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Efficacy of Melasyl (2-Mercaptonicotinoyl glycine) and Niacinamide (MELA B3) in Treating Hyperpigmentation Disorders: A Case Series

Héctor Ricardo Galván Garcia*

Medical Dermoquirúrgica gg ® Hospital. López Cotilla 2261 CP 44130 Guadalajara Jalisco, México

***Corresponding author:** Garcia HRG, Medical Dermoquirúrgica gg ® Hospital. López Cotilla 2261 CP 44130 Guadalajara Jalisco, México, Tel: 01 (33) 36304556; E-mail: doctorricardogalvan@hotmail.com

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Abstract

Background: Thousands of people in latín America suffer from melasma, solar lentigines and fotodamage.

Aims: Melasyl is and effective in treatment melasma, solar lentigines and fotodamage.

Patients and Methods: 73 patients with diagnostic of Melasma, solar lentigines and fotodamage were included and examined with a dermatoscope Dermlite and dermatoscope fotofinder Medicam 800HD and camera Antera 3D Miravex were treated for 12 weeks with melasyl.

Results: We found a total of 73 patients with diagnosis of melasma, solar lentigines and fotodamage. After 12 weeks the result was: 8.17% at 4 weeks, -12.65% at 6 weeks, -11.15% at 8 weeks, -8.63%.

Conclusion: Melasyl is a reliable treatment that is optimal for managing various facial pigmentations caused by the sun and the passage of time.

1. Introduction

1.1 Brief overview of hyperpigmentation disorders (melasma, solar lentigos, post-inflammatory hyperpigmentation).

Hyperpigmentation Disorders: An Overview.

Hyperpigmentation refers to the darkening of skin caused by an increase in melanin production. Melanin is the pigment responsible for skin, hair, and eye color. Several factors can trigger this overproduction, leading to various hyperpigmentation disorders. The most common include melasma, solar lentigos (sunspots), and post-inflammatory hyperpigmentation (PIH).

A. Melasma

Melasma is a common acquired hypermelanosis characterized by symmetrical, hyperpigmented macules and patches, primarily on sun-exposed areas of the face, such as the cheeks, forehead, upper lip, and chin. It predominantly affects women, particularly during their reproductive years [1].

Etiology: The exact cause of melasma is not fully understood, but it is believed to be multifactorial. Key contributing factors include:
Hormonal Influences: Pregnancy, oral contraceptives, and hormone replacement therapy are strongly associated with melasma. Estrogen and progesterone are thought to stimulate melanogenesis [2].

Sun Exposure: Ultraviolet (UV) radiation from the sun is a major trigger and exacerbating factor. UV exposure stimulates melanocytes to produce more melanin.

Genetics: There is a genetic predisposition to melasma, with a higher prevalence among individuals with a family history of the condition [3].

Other Factors: Thyroid dysfunction and certain medications may also play a role.

Clinical Presentation: Melasma presents as irregular, well-defined, brown or gray-brown patches. The patterns are typically centrofacial (forehead, nose, cheeks), malar (cheeks), or mandibular (jawline).

Diagnosis: Diagnosis is usually clinical, based on the characteristic appearance and distribution of the lesions. A Wood's lamp examination can help to assess the depth of the pigment (epidermal vs. dermal) [4].

Treatment: Melasma treatment is often challenging and requires a multi-faceted approach. Common treatments include:
Topical Agents: Hydroquinone (a melanin synthesis inhibitor), retinoids (to promote skin cell turnover), corticosteroids (to reduce inflammation), azelaic acid, and kojic acid.

Chemical Peels: Glycolic acid, salicylic acid, and other chemical peels can help to exfoliate the skin and reduce hyperpigmentation.

Laser and Light Therapies: Q-switched lasers, fractional lasers, and intense pulsed light (IPL) can target melanin and reduce pigmentation. However, these treatments carry a risk of post-inflammatory hyperpigmentation.

Sun Protection: Strict sun avoidance and the daily use of broad-spectrum sunscreen with a high SPF are crucial for preventing melasma and maintaining treatment results.

B. Solar Lentigos (Sunspots)

Solar lentigos, also known as sunspots, liver spots, or age spots, are small, well-defined, hyperpigmented macules that appear on sun-exposed areas of the skin, such as the face, hands, arms, and upper back. They are a sign of cumulative sun damage [5].

Etiology: Solar lentigos are caused by chronic exposure to UV radiation from the sun. UV radiation stimulates melanocytes to produce more melanin, leading to localized areas of hyperpigmentation.

Clinical Presentation: Solar lentigos are typically round or oval, flat, brown or black spots with well-defined borders. They vary in size from a few millimeters to several centimeters.

Diagnosis: Diagnosis is usually clinical, based on the appearance and location of the lesions. Dermoscopy can be helpful in differentiating solar lentigos from other pigmented lesions, such as melanomas.

