ScieniQ Publishers

Archives of Clinical Case Studies and Case Reports

Research Article

EFFICACY AND SAFETY OF MELINE® TREAT MENTS IN PATIENTS WITH PERIOCULAR HYPERPIGMENTATION

Víctor Garcia[1], Sharon Cimolino[2], Loren Prevete[2], Gladys Velazco[3]

[1]Foundation Center for Aesthetic Medicine Studies. Caracas, Venezuela.
[2]Melanina Center Clinic. Caracas, Venezuela
[3]Latín American Center for Medical Training and Research (CLEMI). Bogotá, Colombia

***Corresponding author**
Gladys Velazco, PhD. La Caro-Tocancipa, Sopo, Cundinamarca, Colombia

Received: 07 November 2025
Accepted: 14 November 2025
Published: 20 November 2025

Abstract

This study evaluated the efficacy and safety of MeLine® treatments in patients with periocular hyperpigmentation, a condition that affects quality of life by altering aesthetic perception. A prospective, observational, and quantitative study was conducted, analyzing 52 patients between January 2023 and March 2024. Inclusion criteria considered adults aged 25 to 45 years with no recent treatments for dark circles. The treatment included microexfoliation with Kojic Acid, Gingko Biloba Extract, Tranexamic Acid, Lactobionic Acid, Ruscus Aculeatus, Troxerutin, and Melilotus Officinalis.

Results showed that 92% of patients reported combined benefits such as brighter skin and reduction of wrinkles. Although 30% experienced adverse effects, these were manageable. A significant correlation was found between satisfaction with the lightening of dark circles and other perceived benefits, including improvements in skin texture. Despite the high cost of treatment, patients showed high levels of overall satisfaction and willingness to recommend it.

Treatment with MeLine® proved to be an effective option for periocular hyperpigmentation, yielding positive aesthetic and psychological results. However, further research is recommended to validate its use in different dermatological contexts.

Keywords: periocular hyperpigmentation, MeLine®, aesthetic treatment, patient satisfaction, therapeutic efficacy

Introduction

Dark circles are dark circles that appear on the lower and upper eyelids. They are one of the most common aesthetic concerns, as many people are affected by them and seek cosmetic medicine consultations to have them evaluated and treated in order to improve the aesthetic appearance of their eyelids [1].

It should be noted that, although this problem does not cause specific morbidity, it is a significant concern in the aesthetic sphere, potentially reducing a person's quality of life due to a misperception of themselves. In line with this, it is necessary to recognize that physical appearance can even interfere with an individual's interpersonal relationships, affecting the psychosocial aspect of health, as it makes others perceive the affected person as dull and tired, which is not the cause of this problem [2,3].

In recent years, research has been conducted to improve the treatment these patients receive, focusing on their pathophysiology, etiology, and possible risk factors that could contribute to the appearance of dark circles and their possible implications. In this regard, it should be noted that the mechanism by which they occur may be linked, as some researchers have suggested, to stasis and hyperpigmentation of the eyelids. However, this is not currently the only pathophysiological mechanism being discussed; a possible association with the dermal thickness of the lower eyelid skin has also been noted, as can be seen in Figure 1, where the dissection of the eyelid skin shows us a variable thickness across its length, which contributes to the appearance that we already know, depending on the type [4].

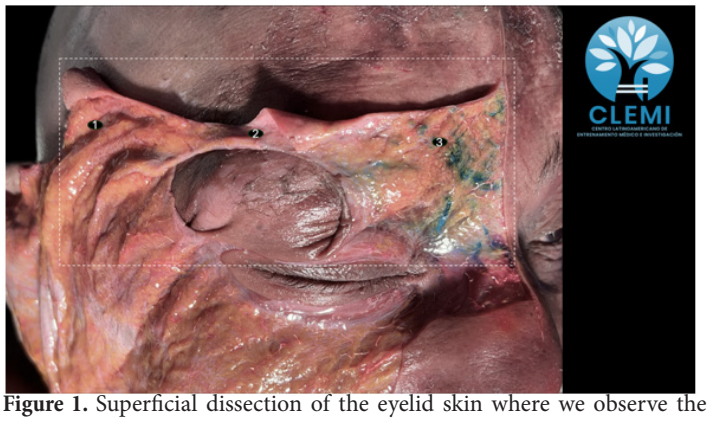

Figure 1. Superficial dissection of the eyelid skin where we observe the thickness of segment 1 in transverse extension. It gives us an external lateral view of the skin, segment 2. The central portion and segment 3, the internal canthal portion, showing the thickness of the skin and the very scarce presence of the Retináculoa Cutis. Dissection performed at the CLEMI Medical Training and Research Center in Bogotá, Colombia.

The histological characteristics of dark circles under the eyes are deter-

mined by infraorbital darkening. This is why some researchers believe that the etiology is due to multiple factors that coexist and interact with each other to give dark circles their characteristic appearance. These factors may include: dermal melanin deposition, post-inflammatory hyperpigmentation secondary to atopic or allergic contact dermatitis, periorbital edema, the superficial location of the vasculature that supplies this area, and shading due to skin laxity [4-6].

