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A Novel Moisturizer Formulated With Micronized *Centella asiatica* and Mandelic Acid Improves Mature, Crepey Skin

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ABSTRACT

Background: Dermatoporosis is a condition of fragile, aging skin that manifests as altered pH, wrinkles, laxity, easy bruising, and hyperpigmentation. This study evaluated efficacy, safety, and subject perception after the use of a novel cream, GC (Galderma Laboratories, LP, Fort Worth, TX), on subjects with mature, aging skin.

Methods: A 12-week multicenter, randomized, blinded, in-use study enrolled female and male subjects aged 40 to 60 years of all races, ethnicities, and Fitzpatrick skin types. Subjects were required to have a history of fragile skin and dry, crepey skin on the knees and thighs. GC cream was applied to knee and upper thigh skin twice daily. Assessments included clinical grading, digital photography, bioinstrumentation (skin texture, pH, and heatmap hydration), standard safety assessments, and satisfaction.

Results: Use of GC cream for 12 weeks resulted in significant improvements in skin crepiness, photodamage, and firmness, as well as decreased skin pH and early improvements in skin roughness and smoothness from baseline. Corneometer heatmapping documented improved skin hydration over baseline. No adverse events were reported; the GC cream was well tolerated, and subjects reported high satisfaction.

Conclusion: Twice-daily application of the novel GC skin cream significantly improved the overall skin quality of mature, aging skin, including crepiness, photodamage, firmness, texture, pH, and hydration. GC cream was well tolerated with high subject satisfaction. These data are intended to help guide healthcare providers and patients in choosing an effective moisturizer that was specifically designed for patients with fragile, mature skin.

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INTRODUCTION

The skin naturally atrophies with age, leading to fragility, poor wound healing, and an increased risk of skin tears.[1] Skin aging is characterized by multiple features, including wrinkling and rough-textured appearance; a loss of contour, elasticity, and firmness; and an increase in laxity and crepiness.[1–3] In addition, changes in skin pH to a more basic pH may have negative consequences for the acid mantle, skin microbiome, and skin barrier, while correcting the elevation may improve overall skin function.[4,5] In older patients, xerosis (dry, scaly skin) can impair skin barrier function and has been associated with a higher incidence of pressure injuries.[6]

Dermatoporosis is a chronic condition of fragile, aging skin manifested by skin atrophy, senile purpura, and pseudoscars.[7–9] The pathophysiology of this condition is not fully understood.[10] Dermatoporosis is most commonly found on sun-exposed areas of skin.[7,11] Early clinical manifestations of dermatoporosis have been reported as early as 40 to 60 years, although prevalence in this younger age group is not well characterized. Prevalence ranges from 27.0% to 37.5% in patients aged 60 years and older.[12–14] While advanced age is the most prominent risk factor, other risk factors include chronic actinic damage, genetic susceptibility, long-term use of topical and systemic corticosteroids, chronic kidney disease, anticoagulant use, chronic obstructive pulmonary disease, epidermal growth factor receptor use, and lack of exercise.[11] In later stages, dermatoporosis can result in frequent skin tears, delayed wound healing, nonhealing atrophic ulcers, and dissecting hematomas.[7–9]

A healthy skin barrier protects against dehydration, microorganisms, allergens, irritants, reactive oxygen species, and ultraviolet radiation.[15,16] Consistent skincare regimens

can mitigate the effects of skin aging by maintaining skin hydration, supporting barrier integrity, and preserving overall skin quality.[17] Moreover, daily skin care may promote skin regeneration, elasticity, and smoothness.[15] These functions are particularly relevant in dermatoporosis, as preventive and supportive skincare has been proposed as an important component of management for this condition.[8,14] However, evidence guiding skincare strategies for dermatoporosis remains limited, highlighting the need for products evaluated for fragile, aging skin.

This study evaluated efficacy, safety, and subject perception following 12 weeks of use of an investigational topical cream, GC (Galderma Laboratories, LP, Fort Worth, TX). The topical GC cream was developed after in vitro experiments demonstrated that the combination of microdosed *Centella asiatica* and mandelic acid has synergistic antisenescence and anti-inflammatory actions.[18] Senescence of dermal fibroblasts has been hypothesized to play a role in reduced extracellular matrix production and skin thinning. As a result, we tested the novel GC compound on subjects with mature, aging skin to determine if the GC cream could be an effective treatment for dermatoporosis.