Treatment: Treatment options for solar lentigos include:
Topical Agents: Hydroquinone, retinoids, azelaic acid, and kojic acid can help to lighten the spots.

Cryotherapy: Freezing the lesions with liquid nitrogen can destroy the pigmented cells.

Laser and Light Therapies: Q-switched lasers, pulsed dye lasers, and IPL can effectively target and remove solar lentigos.

Chemical Peels: Similar to melasma, chemical peels can exfoliate the skin and reduce hyperpigmentation.

Sun Protection: Preventing new solar lentigos requires strict sun protection, including sunscreen, protective clothing, and avoiding peak sun hours.

C. Post-Inflammatory Hyperpigmentation (PIH)

Post-inflammatory hyperpigmentation (PIH) is a common acquired hypermelanosis that occurs following cutaneous inflammation or injury. It results from the increased production and deposition of melanin in the skin as part of the healing process [6].

Etiology: PIH can be triggered by a variety of inflammatory skin conditions, including:

Acne: PIH is a common sequela of acne, particularly inflammatory acne lesions.

Eczema: Eczema flare-ups can lead to PIH, especially in darker skin types.
Psoriasis: Psoriatic lesions can leave behind areas of hyperpigmentation.

Trauma: Cuts, burns, insect bites, and other injuries can cause PIH.

Cosmetic Procedures: Laser treatments, chemical peels, and other cosmetic procedures can sometimes result in PIH, particularly if not performed correctly or if the skin is not properly protected afterward [7].

Clinical Presentation: PIH presents as flat, hyperpigmented macules or patches that correspond to the site of the preceding inflammation or injury. The color can range from light brown to dark brown or even black, depending on the individual's skin type and the depth of the pigment.

Diagnosis: Diagnosis is usually clinical, based on the history of inflammation or injury and the appearance of the hyperpigmented lesions.

Treatment: Treatment of PIH aims to reduce melanin production and promote skin cell turnover. Common treatments include: Topical Agents: Hydroquinone, retinoids, azelaic acid, kojic acid, vitamin C, and niacinamide.

Chemical Peels: Mild chemical peels, such as glycolic acid or salicylic acid peels, can help to exfoliate the skin and fade PIH.

Laser and Light Therapies: Q-switched lasers and fractional lasers can be used to target melanin and reduce PIH, but caution is needed to avoid further inflammation.

Sun Protection: Sun protection is essential to prevent PIH from worsening and to protect the treated skin.

1.2 The impact of hyperpigmentation on quality of life

Hyperpigmentation, characterized by patches of skin that are darker than the surrounding areas, is a common dermatological condition that affects individuals of all ages, genders, and ethnicities. While often medically benign, the psychological and social impact of hyperpigmentation can be significant, leading to a diminished quality of life for many sufferers. This impact stems from a complex interplay of factors, including societal beauty standards, self-perception, and the perceived stigma associated with visible skin conditions.

1.2.1 Psychological impact

One of the most significant consequences of hyperpigmentation is its effect on mental well-being. Individuals with noticeable hyperpigmentation, particularly on the face, neck, or hands, often experience:

Reduced Self-Esteem and Confidence: The presence of dark spots or patches can lead to feelings of self-consciousness and shame. Individuals may feel unattractive or flawed, leading to a decline in self-esteem and a reluctance to engage in social activities. They may constantly worry about how their skin looks and how others perceive them [8].

Anxiety and Depression: The chronic nature of hyperpigmentation and the difficulty in treating it can contribute to feelings of anxiety and depression. Individuals may feel helpless and hopeless about their condition, leading to a negative impact on their

overall mood and mental health. Social anxiety, specifically, can be exacerbated by the fear of being judged or ridiculed for their skin.

Body Image Issues: Hyperpigmentation can distort an individual's perception of their own body image. They may become overly critical of their appearance and develop a negative self-image. This can lead to unhealthy behaviors, such as excessive use of makeup to conceal the condition or avoidance of social situations where their skin is visible.

Emotional Distress: The visibility of hyperpigmentation can trigger a range of negative emotions, including frustration, embarrassment, and anger. Individuals may feel frustrated by the lack of effective treatments or embarrassed by the attention their skin condition attracts. This emotional distress can further contribute to a decline in their overall quality of life [9].

1.2.2 Social impact

The social consequences of hyperpigmentation can be equally profound. Individuals with visible hyperpigmentation may experience:

Social Stigma and Discrimination: In some cultures, hyperpigmentation is associated with negative stereotypes or perceived as a sign of poor hygiene or illness. This can lead to social stigma and discrimination, affecting an individual's opportunities in education, employment, and social relationships.

Avoidance of Social Activities: Self-consciousness about their skin can lead individuals to avoid social gatherings, public places, and even intimate relationships. This social isolation can further exacerbate feelings of loneliness, anxiety, and depression.