In general, it can be said that these circles under the eyes are characterized by bilateral, round, and homogeneous pigmented macules in the infraorbital regions. 4 The known types of dark circles, which are essential for their diagnosis and effective treatment, are as follows:

- Pigmented Dark Circles: Pigmented dark circles are characterized by an increase in melanin in the skin of the eyelids, resulting in a dark tone in this area. This type of dark circle may be more noticeable in people with lighter skin and may be related to genetic factors, sun exposure, hormonal changes, or conditions such as recurrent eczema. Hyperpigmentation can lead to a tired and aged appearance [7]
- Vascular Dark Circles: Vascular dark circles are the result of dilated blood vessels in the eyelid area, causing a blue, pink, or purple color in this area. This type of dark circle is more visible due to the thinness of the skin in the periorbital region. Factors such as fatigue, stress, and circulatory problems can contribute to the appearance of vascular dark circles, creating a tired look [7].
- Structural Dark Circles: Structural dark circles are caused by changes in facial structure, such as loss of fat and collagen in the infraorbital area. They manifest as visible hollows or grooves, known as sunken dark circles, and there may be sagging that leads to the formation of bags. This type of dark circle usually appears with natural aging and is influenced by genetic factors and changes in skin elasticity, which can affect the overall appearance of the face [8].
- Mixed Dark Circles: Mixed dark circles have characteristics of different types of dark circles, combining elements of pigmented, vascular, and structural dark circles. This type of dark circle can show dark coloring along with hollows or grooves, resulting in a tired and aged appearance. The causes of mixed dark circles are multiple, including genetics, lifestyle, stress, and aging, requiring a treatment approach that addresses several factors simultaneously [8].

With regard to treatment, it is worth mentioning the study conducted by [1], which explored the efficacy of vitamin C in the treatment of dark circles through a clinical trial. This study included 14 participants who applied a 10% sodium ascorbate or ascorbic acid glucoside lotion to half of their face, with the opposite side as a control, for a period of six months. These findings suggest that vitamin C (in the form of sodium ascorbate) can improve dark circles by increasing the thickness of the eyelid dermis and concealing dark coloring due to blood congestion.

Another noteworthy study is that of [9], which aimed to determine the effectiveness of a gel containing 2% phytonadione and 0.1% vitamins C and E in reducing dark circles and wrinkles in healthy Japanese adults. Fifty-seven Japanese adult volunteers with dark circles and wrinkles were included in an open-label study. For this research, the formulated gel was applied twice a day to the lower eyelid area for eight weeks. The conclusions found that the topical gel containing 2% phytonadione, 0.1% retinol, 0.1% vitamin C, and 0.1% vitamin E was effective in reducing dark circles, especially in cases of hemostasis, during a short treatment period in healthy Japanese adults. In addition, a slight decrease in wrinkles was observed.

The research conducted by [10], addressed periorbital hyperpigmentation, a commonly encountered condition. In this case, several treatments were described, including topical depigmenting agents such as hydroquinone, kojic acid, azelaic acid, and retinoic acid, as well as physical therapies such as chemical peels, surgical corrections, and laser therapy. Most of these treatments have already been scientifically proven for melasma, another common hyperpigmentation condition that occurs on the face. Therefore, the goal of treatment should be to identify and treat the primary cause of hyperpigmentation, as well as its contributing factors.

The study conducted by [11], addresses the challenge posed by the treatment of similar bilateral acquired macules in the field of cosmetic dermatology. Among the available therapeutic options, Alexandrite lasers have proven effective in lightening these pigmented lesions, with the Q-switched Alexandrite laser (QSAL) being a commonly used option for the treatment of acquired bilateral macules similar to Nevus of Ota (Acquired Bilateral Nevus of Ota-like Macules, ABNOM). However, with the emergence of new technologies, such as the picosecond Alexandrite laser (PSAL), the authors raised the possibility of obtaining improved results in pigmentary disorders. In this case, the study findings would suggest that PSAL offers better clinical results and greater safety in the treatment of ABNOM compared to QSAL. This would be an appropriate option for the treatment of dark circles in patients who meet the criteria for receiving this laser application.

On the other hand, the study conducted by [12], focuses on how aging leaves its mark on the infraorbital region of the human face, manifesting itself through the development of tear troughs and the presence of dark circles and bags under the eyes. These aesthetic changes are not only visible but can also generate significant emotional distress for those who experience them, which can translate into an increase in consultations in search of solutions. This study concludes that a thorough understanding of the anatomical and aesthetic changes associated with aging in the infraorbital region is essential for accurate assessment and selection of appropriate treatment for each patient. This reflects the importance of providing adequate care for dark circles under the eyes to reduce their potential implications, especially considering the possible treatments that can be applied to them.

