DEPIGMENTING TREATMENTS

What Does It Mean to Depigment Hyperchromia?

To depigment hyperchromia means to reduce or eliminate excess pigment in the skin. Hyperchromia refers to darkened spots or areas due to excess melanin. Correcting these spots involves more than just removing pigment — it requires a multifaceted approach addressing the various causes of excess pigment.

The Complexity of Depigmentation

Melanin, the pigment responsible for skin color, is produced by melanocytes through several processes that can be activated or inhibited by different factors. Thus, effective depigmentation requires more than a single treatment or acid. A combination of treatments targeting various pigment production and transfer mechanisms is essential.

Diagnoses of Depigmentation: WOOD LIGHT

- Epidermal Pigmentation

  → Appears enhanced under Wood's light (sharper contrast, darker or bluish tone).

  → Indicates pigment is located in the upper skin layers.

  → Usually responds well to topical treatments.

- Dermal Pigmentation

  → Appears unchanged under Wood's light.

  → Suggests melanin is deposited deeper in the dermis.

  → May be more resistant to superficial treatments.

Mechanisms of Action of Depigmenting Treatments

We will describe some mechanisms usually used for depigmenting treatments:

1. Tyrosine Inhibitors
   It is the key enzyme in the melanin synthesis process. These agents block the action of the enzyme and thus melanin production is reduced.
2. Copper chelating agent
   They block the action of tyrosinase by removing copper from its active site.
3. Inhibitor of melanin transfer to keratinocytes
   They act by preventing the transfer of pigment from melanocyte to keratinocyte.
4. Plasminogen-like effect
   They mimic plasminogen, promoting the degradation of extracellular matrix components and reducing pigmentation.
5. Inhibition of melanosome maduration

They prevent the formation or maturation of melanosomes, which are organelles responsible for melanin storage and transport

To obtain effective depigmenting action, it is necessary to combine several of the above mechanisms.

THE IMPORTANCE OF CELLULAR TURNOVER IN DEPIGMENTATION

Cellular turnover refers to the renewal of skin cells. It is essential in depigmentation because it removes pigmented cells and allows for the emergence of new, even-toned skin. For this reason, exfoliating acids are often combined with depigmenting agents, enhancing the action of the active ingredients by allowing them to penetrate and accelerating melanin elimination.

How exfoliating acids and depigmenting agents work

1. Exfoliating acids:
   - AHAs (Alpha Hydroxy Acids): Water-soluble, work on the surface of the skin.
   - BHAs (Beta Hydroxy Acids): Lipid-soluble, penetrate pores.
   - PHAs (Polyhydroxy Acids): Gentler than AHAs, suitable for sensitive skin.

They help remove the outermost layer of dead skin cells, promoting cell renewal and facilitating the penetration of depigmenting agents.

2. Depigmenting Agents:

2. Direct Depigmenting Agents: These products act directly on melanocytes or on melanin production to reduce hyperpigmentation. Examples include hydroquinone, kojic acid, and vitamin C.
3. Tyrosinase Inhibitors and Other Mechanisms: These compounds prevent melanin formation by interfering with the activity of tyrosinase, a key enzyme in the melanin synthesis.

Combination of Exfoliating Acids and Depigmenting Agents

To achieve effective depigmentation, it is essential to combine exfoliating acids with depigmenting agents in a treatment regimen. Here's how it works:

- In Depigmenting Formulas: It is ideal for depigmenting products to contain an AHA, such as glycolic acid, which not only exfoliates the skin but also allows for better penetration of depigmenting agents into the skin. The combination of these ingredients helps improve the effectiveness of the treatment by ensuring that the depigmenting agents reach the layers of the skin where they act.
- In Treatments: In a professional setting, AHA or BHA treatments can be applied to exfoliate the skin and prepare the area for the application of depigmenting agents. For example, an AHA can be used to exfoliate the skin's surface, and then a specific acid blend can be applied to treat hyperpigmentation. Sequential treatments, including both exfoliation and depigmenting applications, can also be done to achieve better results.

Benefits of the Combination

- Improved Efficiency: Pre-exfoliation facilitates the penetration of depigmenting agents, which enhances their effectiveness in reducing spots.
- Skin Renewal: The combination of exfoliation and depigmentation accelerates cell turnover and helps achieve more even and clearer skin.

Depigmenting Methods

1. Melanosome Dispersers: Retinoids
2. Copper Inhibitors: Kojic Acid and Ascorbic Acid
3. Tyrosinase Inhibitors: Hydroquinone, Arbutin, and Azelaic Acid
4. Inflammation Reducers: Corticosteroids

ACTIVE INGREDIENTS

Hydroquinone

- Competes with tyrosinase for the conversion of an amino acid (dihydroxyphenylalanine) into melanin.
- It is used alone at 2-4% or in combination with other active ingredients that enhance its efficacy.
- Caution is needed on dark skin.
- Beware! Prolonged use can cause: rebound, irritation, or areas of depigmentation.

Alpha Arbutin

- Glycosylated hydroquinone extracted from the bearberry plant.
- Inhibits tyrosinase and prevents melanin formation.
- Has antioxidant properties.
- Concentrations range from 1% to 2%.

Azelaic Acid

- Anti-inflammatory action.
- Inhibits the inflammatory action of UVB.
- Reduces the presence of free radicals.
- Decreases melanin synthesis.
- Bactericidal against *Propionibacterium acnes*.
- Keratolytic action.
- Used at 20%.

Ascorbic Acid (Vitamin C)

Phytic Acid

- Supporting use: 0.5% to 5%, up to 5% in-office. → Obtained from cereals like oats, rice, and wheat germ.
- Anti-inflammatory.
- Potent antioxidant.
- Depigmenting.
- Chelator of iron and copper.
- Tyrosinase inhibitor.
- Anti-aging: hydrates and softens wrinkles.