Difficulties in Interpersonal Relationships: The emotional distress and self-consciousness associated with hyperpigmentation can strain interpersonal relationships. Individuals may become withdrawn or irritable, leading to conflicts with family members, friends, and romantic partners.

Impact on Professional Life: In certain professions where appearance is highly valued, hyperpigmentation can negatively impact career opportunities. Individuals may feel discriminated against or overlooked for promotions due to their skin condition. This can lead to financial stress and a sense of professional inadequacy [10].

1.2.3 Cultural considerations

The impact of hyperpigmentation on quality of life can vary across different cultures. In some cultures, fair skin is highly valued, and hyperpigmentation is seen as undesirable. This can lead to greater social stigma and discrimination for individuals with hyperpigmentation in these cultures. Conversely, in other cultures, hyperpigmentation may be more accepted or even considered a sign of beauty.

2. Conclusion

Hyperpigmentation, while often a cosmetic concern, can have a significant and far-reaching impact on an individual's quality of life. The psychological and social consequences of this condition can lead to reduced self-esteem, anxiety, depression, social isolation, and difficulties in interpersonal relationships. Understanding the multifaceted impact of hyperpigmentation is crucial for healthcare professionals to provide comprehensive and compassionate care to individuals affected by this condition. This includes not only addressing the physical aspects of hyperpigmentation but also providing psychological support and counseling to help individuals cope with the emotional and social challenges they face. Further research is needed to develop more effective treatments for hyperpigmentation and to address the social stigma associated with this condition.

Traditional treatments like hydroquinone and their limitations (adverse effects such as ochronosis and confetti-like depigmentation).

2.1 Hydroquinone: a traditional treatment

Hydroquinone is a topical depigmenting agent that works by inhibiting tyrosinase, a key enzyme involved in melanin synthesis. By reducing tyrosinase activity, hydroquinone effectively decreases melanin production, leading to a lightening of the treated areas [11]. It's available in various concentrations, ranging from over-the-counter (OTC) formulations (typically 2% or less) to prescription-strength options (4% or higher). Hydroquinone is often used to treat melasma, solar lentigines (sunspots), and post-inflammatory hyperpigmentation [12].

2.2 Limitations and adverse effects of Hydroquinone

Despite its efficacy, hydroquinone is associated with several limitations and potential adverse effects, which have led to increased scrutiny and restrictions in some regions [13].

1. Irritation and Inflammation: Hydroquinone can cause skin irritation, redness, burning, stinging, and dryness, especially at higher concentrations. This irritation can exacerbate the underlying hyperpigmentation in some cases, leading to a paradoxical worsening of the condition.

2. Ochronosis: One of the most concerning adverse effects of long-term or high-concentration hydroquinone use is exogenous ochronosis. This condition is characterized by a blue-black or gray-brown discoloration of the skin, primarily in the areas where hydroquinone has been applied. Ochronosis is thought to result from the accumulation of homogentisic acid, a byproduct of tyrosine metabolism, in the dermis. It is more common in individuals with darker skin tones and is often irreversible [14].

3. Confetti-like Depigmentation (Leukoderma guttata): Prolonged or excessive use of hydroquinone can sometimes lead to confetti-like depigmentation, also known as leukoderma guttata. This condition presents as small, scattered, white spots on the skin, resembling confetti. It occurs due to the destruction of melanocytes (melanin-producing cells) in the treated areas.

4. Post-Inflammatory Hyperpigmentation (PIH): While hydroquinone is used to treat PIH, the irritation it causes can paradoxically trigger or worsen PIH, especially in individuals with darker skin tones. This is because inflammation stimulates melanocyte activity.

5. Rebound Hyperpigmentation: Upon discontinuation of hydroquinone, some individuals experience a rebound effect, where the hyperpigmentation returns, sometimes even more intensely than before. This is thought to be due to the reactivation of tyrosinase and increased melanin production.

6. Concerns about Carcinogenicity: Although the evidence is not conclusive, there have been some concerns raised about the potential carcinogenicity of hydroquinone, particularly with oral administration in animal studies. This has led to stricter regulations and restrictions on its use in some countries.

7. Poor Stability: Hydroquinone is prone to oxidation and degradation when exposed to air, light, and heat. This can reduce its efficacy and increase the risk of irritation. Formulations containing hydroquinone often include antioxidants and stabilizers to improve its stability.

3. Conclusion

Hydroquinone remains a widely used treatment for hyperpigmentation due to its effectiveness in reducing melanin production. However, its potential adverse effects, including irritation, ochronosis, confetti-like depigmentation, and rebound hyperpigmentation, necessitate careful consideration and monitoring. Patients should be educated about the risks and benefits of hydroquinone, and alternative treatments should be explored, especially for long-term management of hyperpigmentation. Furthermore, the use of broad-spectrum sunscreen is crucial to prevent further hyperpigmentation and minimize the risk of adverse effects.