Taking this into consideration, this study is based on the premise of understanding all these determining factors in order to evaluate a treatment for dark circles based on the use of MeLine®.

As for the contributions that this research would consequently make, it is assumed that it will offer theoretical, methodological, and healthcare contributions. The theoretical aspect will focus on reviewing updated content on the use of new therapeutic options in the treatment of periocular hyperpigmentation (dark circles under the eyes). The methodological contributions will focus on assessing how observational studies can be applied to patient assessment, applying treatments such as those used in this research. Finally, the healthcare contributions will involve the search for better tools to improve professional practice in order to guarantee the use of different resources in the aesthetic field to treat problems that affect patients' quality of life in some way.

OBJECTIVES

General Objective

To evaluate the efficacy and safety of MeLine® treatments in patients with periocular hyperpigmentation.

Specific Objectives

- To describe the demographic characteristics of Venezuelan patients with periocular hyperpigmentation (dark circles).
- To identify the specifications of the MeLine® treatments applied.
- To categorize the study population into groups according to their general characteristics for better treatment follow-up.
- To establish the cost–benefit ratio based on treatment duration.
- To investigate the benefits and possible adverse events that may have occurred during the observational study (treatment and post-treatment phases).

METHODOLOGY

Type of Research

A prospective, quantitative, observational, and descriptive study design was selected. This allowed continuous monitoring of patients and descriptive reporting of all findings according to research guidelines. Descriptive statistical analysis was performed using frequency and percentage distribution, as well as inferential statistics for relevant associations.

Population and Sample

The study included 52 participants, representing the total number of patients evaluated between January 2023 and March 2024. All participants who met the inclusion and exclusion criteria were selected.

Inclusion Criteria

- Voluntary participation.
- Adults aged 25 to 45 years.
- Clinical diagnosis of dark circles.
- No treatment for dark circles within the past six months.
- No topical or cosmetic treatment in the periocular area.
- No anatomical changes due to aging such as fat accumulation or deep grooves.

Exclusion Criteria

- Presence of congenital eyelid abnormalities or other relevant anatomical problems.
- Existing corneal disease.
- History of hypertrophic scars or allergic reactions.
- Mental health disorders that could interfere with the procedure.
- Involuntary eyelid movements.
- Pre-existing dermatological conditions.
- Pregnant or breastfeeding women.
- Hypersensitivity to any component used in the treatment.

Procedure

The MeLine® Dark Circles microexfoliation procedure consisted of two steps:

Step A: Contained derivatives of acetic acid and lactic acid.

Step B: Contained vitamin A, ascorbic acid, and phytic acid.

Both were applied in solution form following this protocol:

1. Define the treatment area.
2. Clean and degrease the skin.
3. Apply three layers of Step 1 using cotton swabs, waiting 30 seconds between applications. Patients were instructed to keep their eyes closed during application.
4. Apply two layers of Step 2, also with cotton swabs, allowing each layer to act for 15 minutes.

Statistical Analysis

Data were analyzed using descriptive statistics (frequency and percentage distribution) and inferential analysis to confirm findings, with statistical significance set at $p < 0.05$ [13, 16].

RESULTS

A total of 52 patients were analyzed. Figure 2 shows the distribution of treatment time in months among the patients studied. Most patients, 54% (representing a total of 27 patients), received treatment for 3 months. Twenty-four percent of patients (12 patients) were treated for 6 months, while 14% of those treated (represented by 7 patients) received treatment for 9 months. Only 4% of patients (2 patients in each case) had longer treatments, reaching 12 and 24 months, respectively.

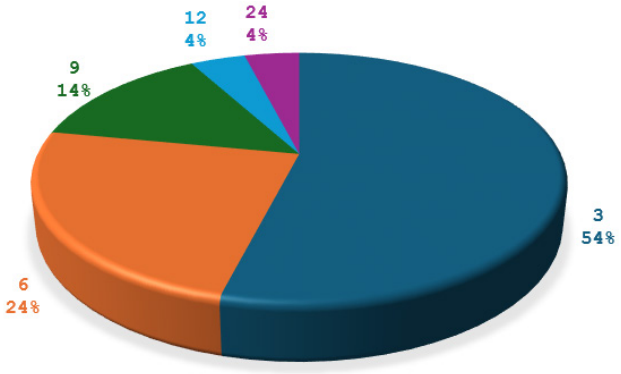

Figure 2. Treatment time for patients.
Source: Prepared by the authors.

On the other hand, Figure 3 shows the distribution of weekly product use time, measured in days. Thirty-seven percent of patients (represented by 18 patients) used the product daily, while 29% of these (14 individuals) applied it 3 days a week. Sixteen percent of participants (8 people) used the product 4 days a week. Eight percent of these (4 individuals) used it 2 days a week, 6% (3 people) used it 1 day a week, and finally, 4% of those treated (2 people) used the product 5 days a week.

