

What is Melasma?

Melasma is a commonly acquired increase of pigmentation, which occurs exclusively in sun-exposed areas. Brownish in color, it is exacerbated by sun exposure, pregnancy, oral contraceptives, and certain anti-epilepsy drugs.

Melasma is reasonably common, especially in women of child-bearing age. However, up to 10% of cases have been reported in males. While all races are affected, there is a prominence among Latinos and Asians. Melasma is more apparent during and after periods of sun exposure and less obvious in winter months, when sun exposure is lacking.

Melasma presents itself in one of the three usually symmetrical facial patterns. The most common is a centrofacial pattern involving the cheeks, forehead, upper lip, nose, and chin. Less common are the malar pattern, involving the cheeks and nose, and the mandibular pattern, involving the ramus of the mandible (the side of the cheeks and jawline). Melasma also occurs on the forearms, but this is rare.

What is the Difference between Dermal and Epidermal Melasma?

Every case of Melasma starts off in the epidermis, where melanocytes are actively producing pigment. A normal case of Melasma can turn into dermal Melasma if skin becomes over-irritated and inflamed. When this happens, it causes a temporary split between the dermis and epidermis. During this time, hyper-pigmented cells can drop from the epidermis into the dermis. Once in the dermis, these cells become very resistant to topical treatment. This is one reason why it is so important to treat Melasma gently.

What are the Causes of Melasma?

Melasma is considered to arise from pregnancy, oral contraceptives, endocrine dysfunction, genetic factors, medications, nutritional deficiency, hepatic dysfunction, and other factors. The majority of cases appear to be related to pregnancy or oral contraceptives. The infrequency of Melasma in postmenopausal women on estrogen replacement suggests that estrogen alone is not the cause. In more recent experience, combination treatment using estrogen plus progestational agents is being used in postmenopausal women, and Melasma is being observed in some of these older women who did not have Melasma during their pregnancies. Sun exposure would appear to be a stimulating factor in predisposed individuals. Although a few cases within families have been described, Melasma should not be considered a hereditary disorder.

Treatments for Melasma

Hydroquinone (HQ)

Hydroquinone is the most popular, and is also the most effective topical hypo-pigmenting agent. Hydroquinone works by inhibiting the conversion of tyrosine to melanin, inhibiting the formation of melanosomes and increase the degradation of melanosomes, and by inhibiting the DNA and RNA synthesis of melanocytes.

As a result, only cells with active tyrosinase activity are affected by HQ. Active tyrosinase activity is only found in epidermal melanocytes. In dermal melanin, tyrosinase activity is not present; therefore dermal Melasma is resistant to hydroquinone. The efficacy of hydroquinone is related to the concentration of the preparation. Preparations with a hydroquinone concentration of 2% or less do not require a prescription, but are much less effective than prescription counterparts and are only recommended for maintenance therapy. Concentrations of 5%-10% hydroquinone are very effective, but can be irritating. The chemical stability of hydroquinone formulations is important because HQ is easily oxidized and loses potency. HQ formulations should be kept in a small, dark bottle of no larger than 1 ounce and should be used within 30 days.

The lightening effect of hydroquinone can be enhanced by combining it with other agents such as Alpha Hydroxy Acids and tretinoin.

Side effects of hydroquinone include irritation, possible allergic reactions, nail discoloration, post-inflammatory hyper-pigmentation (dark spots), and temporary lightening or de-pigmentation of treated and surrounding skin. These side effects are temporary and will resolve when the HQ formula is no longer used. There is one other possible, and rare, permanent side effect known as ochronosis. Ochronosis is a permanent grey or blue-black discoloration occurring in very dark-skinned or African American patients after prolonged treatment with an HQ formula (with an HQ concentration) greater than 3%.

Tretinoin

Tretinoin (Retin-A, Renova) is another widely used therapy for Melasma. Tretinoin does have a lightening effect on Melasma and can be used alone or in conjunction with HQ. Tretinoin works by promoting the rapid loss of pigment via increased epidermopoiesis, easing penetration of HQ into the skin, and preventing HQ oxidation..

Kojic Acid

Kojic Acid is derived from a variety of different fungi and organic substances (such as soy and mushrooms). The current belief is that Kojic Acid suppresses free tyrosinase by the chelation of the copper ion. Kojic Acid has been known to cause contact allergies in a small number of people. Kojic Acid has an ester that may be more effective and less irritating than Kojic Acid itself. One therapeutic ester is kojic dipalmitate. The exact mechanism of action of kojic dipalmitate is not known except that it is a tyrosinase inhibitor.

Azelaic Acid

Azelaic Acid is a dicarboxylic acid that is derived from cereal grains such as wheat, rye, and barley. The depigmenting action of Azelaic Acid is related to its inhibition of tyrosinase, the enzyme necessary for melanogenesis. The clinical efficacy of an Azelaic Acid 20% with glycolic

acid 15% cream was compared to a 4% hydroquinone cream. The results revealed equivalent reduction of the pigmentation in both groups, with a slightly greater irritancy rating with the group, which used the combination of the Azelaic Acid and glycolic acid.

Azelaic Acid may take several months to be effective as a depigmenting agent. Hydroquinone should be discontinued after prolonged use due to a plateau of efficacy and to avoid the possibility of ochronosis. Azelaic Acid would make a good alternative to hydroquinone for continued therapy. A small percentage of patients may, however, experience some itching or burning.

Arbutin

Arbutin is an extract of the bearberry plant and is a derivative of hydroquinone. It can inhibit the formation of tyrosinase while also preventing the oxidation of hydroquinone. This is a popular treatment in Japan, where hydroquinone is unavailable.

N-acetyl-4-cysteaminyphenol

N-acetyl-4-cysteaminyphenol is a de-pigmenting agent that acts on functioning melanocytes with minimal side effects. It has shown good results in a 4% formulation, and is more stable and less irritating than hydroquinone. In one study, 75% of the cases showed improvement

Licorice

Licorice also helps inhibit tyrosinase activity and can be used with HQ or tretinoin.

Vitamin C

Vitamin C can be combined with other Melasma treatments for enhanced results. It can fade Melasma from a dark black to light tan while also providing additional protection from the sun. In one study, 55% of the cases showed improvement after 5 months on a 10% formulation.

Mandelic Acid

Mandelic Acid, an Alpha Hydroxy Acid derived from the bitter almond, has been shown to have a lightening effect on Melasma. Its most important aspect is its ability to fade dermal Melasma, which has long been known to be resistant to topical therapies. The majority of Melasma cases are a combination of dermal and epidermal Melasma. The best results are gained on this type of Melasma when Mandelic Acid is combined with a hydroquinone or other bleaching formula. It is also effective when used alone and is a great alternative for those who are sensitive to hydroquinone or for those who hyper-pigment easily.

SunScreens

Sunscreen is the most important factor for the successful treatment of Melasma. Without daily use of opaque sunscreen, treatment will fail. A broad-spectrum formulation with an SPF over 30 plus cover up is adequate. Use sunscreens, which contain PARSOL 1789 or Avobenzone, Zinc Oxide, and/or Titanium Dioxide. Make sure the formula is sweat-proof if you plan on being in the sun for long hours.

Normally, up to two months are required to begin to initiate response, and up to one year to complete the process. Once epidermal Melasma is cleared and is no longer apparent with Wood's lamp examination, the hydroquinone and tretinoin should be discontinued. However, the opaque sunscreen should be continued through at least one summer season to reduce the risk of recurrence. Often, Melasma will slowly resolve following childbirth or upon discontinued use of oral contraceptives.