- Introduce the need for alternative treatments.
- Introduce Melasyl as a novel depigmenting agent with a unique mechanism of action [15].
- Mention the combination of Melasyl with Niacinamide (MELA B3).

4. Hypothesis

Melasyl combined with Niacinamide (MELA B3) is a safe and effective treatment for various hyperpigmentation disorders, offering superior results compared to traditional treatments like hydroquinone and other depigmenting agents.

5. Materials and Methods

5.1 Study design

- A combination of a comparative study and a case series.
- The comparative study involved a cosme-clinical evaluation.
- The case series presents individual cases of patients treated with Melasyl and Niacinamide (MELA B3).

5.2 Participants

- 73 women aged 32-60 years.
- Phototypes I-VI.
- All skin types.
- 54.7% presented with persistent spots.

5.3 Intervention

- Twice-daily application of Melasyl and Niacinamide (MELA B3 cream or serum) on a clean, dry face.
- In the morning, followed by Face Broad Spectrum SPF 30.
- At night, followed by Melasyl and Niacinamide (MELA B3 cream or serum)

5.4 Evaluation

- Clinical evaluation after 4, 8, 12 weeks.
- Self-assessment after Timm,2, 4, 6, 8, 12 weeks.

5.5 Case series

- Description of individual patients with melasma, photodamage, and solar lentigos.
- Treatment regimen: Melasyl and Niacinamide (MELA B3) cream and serum, combined with sunblock.
- Photographic documentation before and after treatment (camera Antera 3D Miravex).
- Dermatoscopic evaluation (dermatoscope Dermlite and dermatoscope fotofinder Medicam 800HD).

6. Results

6.1 Study

- Significant reduction in dark spot intensity and visibility.
- Intensity: -8.17% at 4 weeks, -12.65% at 6 weeks, -11.15% at 8 weeks, -8.63% at 12 weeks (remanence).
- Visibility: -8.59% at 4 weeks, -14.58% at 6 weeks, -12.61% at 8 weeks, -9.41% at 12 weeks (remanence).
- Melasyl and Niacinamide (MELA B3) serum showed faster and superior efficacy in treating PIH compared to a reference tyrosinase inhibitor.

6.2 Case series

- Presentation of clinical cases with before-and-after photos.
- Description of the improvement in melasma, photodamage, and solar lentigos.
- Dermatoscopic findings.

7. Cases

7.1 Patient n.1

48-year-old female patient with chronic melasma pigment of 10 years duration, who has been multitreatment with different medications and depigments agents.

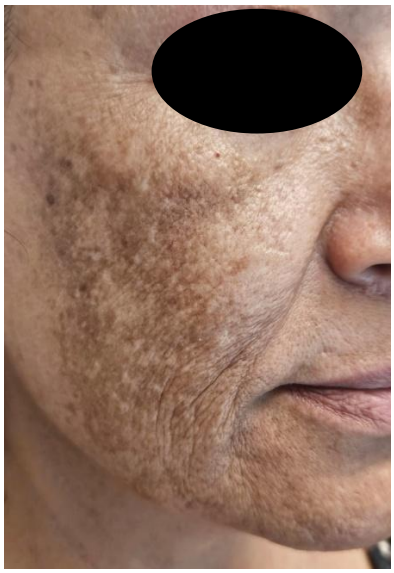

FIG. 1. **Patient N.1 initial pigment melasma.**

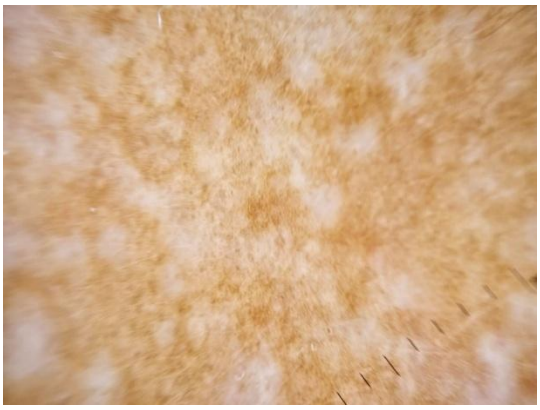

FIG. 2. **Patient N. 1 Dermatoscopy initial perifollicular pigment.**

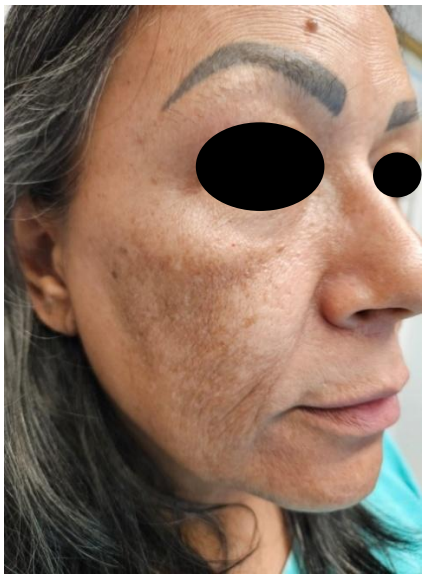

FIG. 3. **Patient 1. 12 Weeks post treatment decrease in facial pigment and improvement in facial luminosity.**

