



Multi-Faceted Evaluation of a Facial Cream Across Aging and Targeted GLP-1 Users

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Abstract

Cutaneous aging results from intrinsic senescence and environmental stressors that degrade collagen, elastin, and hyaluronic acid, leading to wrinkles and loss of skin quality. Topical vitamin C, retinoids, and hyaluronic acid target complementary pathways involved in antioxidant defense, collagen synthesis, epidermal renewal, and hydration. Rapid weight loss from GLP-1–based therapies may further accentuate facial aging, highlighting the need for supportive dermocosmetic strategies. This study aimed to evaluate a dermocosmetic formulation combining ascorbyl glucoside (vitamin Cg), retinyl palmitate (pro-retinol), and hyaluronic acid using a multi-faceted approach integrating instrumental measurements, clinical grading, and finally patient-reported outcomes in conventional aging populations and individuals using GLP-1–based therapies. Dermocosmetic formulation improved skin hydration from 15 min post-application (46%; $p < 0.001$) with an improvement maintained for 24h. Product application over the course of 4 weeks in a general skin aging population had significant improvement on overall skin appearance and on all skin aging parameters evaluated, with several parameters showing significance from week 1. Particularly, skin roughness significantly decreased (-44%; $p < 0.001$), while skin firmness and radiance increased by 21% and 20%, respectively ($p < 0.001$). These improvements were accompanied by a significant reduction of -29% and -26% ($p < 0.001$) in global fine lines and wrinkles by week 4. Moreover, dermocosmetic formulation potentially responds to GLP-1 users' skin concerns according to self-reported benefits. GLP-1 users, specifically for weight loss, were highly satisfied with product performance after 4 weeks of use (86%), likewise a majority of GLP-1 users agreed that the product was a “great ally/companion” for their skin during their weight loss period.

Introduction

Cutaneous aging results from intrinsic senescence combined with extrinsic exposome factors (UV radiation, pollution, smoking, diet, psychosocial stress) that drive oxidative damage, barrier disruption, and extracellular matrix (ECM) breakdown, manifesting as altered texture, elasticity, and pigmentation.¹ These insults accelerate collagen and elastin fragmentation, hyaluronic acid (HA) depletion, and chronic inflammation, producing wrinkles, laxity, xerosis, and dyschromia.^{1,2}

Concurrently, incretin-based obesity pharmacotherapy has introduced a new aesthetic challenge. Recent randomised controlled trials (RCTs) have demonstrated the efficacy of some GLP-1 for weight reduction.^{3,4} GLP-1 modulate appetite regulation, which includes slowing gastric emptying, increasing satiety, and reducing appetite, resulting in weight loss.⁴ Semaglutide (2.4 mg weekly)

produces ~15% weight loss over two years, while dual GIP/GLP-1 agonists like tirzepatide achieve $\geq 20\%$ reductions.^{3,5,6} Significant weight loss, such as from the use of GLP-1/GIP agonists, is associated with both loss of muscle and connective tissue along with the loss of fat.⁷ Consequently, there is an associated loss of facial volume as a result of fat, muscle, and connective tissue loss that has been termed “Ozempic Face” characterized by hollowness and laxity and perceived as premature aging.⁸⁻¹⁰ Moreover, emerging evidence suggests GLP-1 agonists may influence cutaneous aging also by adipose-derived cell effects, oxidative stress, and hormonal signaling.¹¹ Beyond fat distribution, patients also experience a measurable decline in skin quality, with an impact in collagen density and elastic fiber network.¹² Clinically, patients may describe faces that feel and look drier, duller, and rougher, with more visible lines and sagging following rapid weight loss.¹³

This metabolic-aesthetic tension underscores the need for topical strategies that reinforce collagen and HA, bolster antioxidant defenses, normalize epidermal renewal, and restore hydration to address premature aging signs related with GLP1-agonists use.

Three mechanistically complementary topical actives—stabilized vitamin C, cosmetic retinoids, and HA—may form a rational “triad” for evidence-based rejuvenation. Vitamin C, essential for collagen maturation, redox control, and melanogenesis modulation, declines with age and photoexposure.^{14,15} Optimized vitamin C formulations (e.g., ascorbyl glucoside) improve dermal density, texture, and fine wrinkles while enhancing radiance.¹⁵ Retinoids, via nuclear receptor engagement, normalize keratinocyte turnover, upregulate ECM components, and suppress matrix metalloproteinases, reproducing many benefits of prescription retinoic acid with better tolerability.¹⁶⁻¹⁸ HA restores hydration and biomechanical properties; topical and injectable HA significantly improve barrier recovery, wrinkle appearance, and dermal quality.^{19,20} Antioxidant depletion and loss of structural macromolecules are now recognized as modifiable targets for dermocosmetic intervention.^{14,15,19} Expert consensus consistently ranks vitamin C, retinoids, and HA among the most recommended anti-aging ingredients.^{21,22}

The present work focuses on the multi-faceted evaluation of ascorbyl glucoside (vitamin Cg), retinyl palmitate (pro-retinol), and hyaluronic acid formulation which will be referred to as « the test product » in this article, with the specific objective of bridging instrumental measurements, clinical grading, and patient-reported outcomes across conventional aging cohorts as well as explore self-reported outcomes on targeted GLP-1 user population seeking weight loss within the context of this evolving metabolic longevity era.