In terms of scientific evidence, there is a recent study showing significant effectiveness using a 10% glycolic cream with 2% phytic acid for 12 weeks. A minimalist formula but highly effective for PIH (Post-Inflammatory Hyperpigmentation).

Kojic Acid

- Used from 1% to 5%. When used alone at 5%, it can irritate the skin, causing contact dermatitis. If combined with other ingredients, the concentration is reduced to 2-3%. It can be photosensitizing with prolonged use.
- In-office treatments up to 10%.
- Derived from various types of fungi, from rice fermentation.
- Multifunctional depigmenting agent with a reliable molecule.
- Antioxidant.
- Copper chelator.
- Inhibits tyrosinase and prevents the formation of new spots.

Melatonin

- A hormone that regulates the circadian sleep-wake cycle.
- Can be found in the intestines, thyroid, lungs, kidneys, blood, and, of course, in the skin.
- Regulates the synthesis of enzymes that repair oxidative damage, thus stimulating the skin's antioxidant processes.
- Inhibits all steps in melanin synthesis.

Tranexamic Acid

Tranexamic acid is a compound used in the treatment of hyperpigmentation due to its ability to inhibit plasmin, a protein that plays several roles in the body, including coagulation and melanin production.

What is Plasmin?

- **Procoagulant Function:** Plasmin is an enzyme that breaks down blood clots, helping prevent the excessive formation of clots.
- **Melanogenic Function:** In addition to its role in coagulation, plasmin also has an effect on melanin production, the pigment responsible for skin color. It stimulates melanin production by acting on melanocytes, the cells that produce this pigment.

How Tranexamic Acid Works
Tranexamic acid inhibits plasmin, which in turn reduces its influence on melanin production. This can help decrease hyperpigmentation and dark spots on the skin by reducing the activity that leads to excess pigment.

Application Forms and Effectiveness

- **Concentrations and Methods:** Tranexamic acid is used in concentrations of 2% to 5% in topical treatments or microneedling procedures. These treatments can help improve the appearance of spots and hyperpigmentation by reducing excess pigment in the skin.
- **Microneedling vs. Topical Application:** Microneedling is a technique that uses small needles to create microchannels in the skin, improving the penetration of topical treatments. Microneedling can increase the effectiveness of tranexamic acid by 50% compared to topical application alone. This technique allows tranexamic acid to penetrate deeper into the skin and have a more pronounced effect on reducing pigmentation.

Benefits of Tranexamic Acid

- **Reduction of Hyperpigmentation:** By inhibiting plasmin and, therefore, melanin production, tranexamic acid can help lighten dark spots and areas of hyperpigmentation.
- **Improvement in Skin Texture:** In combination with techniques like microneedling, tranexamic acid can improve the overall texture and tone of the skin.

Retinoids
Retinoids are derivatives of vitamin A that are widely used in skincare, especially in the treatment of pigmentation and other dermatological issues. Their main features are:

1. **Generation of Melanin Granule Dispersion:** Retinoids help disperse melanin granules, which are the small particles responsible for skin color. By promoting a more even distribution of melanin, retinoids can help reduce dark spots and hyperpigmentation.
2. **Keratolytic Effect: Epidermal Renewal:** Retinoids have a keratolytic effect, meaning they help remove dead skin cells from the surface. This facilitates epidermal renewal, promoting the regeneration of a new, more even skin layer with less pigmentation.
3. **Stimulation of Angiogenesis:** Angiogenesis is the formation of new blood vessels. Retinoids can stimulate this process, improving circulation in the skin. Better circulation can contribute to healthier and more vibrant skin.
4. **Stimulation of New Dermal Collagen Formation:** Retinoids promote the formation of new collagen in the dermis, especially types I and III, through the activation of genes that regulate this production. Collagen is essential for keeping the skin firm, elastic, and resilient, which helps reduce the appearance of wrinkles and spots.

5. **Inhibition of Metalloproteinase 3:** Metalloproteinase 3 (MMP-3) is an enzyme that breaks down collagen. Retinoids inhibit this enzyme, helping preserve collagen in the skin and maintain its structure and firmness.
6. **Prevention of UV-Induced Lesions:** Although retinoids do not replace sunscreen, they can help improve the skin's resistance to sun damage. By promoting cellular renewal and improving skin texture, retinoids contribute to better protection against the harmful effects of ultraviolet radiation

REMEMBER: Most macules cannot be completely eradicated; they can only be improved until they become nearly imperceptible. For example, melasma is considered a disease of the melanocyte, meaning that hyperpigmentation is practically chronic. Some types of melasma appear after an injury; for us, they are considered a “scar” that is impossible to fully eliminate and very difficult to even improve in color.

In these cases, the pigment is deposited in the dermis, which limits us as cosmetologists, since we cannot work at that level. This is why it is essential to properly combine different depigmenting approaches in order to make the pigmentation less visible to the naked eye.

It is a LONG process that requires lifelong commitment from the patient. As we’ve seen, the spot is not removed — it is merely "put to sleep." Therefore, the patient must not neglect care.

Sun protection is essential, and it is always more effective if it is 100% physical (mineral).

TREATMENT PROTOCOL

The idea behind creating this protocol is to address three key aspects. In general, it’s best to start with peeling treatments to deeply renew the skin, and then focus on treating pigmentation with depigmenting agents.

SESSIONS

Make sure to clearly explain to the patient that this type of treatment is VERY long and requires CONSISTENCY. Without that, the results will not be optimal