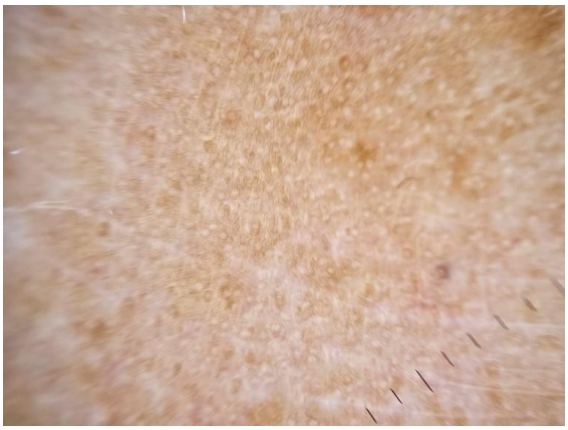

FIG. 4. **Patient N. 1. Dermatoscopy post treatment decrease in perifollicular pigment.**

7.2 Patient n.2

34-year-old female patient presents with pigmentary melasma of 4 years duration, which has been treated with different topical depigmenting agents without improvement.

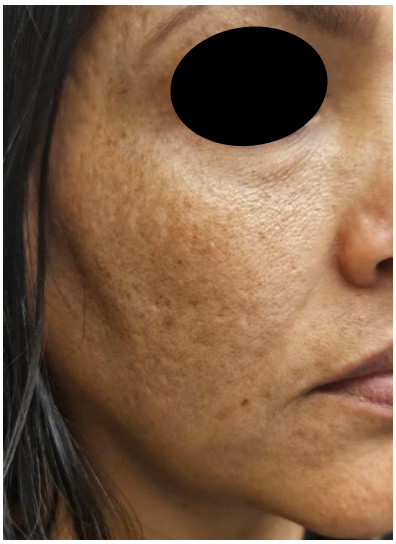

FIG. 5. **Patient N. 2. Initial pigment melasma.**

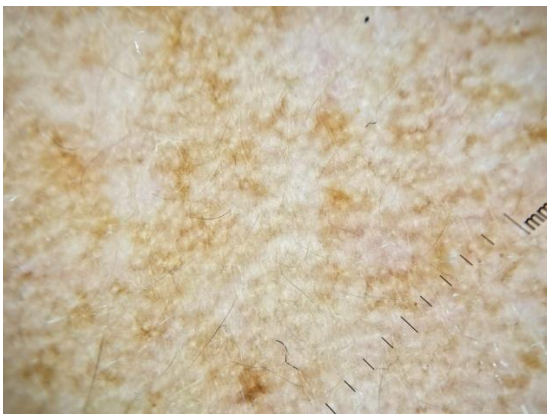

FIG. 6. **Patient N. 2 Dermatoscopy Inicial perifollicular pigment.**

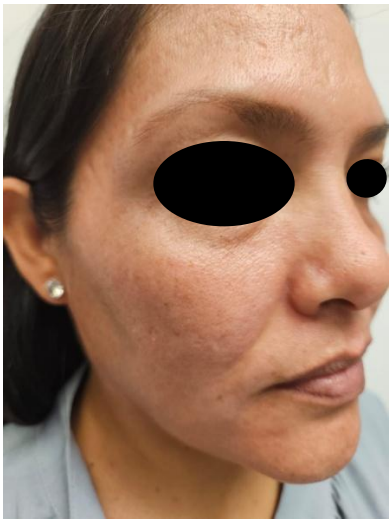

FIG. 7. **Patient N. 2. 12 Weeks post treatment decrease in facial pigment and improvement in facial luminosity.**

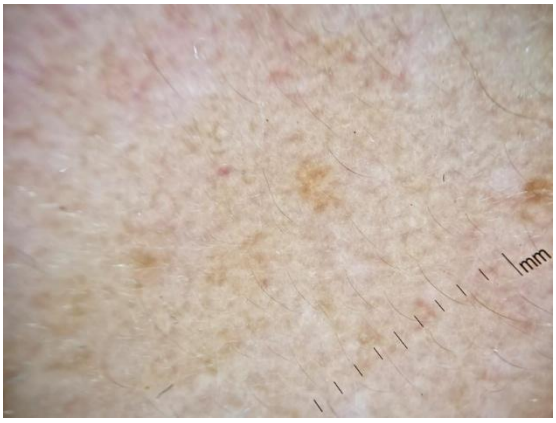

FIG. 8. **Patient N.2. Dermatoscopy post treatment decrease in perifollicular pigment.**

7.3 Patient n.3

56-year-old female patient comes in for chronic pigmentary melasma and lesions that ,upon evaluation dermatoscopy, are consistent with Ochronosis with hidroquinona.