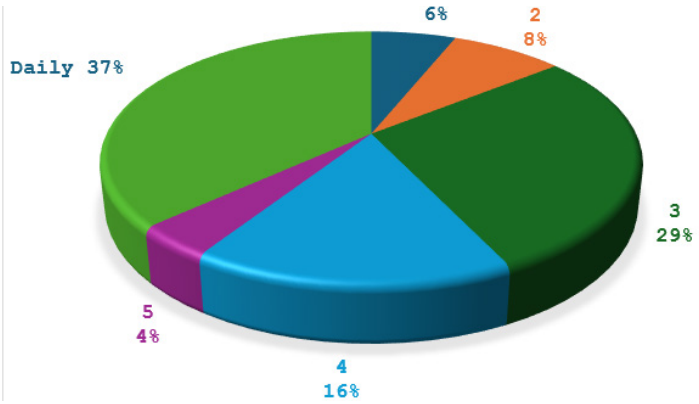

Figure 3: Weekly product usage time
Source: Prepared by the authors.

Next, let's move on to the actual results with MeLine®. Figure 4 shows the positive effects reported by patients after using the product. Ninety-two percent of patients (46 people) experienced all of the combined benefits, including smoother skin, brighter skin, and wrinkle removal, while 4% (2 people) had brighter skin, and 2% in each case (1 individual) experienced wrinkle removal and smoother skin. This reflects that, in general, the improvement was noticeable in various aspects.

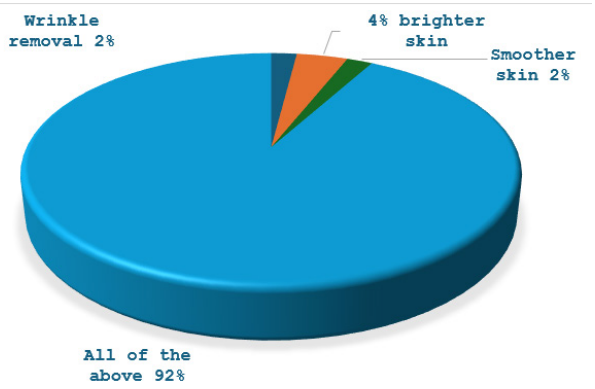

Figure 4: Positive Effects (Benefits).
Source: Prepared by the author.

Similarly, Figure 5 shows the proportion of patients who experienced adverse effects during treatment. Only 30% of patients (15 individuals) reported experiencing side effects, while 70% (35 individuals) reported no adverse effects. This distribution suggests that, although a significant percentage of patients experienced some unwanted reaction, most of them did not show such effects, suggesting that the treatment was effective in eliminating peri-orbital pigmentation.

In the case of positive effects, a p-value of 0.178 was obtained when evaluating whether treatment time had anything to do with such effects, finding that the association was not statistically significant, indicating that there is no notable relationship between treatment time and positive effects. On the other hand, regarding the relationship between weekly product use time and positive effects, where the p-value was 0.924, this is also not statistically significant and indicates that the number of days of weekly use does not appear to be associated with the level of benefits perceived during the dermatological examination.

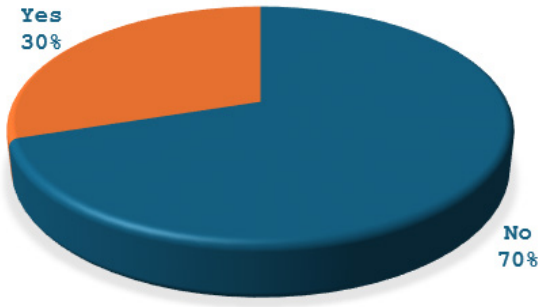

Figure 5. Side Effects (Negative).
Source: Prepared by the author.

Figure 6 shows the percentages of improvement in patients after treatment. The data show a varied distribution in the levels of perceived improvement: 32% of patients (16 people) reported an 80% improvement, followed by 16% (8 people) who experienced a 90% improvement. Fourteen percent of those treated (7 people) observed a 70% improvement, while 12% (6 people) perceived a 60% improvement and 10% (5 individuals) reported a 50% improvement. And, to a lesser extent, 2% in each case showed 100% improvement (1 person) or did not respond (1 person). This reflects that the results in terms of treatment were favorable for the individuals evaluated. To this end, a p-value of 0.011 was observed when evaluating the relationship between treatment time and (negative) side effects, indicating that treatment time may influence the likelihood of experiencing adverse effects. In the case of the relationship between weekly product use time and negative side effects (p = 0.000), this indicates that the frequency of product use could have an impact on the occurrence of adverse effects.

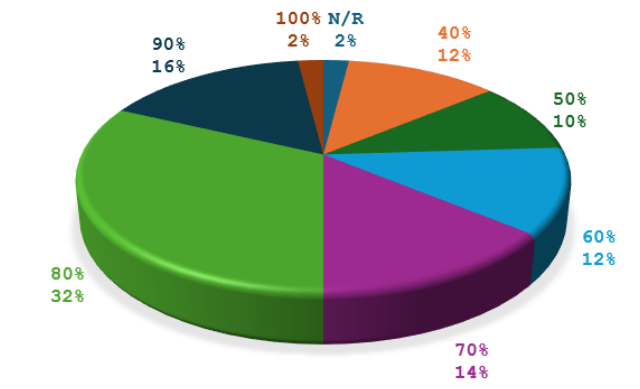

Figure 6. Percentage of improvement.
Source: Prepared by the authors.