MATERIALS AND METHODS

This was a 12-week, randomized, blinded, multicenter, in-use study conducted in the United States in accordance with Good Clinical Practice guidelines, and it obtained Institutional Review Board (IRB) approval on July 30, 2025 (IRB ID: 14308; ClinicalTrials.gov number: NCT07398989).

Subjects

The study was open to males and females aged 40 to 60 years, in general good health, of all races, ethnicities, and Fitzpatrick skin types, with a self-reported history of fragile and easily bruised skin. Eligible subjects had mild-to-moderate skin crepiness, photodamage, and firmness on the skin of the knees and lower thighs, defined as a score of 3–6 on the modified Griffiths scale (0 = none; 9 = severe).[19]

All subjects provided written informed consent. Subjects were asked to apply GC cream twice daily for the duration of the study. A supporting SPF moisturizer was also provided, which subjects were instructed to use before sun exposure and to reapply as needed throughout the day. Subjects also agreed to stop using current topical skincare products for the duration of the study. Individuals were excluded from enrollment in the study if they had any known allergies or hypersensitivity to any cosmetics, personal care products, and/or fragrances; had a history of cancer within the past 5 years; had a history or presence of any skin condition/dermatologic disease on the test areas that might interfere with the evaluation of study parameters and/or put the subject at significant risk if they took part in the trial; or had and/or have a history of any clinically active bacterial, fungal, or viral skin infections.

Assessments

Clinical grading of the knee and lower thigh skin was performed at baseline and weeks 4, 8, and 12 using the Griffiths 10-point scale (0 = none, 1–3 = mild, 4–6 = moderate, 7–9 = severe).[19] Parameters assessed included crepiness, overall photodamage, and firmness. Standardized clinical photographs of the knees and hands were captured at the same intervals.

Additionally, bioinstrumentation was used on either the left or right upper knee, based on predetermined randomization, of a subset of 15 subjects to quantitatively assess skin parameters. Instruments included the Visioscan® VC 20plus (Courage + Khazaka electronic GmbH, Cologne, Germany) to objectively evaluate skin texture at baseline and weeks 4, 8, and 12; the Skin-pH-Meter PH 905 (Courage + Khazaka electronic GmbH, Cologne, Germany) to assess skin pH at the same timepoints; and the Corneometer® CM 825 (Courage + Khazaka electronic GmbH, Cologne, Germany) to measure skin hydration at baseline and week 12. Corneometer assessments were conducted in a randomly selected subset of 5 subjects to generate a hydration heatmap to visualize changes in hydration across the upper knees and lower thighs.

Subjects' perception, satisfaction, and preference regarding the study product were appraised via a self-assessment questionnaire at weeks 4, 8, and 12.

Tolerability of the study product was evaluated at baseline and weeks 4, 8, and 12. Investigators assessed erythema, edema, and dryness of subjects' knees and lower thighs using a 4-point analog scale (0 = none, 1 = mild, 2 = moderate, 3 = severe). Any additional adverse events (AEs) that occurred during the study period were monitored and reported.

Statistical Methods

Descriptive statistics were reported for all endpoints. Changes from baseline in clinical grading and bioinstrumentation and tolerability assessments were analyzed using a one-sided t-test. Where the assumption of normality was not met, the Wilcoxon signed-rank test was used to assess differences. For subject questionnaire data, a binomial sign test was applied to determine whether the proportion of combined favorable responses differed significantly from that of combined unfavorable responses. All statistical tests were performed at a two-sided significance level of 5%.

RESULTS

A total of 31 subjects were enrolled in the 12-week study. Subjects were a mean of 54 years of age (range, 43–60 years). Eighty seven percent of the population was female (n=27)

TABLE 1.