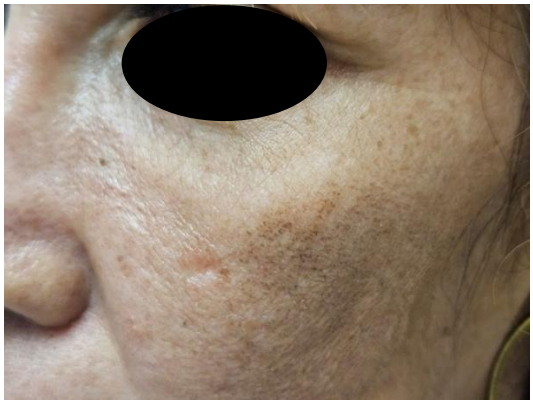

FIG. 9. **Patient 3. Initial melasma pigmentary and Ochronosis with hidroquinona, malar area.**

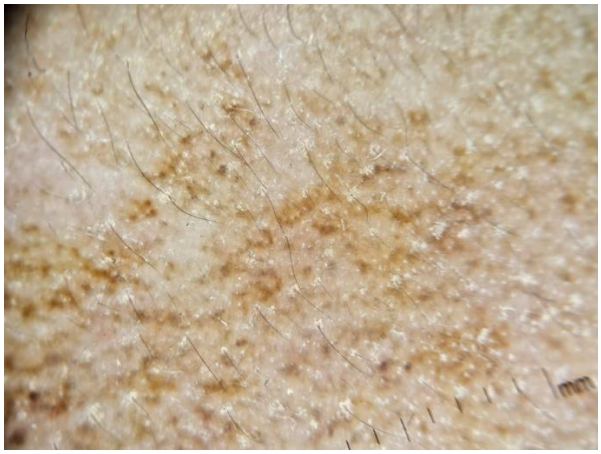

FIG. 10. **Patient N.3 Dermatoscopy: Crescent moon images for hidroquinona.**

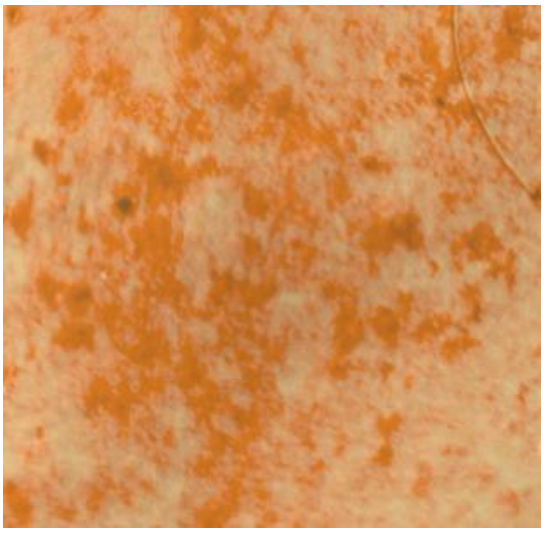

FIG. 11. **Patient N 3. Camera Antera 3D recalcitrant pigment and Ochronosis.**

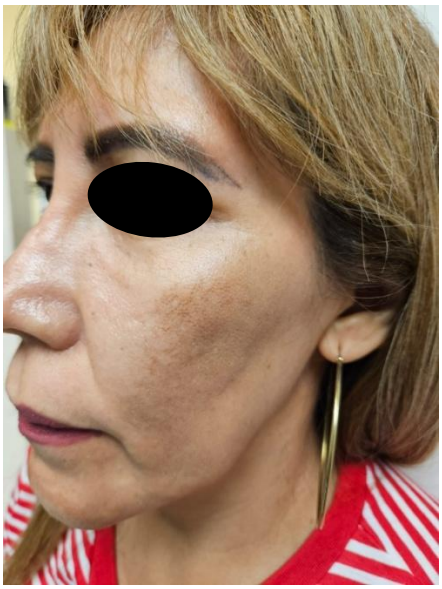

FIG. 12. **Patient 3. 12 Weeks post treatment decrease in facial pigment, only Ochronosis residual.**