Figure 7 shows participants' responses to the question about the presence of dark circles in their family. Fifty-two percent of participants answered affirmatively (26 individuals), indicating that they have relatives with dark circles, while 48% answered negatively (24 individuals).

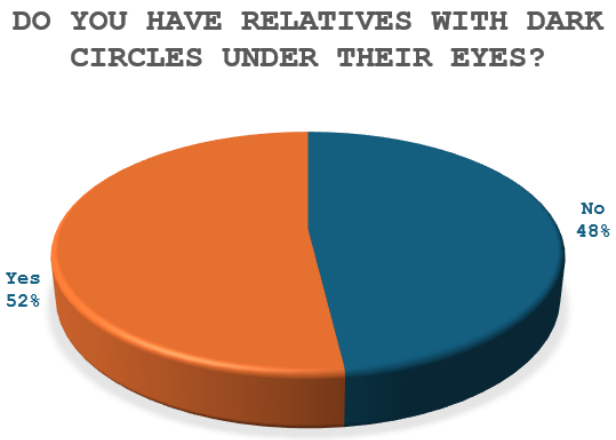

Figure 7. Questionnaire for patients on the presence of dark circles in the family.
Source: Prepared by the authors.

The satisfaction ratings for the questions asked to patients who underwent treatment include the following:

1. Are you satisfied with the improvement in the tone of your dark circles after the treatment? (Q1)
2. To what extent are you satisfied with the improvement in your skin condition (reduction in fine wrinkles, increased luminosity, improvement in skin tone)? (Q2)
3. Are you satisfied with how practical and comfortable the treatment is? (Q3)
4. Are you satisfied with the financial investment made in the treatment? (P4)
5. How satisfied are you with the information provided by the medical professional in charge of your treatment? (P5)
6. How satisfied are you with this treatment that you would recommend it to others? (P6)
7. How satisfied are your family members with the improvement they have noticed? (P7)

With this in mind, these questions were asked using a Likert scale (from 1 to 5) specifically rated as not at all satisfied, somewhat dissatisfied, indifferent, moderately satisfied, and quite satisfied. The results of this survey were as follows, taking into account the degrees of acceptance:

- Quite satisfied: Question P5 had the highest percentage result (69.2%, 34 people), followed by P3 (55.8%, corresponding to 27 individuals) and P6 (50.0%, given by 26 participants). Next were Q7 (37.3%, or 19 patients), Q1 and Q2 (34.6%, or 16 people), which had similar results. The lowest percentage result was for Q4 (28.8%, corresponding to 13 people).
- Moderately satisfied: The response with the highest percentage corresponds to P4 (36.5%, represented by 17 people), followed by P1 (30.8%, for a total of 14 people) and P2 (28.8%, corresponding to 13 people). Among the average percentage results are P3 (26.9%, given by 12 individuals) and P7 (25.5%, reflected in 14 participants). Likewise, the lowest percentage result is found in question P6 (19.2%, which would be 9 of the patients) and P5 (11.5%, reflected in 5 patients). Accordingly, Figure 8 graphically reflects these results.
- Indifferent: The highest percentage of responses were found in P2 (19.2%, reflecting a total of 9 people) and P7 (17.6%, reflecting 8 individuals). Next, P4 showed average results (13.5%, or 6 people), followed by P1 and P6 (11.5%, or 5 people). Finally, the minority per-

centage results are reflected in P5 (5.8%, or only 3 participants) and P3 (3.8%, or 2 people).

- Somewhat dissatisfied: The highest percentage response is found in P1 (17.3%, or 8 of those evaluated), followed by P2 (13.5%, corresponding to 6 of these participants) and P7 (11.8%, for a total of 5 individuals). Among the average responses are P4 (9.6%, corresponding to 4 people) and P6 (5.8%, corresponding to 3 individuals). Finally, the responses with the lowest percentage results are P3 and P5 (1.9%, corresponding to 1 individual in each case).
- Not satisfied: The highest percentage result was in P6 (13.5%, corresponding to 6 of the participants), followed by P3, P4, and P5 (11.5%, which would be 5 individuals in each case). The lowest percentages were recorded in P7 (7.8%, corresponding to 3 participants), P1 (5.8%, corresponding to 3 patients) and P2 (3.8%, corresponding to a total of 2 patients).

The correlation of satisfaction levels shows that there are positive correlations close to 1 between the questions asked. P1 showed a correlation close to 1 (0.815 and p=0.000); P2 showed results close to 0 (0.668 and p=0.000); P3 reflected results close to 1 (0.810 and p=0.000); P4 showed results close to 0 (0.611 and p=0.000); P5 showed results close to 1 (0.790 and p=0.000), and finally P7 shows a correlation close to 1 (0.867 and p=0.000). The p-value for all questions reflects statistically significant values regarding satisfaction.