Demographic and Baseline Characteristic Information		
Subjects	**N**	**%**
Enrolled	31	100
Completed*	30	100
Age, years		
Mean	54	
Minimum	43	
Maximum	60	
Sex	27	87.1
Female	27	87.1
Male	4	12.9
Race		
White/Caucasian	23	74.2
Black/African American	3	9.7
Native American	1	3.2
Southeast Asian	1	3.2
East Asian	2	6.5
West Asian	1	3.2
Ethnicity		
Hispanic/Latin American	5	16.1
Non-Hispanic/Latin American	26	83.9
Fitzpatrick skin type		
I	2	6.5
II	13	41.9
III	7	22.6
IV	5	16.1
V	2	6.5
VI	2	6.5

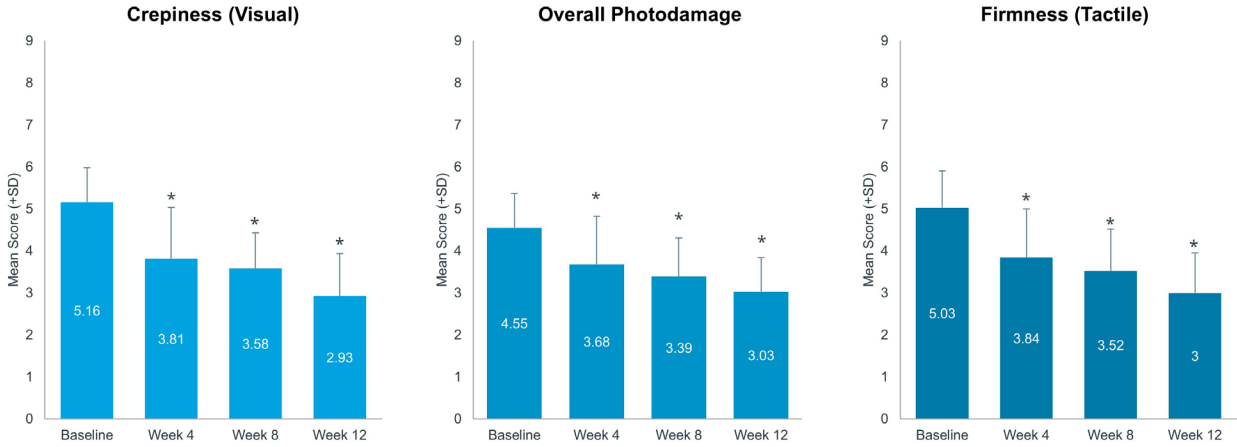
*One subject discontinued due to a serious adverse event unrelated to the GC cream.

and 13% was male (n=4); 74% were White/Caucasian (n=23), 10% were Black/African American (n=3), and 16% were other ethnicities, including Native American (n=1), Southeast Asian (n=1), East Asian (n=2), and West Asian (n=1). Five subjects (16%) identified as Hispanic/Latin American. Of the 31 subjects, 71% had Fitzpatrick skin types I to III (n=22) and 29% had Fitzpatrick skin types IV to VI (n=9) (Table 1).

Clinical grading assessments of crepiness (visual), overall photodamage, and firmness (tactile) on the knee and lower thigh skin were conducted at baseline and weeks 4, 8, and 12 following twice-daily application of the GC cream (Figure 1). Mean crepiness (visual) scores improved from 5.16 at baseline to 2.93 at week 12 ($P<.0001$). Similarly, mean photodamage scores decreased from 4.55 at baseline to 3.03 at week 12 ($P<.0001$). Finally, firmness (tactile) grading also showed consistent and statistically significant improvement across all timepoints. Mean firmness scores decreased from 5.03 at baseline to 3.00 at week 12 ($P<.0001$).