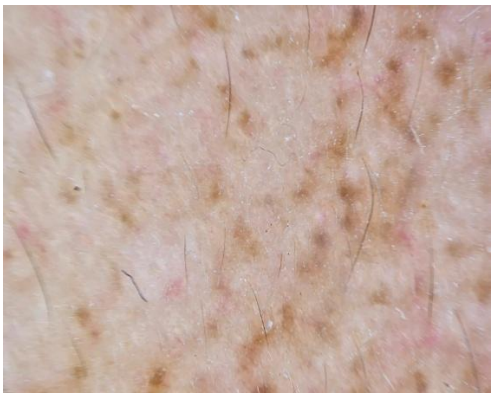

FIG. 13. **Patient 3. Dermatoscopy post treatment decrease in perifollicular pigment, and persist crescent moon images for hidroquinona.**

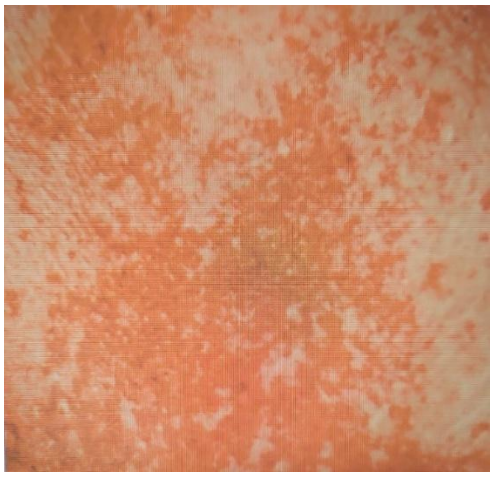

FIG. 14. **Patient N. 3. Camera Antera 3D a decrease in recalcitrant Pigment and Ochronosis residual.**

7.4 Patient n.4

72-year-old patient who comes for photodamage and solar lentigines.

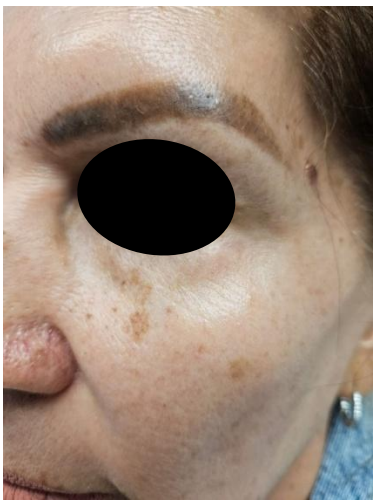

FIG. 15. **Patient 4. Inicial solar lentigines.**

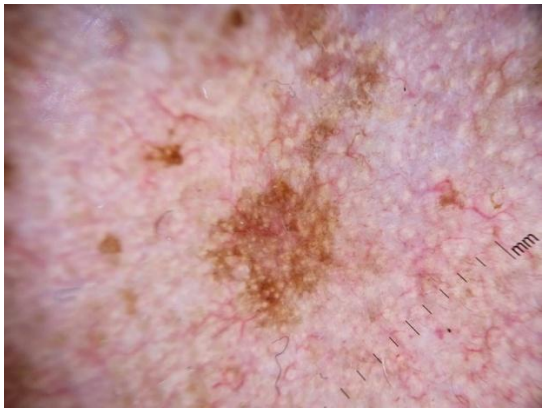

FIG. 16. **Patient 4. Dermatoscopy solar lentigines.**

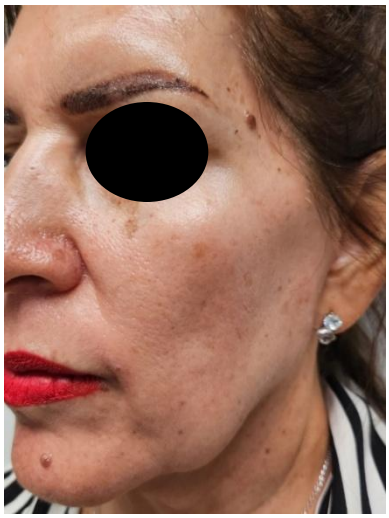

FIG. 17. **Patient 4. 12 Weeks post treatment solar lentigines.**

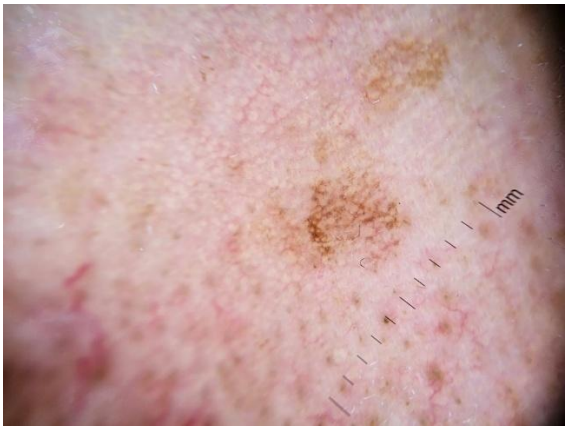

FIG. 18. **Patient 4. Dermatoscopy post treatment solar lentigines. See the decrease in the amount of solar lentigo pigment.**

7.5 Patient n.5

55-year-old female patient with photodamage and pigmentary melasma of one year's duration.