Overall, this suggests that as patients are more satisfied with the improvement in the tone of their dark circles, they also tend to be more satisfied with other skin benefits of the treatment, such as a reduction in fine lines, increased radiance, and improved firmness. Likewise, this determined that patients considered the cost-benefit ratio of the product to be a favorable outcome as well. In addition, patients who are satisfied with the improvement in the tone of their dark circles are more likely to recommend the treatment to others, showing a positive relationship between the perception of results and the recommendation of the treatment.

Table 1: Chi-square test relating Treatment Time to Positive Effects (Benefits).

	Value	df	p-value
Pearson's chi-square	16,287[a]	12	0,178
Reason for plausibility	10,649	12	0,559
Number of valid cases	50		

Source: *Prepared by the authors*

Table 2: Chi-square test relating Treatment Time to Side Effects (Negative).

	Value	df	p-value
Pearson's chi-square	13,039[a]	4	0,011
Reason for plausibility	13,293	4	0,010
Number of valid cases	50		

Source: *Prepared by the authors*

Table 3: Chi-square test relating weekly product usage time to positive effects

	Value	df	p-value
Pearson's chi-square	10,231[a]	18	0,924
Reason for plausibility	9,161	18	0,956
Number of valid cases	50		

Source: *Prepared by the authors*

Table 4: Chi-square test relating weekly product use time to side effects (negative).

	Value	df	p-value
Pearson's chi-square	33,673[a]	6	0,000
Reason for plausibility	10,649	6	0,000
Number of valid cases	50		

Source: *Prepared by the authors*

DISCUSSION

MeLine®, due to its composition of tranexamic acid, alpha arbutin, and kojic acid, acts as a peel, which helps to depigment the periorbital area of patients who use it. In this study, the improvement in patients who used the MeLine® line for dark circles was studied; according to the indications, 52 patients underwent treatment with MeLine®. The results shown in most patients were an improvement in skin texture and pigmentation around the eyes. It is also worth mentioning that a significant percentage of these patients applied the treatment daily, which enhances its effectiveness on periorbital hyperpigmentation.

In line with this, it should be noted that one of the components of MeLine® is alpha arbutin, a hydroquinone that acts directly on tyrosinase, blocking it, which is responsible for the production of melanin [17]. This results in a decrease in melanin synthesis and helps improve the texture of the dermis. The study by Enríquez [18], showed that 16% of the patients studied improved their melasma with this compound, while the use of 3% alpha arbutin helped to reduce melasma and its severity index.

On the other hand, it should be noted that there are currently not many studies comparing and demonstrating the effectiveness of alpha arbutin; however, it is important to encourage future lines of research to conduct controlled clinical trials comparing the effectiveness of this enzyme with other compounds that act in the same way, as well as to increase the scientific evidence surrounding its effectiveness. It should also be noted that this product for dark circles contains kojic acid and tranexamic acid. The former is a phenol obtained through the fermentation of fungi or rice, and due to its composition, it acts as a whitening agent by reducing the action of melanogenesis and helping to reduce inflammation caused by acne [19].

Tranexamic acid is a synthetic compound similar to lysine, developed in 1962 by Utako Okamoto. Its main function is to inhibit the fibrinolysis system by reversibly binding to plasminogen, preventing its conversion to plasmin and, therefore, the degradation of fibrin. (20) In addition, tranexamic acid decreases the expression of factors such as VEGF and endothelin-1, helping to reduce bleeding and limit angiogenesis. Although its main use is to control heavy menstrual bleeding, its application has expanded to dermatological diseases, with its effectiveness in the treatment of melasma being particularly noteworthy [20].

The study by [21]. demonstrated that kojic acid and tranexamic acid can be effective in treating dyschromias such as melasma and post-inflammatory hyperpigmentation. In a clinical study, a serum containing 1% kojic acid and 3% tranexamic acid showed significant improvements in the appearance of hyperpigmentation, skin texture, and skin tone evenness from the second week of treatment. Tranexamic acid, by inhibiting the release of inflammatory mediators, helps control pigment production, while kojic acid acts as an effective depigmenting agent. Both compounds are considered well tolerated and effective in reducing hyperpigmentation conditions.

In the study by [22]. the efficacy of a moisturizing cream combining 2% niacinamide and 2% tranexamic acid was evaluated in 42 Korean women over 8 weeks. The results showed that this formulation was significantly more effective ($P < 0.05$) than the excipient control in reducing uneven

facial pigmentation. The combination of niacinamide and tranexamic acid not only improved the appearance of hyperpigmentation but also demonstrated a superior effect to using sunscreen alone. This finding suggests that the combination of these two components is a promising option for the treatment of facial hyperpigmentation.

