed tolerance and high efficiency.

- Complex for inhibition of DOPA-tautomerase and eumelanin: a complex of active ingredients that inhibit enzymes.
- Complex of inhibition of melanogenesis: prevents the movement of melanosomes to keratinocytes, neutralizes the effect of sunlight on melanocytes.
- Vitamin complex: provides powerful protection against free radicals, stimulates collagen synthesis and cell renewal, regenerates the skin, brightens, adds radiance.
- Complex of plant extracts: brighten, moisturize, soothe the skin.
- Sun filters: a complex of physical and chemical filters, protects against free radicals, neutralizes UVA and UVB rays.
- Exfoliating agent: stimulates the natural process of exfoliation of the stratum corneum and, accordingly, the removal of melanin.
- Cosmetic base, free from preservatives and fragrances: the special formula promotes the penetration of active ingredients into the epidermis.

Active ingredients contained in the preparations:

- Kojic acid;
- Phytic acid;
- Ascorbic acid;
- Retinol palmitate;
- Arbutin.

Cosmelan acts on melanocytes, the pigment cells of the skin that are found in the epidermis and are responsible for the excessive production of melanin. Cosmelan inhibits the production of melanin and thus reduces or lightens unsightly discoloration, discoloration or blemishes. The mechanism of action was based on the use of substances that preserve tyrosinase, an enzyme involved in the formation of melanin. The sun's rays contained in Cosmelan block enzyme activity or reverse metabolic changes.

Within a week, the appearance of the treated skin is noticeably improved. Skin type has a big influence on the effect of the treatment. People with skin phototype IV and V (dark skin) may notice that the effect will start faster because after 8-10 days. People with phototype I and II notice the disappearance of spots from 8 to 21 days. The overall effect of Cosmelan treatment should be up to 30 days.

Contraindications

- Pregnancy and breastfeeding;
- Active changes in the skin, dermatitis;
- Active herpes;
- Allergy to the ingredients of the drug;
- Using medications with vitamin A;
- Predisposition to the formation of keloids.

Conclusion

The Cosmelan procedure is one of the most effective and safe procedures that eliminates discoloration and restores the balance of oily or combination skin, leaving it shiny and smooth. It is a treatment aimed at reducing skin discoloration that reduces dark spots and discoloration from excessive melanin production or from excessive exposure to sunlight or hormonal imbalances. Its revolutionary formula has been designed to maximize potency and provide optimal tolerance.

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