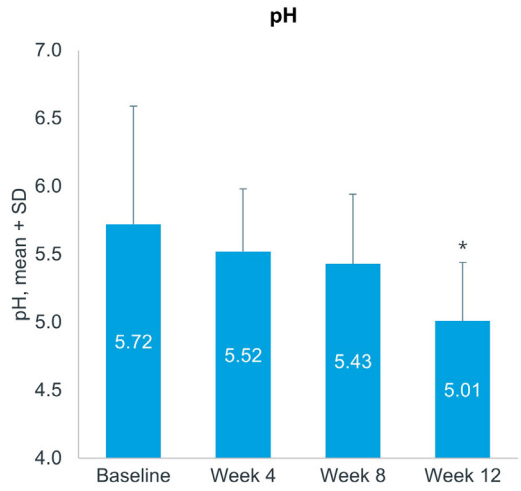
Bioinstrumentation assessments captured the changes from baseline in skin pH, texture, and hydration after 12 weeks of GC application in a subset of 15 subjects. Mean pH at baseline was 5.72, which incrementally decreased throughout the study and reached 5.01 by week 12 (Figure 2). For skin texture, there was a clinically significant decrease in roughness and increase in smoothness from baseline to week 12. The mean roughness value reached the greatest improvement at week 8 compared with baseline ($P<.05$); roughness remained numerically improved but was not statistically significant at week 12 ($P=.0664$). There was a similar improvement in skin smoothness, which reached a maximum at week 4 ($P<.05$) and remained numerically improved but not statistically significant at weeks 8 and 12 ($P=.2625$ and $P=.2330$, respectively; Figure 3).

FIGURE 1. Clinical grading of subject skin.



Clinical grading showed significant improvement in crepiness, photodamage, and firmness at all timepoints compared with baseline. Clinical grading of upper knees/lower thighs was based on the 10-point Griffiths scale (0 = none, 1–3 = mild, 4–6 = moderate, 7–9 = severe). *$P<.0001$ vs baseline. N=30 for week 12; N=31 for baseline, week 4, and week 8.

FIGURE 2. Change in pH over 12 weeks of study treatment.



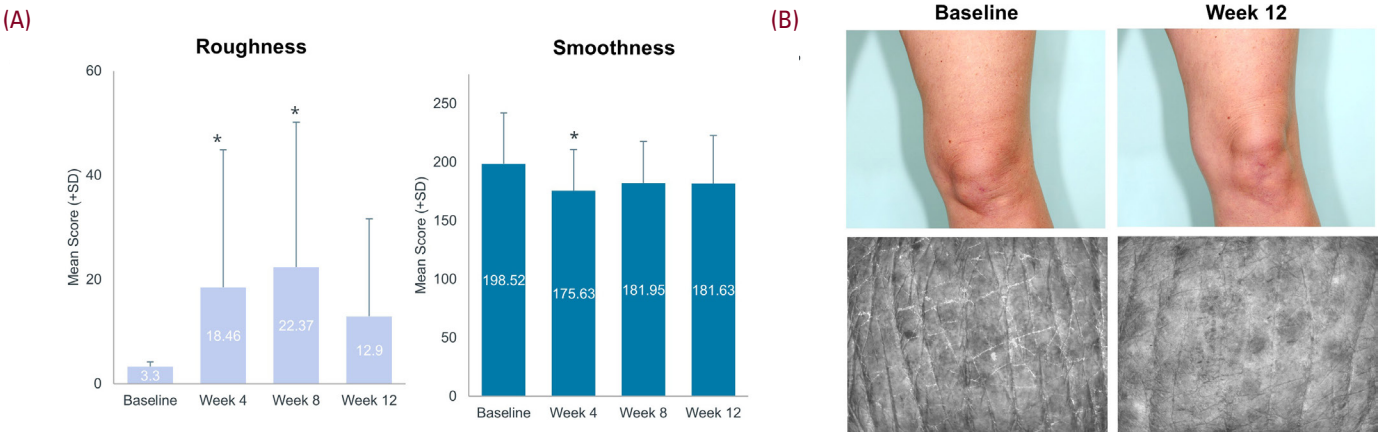
The average pH of 15 study subjects was measured at baseline and at weeks 4, 8, and 12.
*P<.05 vs baseline.

To assess changes in hydration with twice-daily use of GC cream, 5 subjects underwent Corneometer assessment at baseline and week 12. At baseline, mean hydration values ranged from 34.55 to 45.89. At week 12, mean hydration values significantly increased across all sites (range, 61.39–76.64), with mean changes from baseline ranging from 64.91% to 104.41%. Representative images of changes in skin hydration of a single subject and a composite image of changes from baseline to week 12 of all 5 subjects are shown in Figure 4.