The study by Furmanczyk [23], evaluated the efficacy of a gel serum containing tranexamic acid, among other components, in reducing facial hyperpigmentation. Tranexamic acid was shown to significantly contribute to decreasing melanin production in vitro, showing a 50% reduction in the first 14 days and a 67% reduction in 21 days. Clinically, notable improvements in hyperpigmentation parameters were observed, with a 28.4% reduction in the number of brown spots and a 31.1% reduction in the melanin index at the end of treatment. In addition, the benefits were maintained one month after discontinuing treatment, and the serum demonstrated excellent skin tolerability. These results suggest that tranexamic acid is effective for controlling skin pigmentation.

In correlation with the current study, the application of MeLine® showed a high degree of patient satisfaction with the improvement in the tone of their dark circles, strongly correlated with other positive aspects of the treatment. For example, a high correlation of 0.815 ($p < 0.000$) was found between satisfaction with tone and skin condition, indicating that those who report an improvement in tone also appreciate benefits such as wrinkle reduction and increased luminosity. In addition, satisfaction with tone is significantly related to the perception of cost-benefit ratio (0.810) and willingness to recommend the treatment to others (0.790), suggesting that the perception of positive results influences the overall assessment of the treatment.

On the other hand, the correlation between satisfaction with shade and practicality of treatment is moderate (0.668), indicating that although patients satisfied with shade improvement value ease of use, this relationship is less strong. Similarly, the quality of information provided by the medical professional also shows a moderate correlation (0.611) with patient satisfaction. Finally, satisfaction with shade has a very high correlation (0.867) with the perception of satisfaction among family members, which reinforces the social validity of the treatment results.

From this point, it can be mentioned that during the application of MeLine® in the patients of the current study, a high percentage of acceptance and improvement in skin appearance in terms of hyperpigmentation of the periorbital area was observed. However, there is little bibliographic information available on the use of MeLine® in this skin area, so the results on its effectiveness over a given period of time must continue to be studied.

CONCLUSIONS

Based on the results of this study, the following conclusions were established:

- **Demographic characteristics:** Most patients were adults between 18 and 50 years old, primarily female, with no prior dark-circle treatments.
- **Efficacy and mechanism:** Treatment with MeLine® proved to be highly effective. Its composition—tranexamic acid, alpha-arbutin, and kojic acid—acts as a **chemical peel**, promoting depigmentation of the periorbital area. The treatment offered both aesthetic and psychological benefits for patients, with results that were **visible and long-lasting**.
- **Cost–benefit relationship:** Although patients were not grouped, data were analyzed considering treatment duration, frequency of use, and improvement percentage, which allowed for a clear understanding of treatment impact. The product cost ranged from **$350 to $500**, a factor that may limit accessibility in certain populations (e.g., Venezuelan patients). Nevertheless, despite the cost, **patients reported high satisfaction and favorable outcomes**, suggesting strong value perception.
- **Adverse effects:** While 30% of patients reported minor adverse reactions, these were manageable and did not outweigh the treatment's benefits.
- **Overall assessment:** MeLine® proved to be a **safe, effective, and well-tolerated treatment** for periocular hyperpigmentation, significantly improving the aesthetic appearance of dark circles and contributing positively to patients' self-esteem.

Therefore, continued research on MeLine® is strongly recommended, expanding its application in dermatological and cosmetic care, not only to enhance skin appearance but also to support patients' psychological well-being and self-confidence through improved aesthetics.