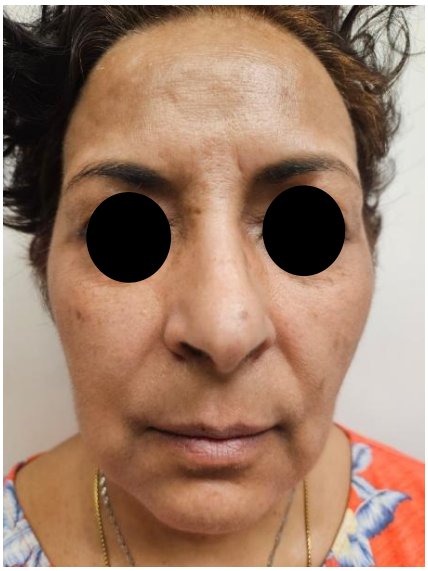

FIG. 19. **Patient N.5 Initial melasma pigmentary and photodamage, frontal and malar area.**

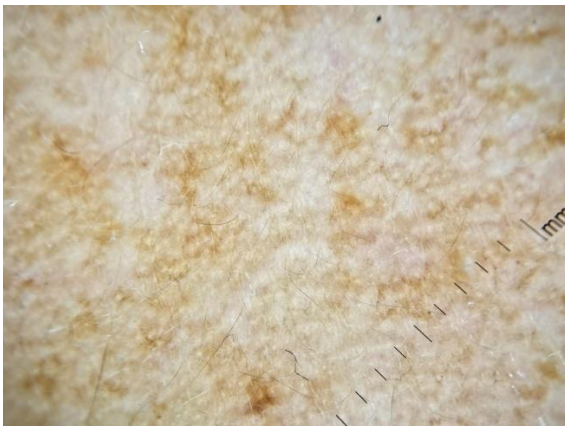

FIG. 20. **Patient N. 5 Dermatoscopy inicial perifollicular pigment.**

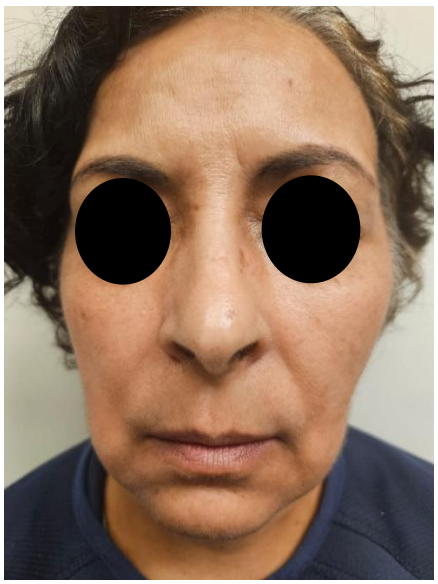

FIG. 21. **Patient N. 5, 12 Weeks post treatment decrease in facial pigment and improvement in facial luminosity.**

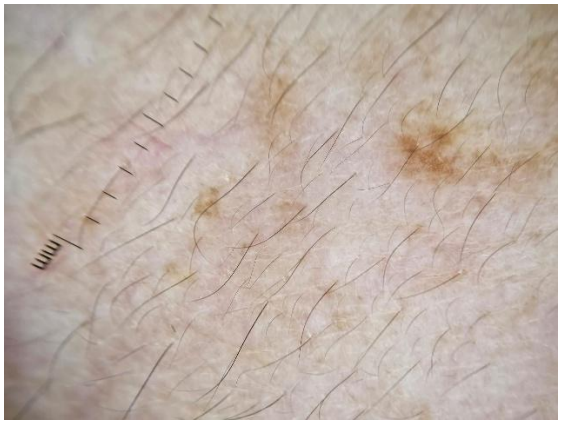

FIG. 22. **Patient 5. Dermatoscopy post treatment decrease in perifollicular pigment.**

8. Discussion

- Discuss the mechanism of action of Melasyl: capturing intermediate products of melanogenesis (DOPAquinone, DHI, and DHICA).
- Explain how Melasyl prevents the integration of intermediates into eumelanin and pheomelanin.
- Compare the efficacy of Melasyl and Niacinamide (MELA B3) to other depigmenting agents.
- Discuss the safety profile of Melasyl and Niacinamide (MELA B3).
- Address the limitations of the study.

9. Conclusion

- Melasyl and Niacinamide (MELA B3) is an effective and well-tolerated treatment for hyperpigmentation disorders.
- It offers a promising alternative to traditional treatments like hydroquinone, with a potentially lower risk of adverse effects.
- Further studies with larger sample sizes and longer follow-up periods are warranted.

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11. Conflicts of Interest

There are no conflicts of interest.

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