Results of the self-assessment questionnaire showed most subjects reported favorable perceptions on GC and overall skin improvement as early as week 4. For example, at week 4, 93.3% of subjects felt that their skin was softer and smoother and GC kept their skin well-nourished. After 8 weeks of GC usage, 93.5% of subjects felt their skin to be stronger and 90.3% felt it was much tighter. As summarized in Figure 5, after 12 weeks, 93.3% of subjects agreed that their skin felt much more resilient to withstand daily stressors and 90.0% reported that their skin barrier no longer felt compromised. Improvements in overall skin appearance and quality were also frequently reported, with 96.7% of subjects indicating satisfaction with the overall quality of their skin and 90.0% stating that GC was a game changer for improving the look of their fragile skin. Perceptions related to self-confidence and visible improvement were similarly favorable. At week 12, 90.0% of subjects reported feeling confident showing their skin, 86.7% noted a visible improvement in skin appearance, and 100.0% agreed that they would continue using the product.

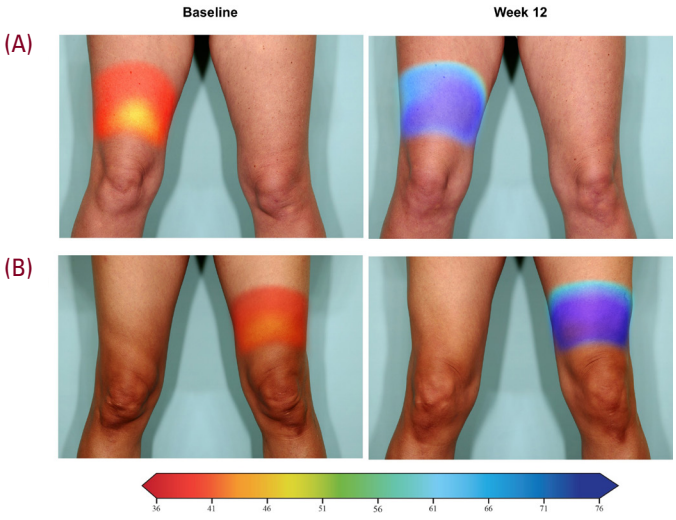
Overall, there was no clinically meaningful increase in erythema or edema at any post-baseline visit. In contrast, dryness demonstrated a statistically significant reduction from a mean score of 1.29 to 0.24 at week 12 (P<.0001) (Figure 6). There were no observed or reported AEs related to the GC cream throughout the study. Unrelated adverse events (AEs) were reported by 2 subjects – 1 moderate AE of influenza and 1 serious AE of equilibrium loss; both events resolved. Of 31 patients who enrolled in the study, 30 completed all 12 weeks; one subject withdrew due to an AE that was not related to the GC cream.

FIGURE 3. Visioscan assessment of skin roughness and smoothness.



Bioinstrumentation showed significant improvement in skin texture as early as week 4. Visioscan was used to assess skin texture (roughness and smoothness) on the upper knees. A) For roughness, the higher the value, the less rough the skin. For smoothness, the lower the value, the smoother the skin. *P<.05 vs baseline; n=15. B) Representative images of skin roughness/smoothness at baseline and week 12 for a subject with Fitzpatrick type II skin are shown below.

FIGURE 4. Changes in hydration from Corneometer data.