REFERENCES

1. Ohshima H, Mizukoshi K, Oyobikawa M, Matsumoto K, Takiwaki H, Kanto H, et al. (2009) Effects of vitamin C on dark circles of the lower eyelids: Quantitative evaluation using image analysis and echogram. Ski Res Technol. 15: 214-7.
2. Bucay VW, Day D. (2013) Adjunctive Skin Care of the Brow and Periorbital Region. Clin Plast Surg [Internet]. enero de. 40: 225-36. Disponible en: https://linkinghub.elsevier.com/retrieve/pii/S0094129812001307
3. Concha Martínez L. (2023) El contorno de ojos en el tratamiento de ojeras y bolsas [Internet]. Universidad de Sevilla. Disponible en: https://idus.us.es/bitstream/handle/11441/157332/CONCHA MARTINEZ LAURA.pdf?sequence=1&isAllowed=y
4. Magagnin Freitag F, Ferreira Cestari T. (2007) What causes dark circles under the eyes? J Cosmet Dermatol. 6: 211-5.
5. Lowe NJ, Wieder JM, Shorr N, Boxrud C, Saucer D, Chalet M. (1995) Infraorbital pigmented skin. Preliminary observations of laser therapy. Dermatologic Surg Off Publ Am Soc Dermatologic Surg [Internet]. septiembre de 21: 767-70. Disponible en: http://www.ncbi.nlm.nih.gov/pubmed/7655794
6. Gartner LP, Hiatt JL. (2011) Histología básica. Barcelona, España: Elsevier España, S.L.
7. Álvarez Borrego L. (2022) Procedimientos médico-estéticos para el abordaje integral de la ojera. Revisión sistemática. Med Estética Rev Científica la Soc Española Med Estética [Internet]. 15 de junio de. (71). Disponible en: https://www.seme.org/revista/articulos/procedimientos-medico-esteticos-para-el-abordaje-integral-de-la-ojera-revision-sistematica
8. Redacción Vichy Laboratoires. (2024) Tipos de ojeras y cómo tratarlas [Internet]. Vichy Laboratoires. [citado 25 de mayo de 2024]. Disponible en: https://www.vichy.es/consejo-experto/otras-preocupaciones/tipos-de-ojeras
9. Mitsuishi T, Shimoda T, Mitsui Y, Kuriyama Y, Kawana S. (2004) The effects of topical application of phytonadione, retinol and vitamins C and E on infraorbital dark circles and wrinkles of the lower eyelids. J Cosmet Dermatol. 3: 73-5.
10. Sarkar R, Ranjan R, Garg S, Garg VK, Sonthalia S, Bansal S. (2016) Periorbital Hyperpigmentation: A Comprehensive Review. J Clin Aesthet Ther. 9: 49-55.
11. Yu W, Zhu J, Yu W, Lyu D, Lin X, Zhang Z. (2018) A split-face, single-blinded, randomized controlled comparison of alexandrite 755-nm picosecond laser versus alexandrite 755-nm nanosecond laser in the treatment of acquired bilateral nevus of Ota–like macules. J Am Acad Dermatol [Internet]. 79: 479-86. Disponible en: https://doi.org/10.1016/j.jaad.2017.12.053
12. Lipp M, Weiss E. (2019) Nonsurgical Treatments for Infraorbital Rejuvenation: A Review. Dermatologic Surg. 45: 700-10.
13. Hernández-Sampieri R, Fernández-Collado C, Baptista-Lucio M del P. (2014) Metodología de la Investigación. 6ta Edició. Toledo Castellanos MÁ, editor. Madrid, España: McGraw-Hill Interamericana

Editores, S.A., de C.V. 634 pp.
14. Monje Álvarez CA. (2011) Metodología de la investigación cuantitativa y cualitativa. Guía didáctica. Neiva, Colombia: Universidad Surcolombiana.
15. Lilia CFA. Población y muestra. Mexico, D.F. (2015) Plantel Texcoco de la Escuela Preparatoria.
16. Martínez CL. Estadística Descriptiva: El primer paso de toda investigación. Villa-Murillo A, Echiburú M, Rivera-Soto J, González A, Henríquez Miranda C, González-Weil C, et al., (2022) editores. Una aproximación a la investigación multi e interdisciplinar: Diversos enfoques teóricos y metodológicos. Viña del Mar, Chile: Ediciones UVM. 76-96 p.
17. Sugimoto K, Nishimura T, Nomura K, Sugimoto K, Kuriki T. (2004) Inhibitory effects of alpha-arbutin on melanin synthesis in cultured human melanoma cells and a three-dimensional human skin model. Biol Pharm Bull. abril de. 27: 510-4.
18. Enríquez M. (2020) Determinación de la eficacia despigmentante de dos productos cosméticos elaborados uno con arbutina y el otro con una combinación de arbutina y pteria sterna, en pacientes con melasma de la fundación ecuatoriana de la psoriasis. Universidad Politécnica Salesiana.
19. ACOFARMA. (2020) Ficha técnica de Ácido Kójico.
20. Suñer Ollé E. (2021) Ácido Tranexámico En Dermatología. Más Dermatología. 34: 21-8.
21. Desai S, Ayres E, Bak H, Manco M, Lynch S, Raab S, et al. (2019) Effect of a Tranexamic Acid, Kojic Acid, and Niacinamide Containing Serum on Facial Dyschromia: A Clinical Evaluation. J Drugs Dermatol. mayo de. 18: 454-9.
22. Lee DH, Oh IY, Koo KT, Suk JM, Jung SW, Park JO, et al. (2014) Reduction in facial hyperpigmentation after treatment with a combination of topical niacinamide and tranexamic acid: a randomized, double-blind, vehicle-controlled trial. Ski Res Technol. mayo de. 20: 208-12.
23. Furmanczyk M, Brown A, Bustos J, de Henestrosa ARF, Trullas C, Granger C, et al. (2024) Efficacy and tolerability of a depigmenting gel serum comprising tranexamic acid, niacinamide, 4-butylresorcinol, phytic acid, and a mixture of hydroxy acids that targets the biological processes regulating skin melanogenesis. J Cosmet Dermatol. junio de 23: 2058-65.

Cite this article: Víctor Garcia, Sharon Cimolino, Loren Prevete, Gladys Velazco. (2025) EFFICACY AND SAFETY OF MELINE® TREATMENTS IN PATIENTS WITH PERIOCULAR HYPERPIGMENTATION. Archives of Clinical Case Studies and Case Reports 5(2): 374-380.