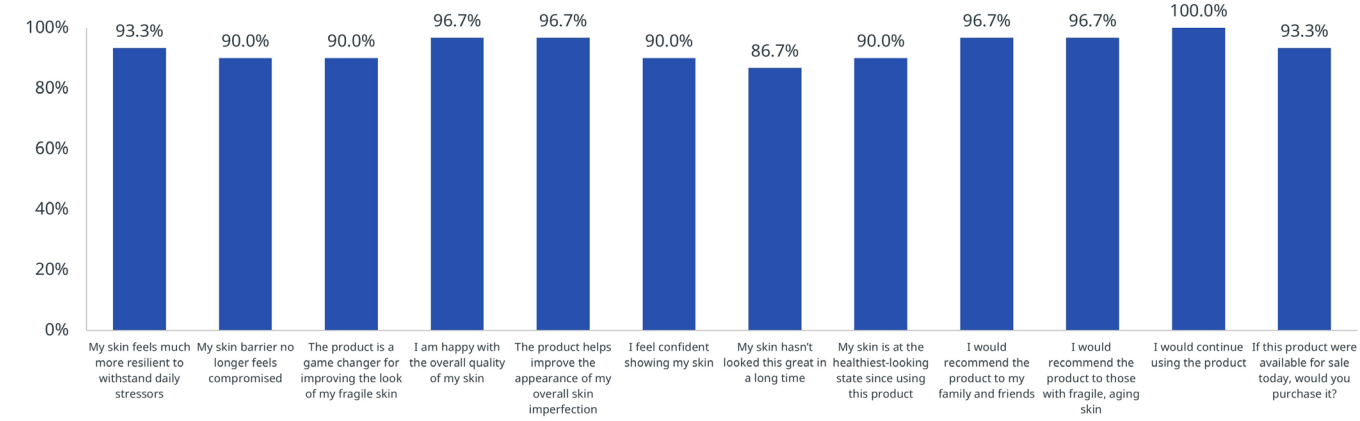
Heatmap hydration was created using Corneometer measurements at 9 points on the upper knees/lower thighs (n=5). A) Hydration values from one individual subject with Fitzpatrick type III skin. B) Average hydration values from all 5 subjects, superimposed on a single subject, show an increase in hydration across all measured sites from baseline (range, 34.55–45.89) to week 12 (range, 61.39-76.64). The redder, the drier the skin. The bluer, the more hydrated the skin.

DISCUSSION

Effective management of dermatoporosis requires not only avoidance of trauma but also supportive interventions that maintain hydration, reinforce the skin barrier, and improve overall skin quality.[15,16,20] Despite its high prevalence and early manifestations, evidence-guided skincare strategies specifically formulated for fragile, dermatoporotic skin remain limited, underscoring the importance of evaluating targeted topical products designed to address these functional deficits.

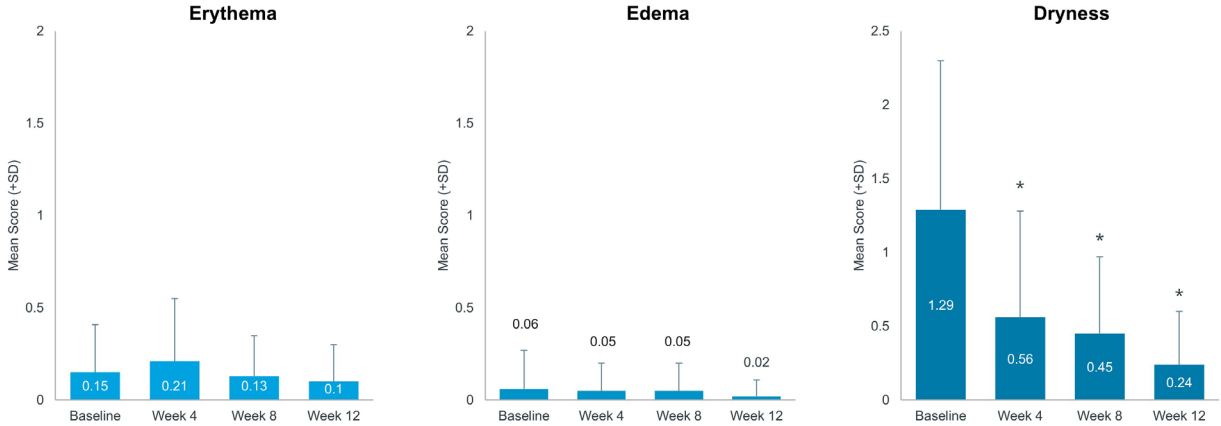
The results of this study demonstrate that twice-daily use of the study product GC for 12 weeks effectively improved the manifestations of dermatoporosis on mature, aging skin. Clinical grading by investigator showed significant improvement in skin crepiness, photodamage, and firmness. After 12 weeks of study product application, statistically significant improvements were observed across all 3 parameters using the modified Griffiths scale, with mean scores improving from moderate severity to mild severity at week 12. Furthermore, there was concordance between the investigator assessments and objective bioinstrumentation results. pH analysis demonstrated skin pH

FIGURE 5. Results of subject self-assessment questionnaire at week 12.



Data shown are the percentage of subjects with favorable responses (N=30). All responses are significant ($P<.05$) vs neutral/negative responses.

FIGURE 6. Tolerability of study product.



Tolerability was assessed by investigators using a 4-point scale (0 = none, 1 = mild, 2 = moderate, 3 = severe).
*$P<.0001$ vs baseline. N=30 for week 12; N=31 for baseline, week 4, and week 8.

restoration from baseline, approaching levels consistent with healthy skin pH levels;[4,21] while Visioscan showed early significant improvements in skin texture. Corneometer measurements indicated significantly increased hydration following 12 weeks of use. Finally, the study product was well tolerated, with no product-related AEs reported and high rates of patient-reported satisfaction. It is important to emphasize that these analyses were performed on the skin of the knees and upper thighs, areas commonly affected by aging and dermatoporosis. While many skincare products are designed for use on the face, hands, and arms, the lower body is seldom included in clinical studies of topical therapies.

Limitations of this study include the small sample size. Future studies could assess efficacy in other areas of the body prone to photodamage and frailty and could include longer durations of use.

For individuals who are concerned about fragile or thinning skin, there are currently no evidence-backed options proven to effectively address dermatoporosis.[13] Future studies could help determine whether long-term use of the study product could further improve fragile or thinning skin or slow its progression. Such findings could be particularly valuable for individuals with a family history of, or who are otherwise at increased risk for, dermatoporosis.

CONCLUSION

Given the aging population of the United States, dermatoporosis is a growing area of unmet need with limited clinical data on treatment options designed specifically for mature, fragile skin. We investigated a novel GC cream that is formulated with a combination of microdosed *Centella asiatica* and mandelic acid, which was previously shown to have synergistic antisenescence and anti-inflammatory actions in an ex vivo skin model.[18] This is the first-ever clinical study to show that twice-daily use of the GC cream by subjects with mature skin not only improved skin texture, appearance, and hydration, but also helped restore skin health and overall skin quality. The product was well tolerated and elicited high satisfaction scores. Taken together, these findings support use of the GC cream as a novel moisturizer containing skin-conditioning ingredients specifically designed for individuals with dermatoporosis.

DISCLOSURES

Christine Emesiani, Sindhu Garimella, Matthew Meckfessel, Thu Q. Nguyen, and Alan Widgerow are employees of Galderma Laboratories, LP. Glynis Ablon is an investigator and/or consultant for AbbVie, Almirall, Bausch, Benev, Beiersdorf, Church Dwight, Eli Lilly, Estee Lauder, Everwell, Galderma, LaRoche Posay, L'Oreal, Nutrafol, Omnilux, Revision, and Valens. Todd Schlesinger is an investigator and/or consultant for AbbVie, Almirall, Apogee, Arcutis Biotherapeutics, Benev, Biofrontera, Bristol Myers Squibb, Crown Aesthetics, Eli Lilly, Flint Clinical, Galderma, Genentech, Janssen, LEO Pharma, Oruka, Pfizer, Regeneron Pharmaceuticals, Sun Pharma, Verrica, and UCB; has served as an investigator for AbbVie, Allergan, Almirall, Arcutis Biotherapeutics, Aslan Pharmaceuticals, Biofrontera, Bristol Myers Squibb, Boehringer Ingelheim, Cara Therapeutics, Castle Biosciences, Concert Pharmaceuticals (acquired by Sun Pharma), Cutanea Life Sciences, Dermavant Sciences, Eli Lilly, Galderma, HighlightII, Incyte, Janssen, Nimbus Therapeutics, Medicus, Novartis, Processa, Prolacta, Regeneron Pharmaceuticals, Sanofi, SkinCure Oncology, Takeda, Trevi Pharmaceuticals, and Verrica; is a shareholder of Bristol Myers Squibb, Chronicle Medical Software, Eli Lilly, and Remedly; is a consultant for Beiersdorf, Estee Lauder, Dermsquared, HTL Biotechnology, LaRoche Posay, L'Oreal, MJH Life Sciences, and RBC Consultants; and receives a salary from Avant-Health.

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