Materials & Methods

Tested product

The test product is a facial cream formula (Revitalift Triple Power Moisturizer, L’Oreal Paris, France) that contains the three mechanistically complementary topical actives: ascorbyl glucoside, retinyl palmitate and hyaluronic acid (HA) formulation in addition to niacinamide. Tested product was provided in blinded packaging to avoid bias during clinical and consumer evaluation.

Hydration test

The study was conducted to evaluate the effectiveness of the test product, in improving skin hydration over a 24-hour period. A total of 26 female subjects (average age 56, range 40–65 y.o) completed the trial. Participants were selected based on healthy skin on the volar surface of the forearms and a baseline Corneometer reading of 40 ± 10 a.u.

Skin hydration was measured instrumentally using a Corneometer CM 825 (Courage & Khazaka, Germany), which determines the electrical capacitance of the skin. Approximately 2 mg/cm^2 of the test product was applied to a randomized $4 \text{ cm} \times 4 \text{ cm}$ test site on the volar forearm and gently rubbed into the skin until absorbed. Subjects remained sequestered in a temperature- and humidity-controlled facility for the first eight hours of the study. Measurements were recorded at baseline, 15 minutes, 8 hours, and 24 hours post-application.

Clinical evaluation of product efficacy on aging population

Fifty-four women aged 35–55 years old were enrolled in a U.S. 4-week clinical study between December and February, with 53 completing the study. Participants represented diverse ethnicities, all phototypes and skin types, and 50% reported sensitive skin. Eligible subjects were regular moisturizer users ($\geq 2/\text{day}$) with mild to moderate signs of aging (scores 3–6/10 for fine lines, wrinkles, tone evenness, radiance/luminosity, firmness, elasticity, skin roughness/texture, and skin tone clarity). Exclusion criteria included visible skin conditions or medications interfering with study evaluation, excessive dryness or erythema, and pregnancy or planned pregnancy.

Participants were instructed to replace their usual facial cream with the test product, applying it to the face and neck twice daily (morning and evening). Test product was provided in blinded packaging. Clinical assessments, after 15 minutes of acclimation in a controlled environment ($70^\circ \pm 5^\circ \text{F}$; $40\% \pm 15\% \text{ RH}$), were performed at baseline and weeks 1, 2, and 4, evaluating skin aging parameters and overall appearance with self-assessment questionnaires completed by participants. Finally, tolerability was assessed at baseline and week 4.

Consumer perception evaluation on GLP-1 population

This study was a 4-week, home-use monadic test conducted from September to October. Study population consisted of 102 subjects out of an initial 145 who completed the trial; 43 subjects were disqualified due to non-compliance. Participants were women aged 40 to 65, current users of GLP-1 medications mainly for weight loss for at least one month and willing to continue to see a physician for regular check-ups while using GLP-1 medication. While weight loss was reported by participants as the main reason for GLP-1 prescription at least 20 participants had comorbidity and type 2 diabetes (T2D). Participants were excluded if currently pregnant or nursing, allergic to facial or body skin care products or currently treated by a dermatologists or physician, for a skin problem or irritation. Subjects were required to have a starting BMI between 25 and 39.9 and to have experienced at least three specific skin concerns since starting GLP-1 therapy, such as increased skin dryness, lack of firmness, or increased visible lines.

The test product was provided in blinded packaging. Subjects were instructed to replace their usual facial cream and avoid the use of any other cream other than the test product. Participants were instructed to apply the test product twice daily (morning and evening) to the face and neck for 4 weeks.

Data collection and questionnaire structure evaluative data were collected through online surveys at three specific intervals: immediately after first use, after one week, and after 4 weeks. Subjects assessed various attributes using: mainly 9-point Agreement and Satisfaction scales, where a score of 1 represented “Disagree Completely/Extremely Dissatisfied” and 9 represented “Agree Completely/Extremely Satisfied”, Yes/No questions and finally, open-ended questions were administered at the 4-week conclusion to capture qualitative likes and dislikes.

Statistical Analyses

Data were analysed by comparing post-treatment scores to baseline using a paired-t test after confirming normality test or with a Wilcoxon Signed-rank test if normality tests failed. Changes from baseline were considered significant at $p \leq 0.05$. Since Consumer perception evaluation failed the normality test, results were reported using median scores and frequency percentages.

Results & Discussion

This multi-arm program demonstrates that the test product was associated with consistent improvements in skin hydration, clinical signs of aging, and consumer-perceived skin quality in both a general aging population and individuals using GLP-1 therapies mainly for weight loss.

Instrumental hydration efficacy

A single product application produced a rapid and sustained increase in skin hydration compared to baseline and an untreated control site (Figure 1). Hydration increased significantly at 15 minutes (+46%; $p < 0.001$) and remained elevated at 8 hours (+30%; $p < 0.001$) and 24 hours (+20%; $p < 0.001$), indicating a prolonged moisturizing effect. No significant changes were observed at the untreated site.

Skin hydration is a key determinant of barrier function. HA plays a central role in maintaining epidermal moisture, and its depletion and redistribution with age contribute to skin dryness and reduced elasticity.²³ Consistent with previous reports, HA-containing formulations improve hydration and may reduce visible signs of aging.¹⁹

Clinical efficacy

In a 4-week clinical study in women with mild-to-moderate facial aging, significant improvements were

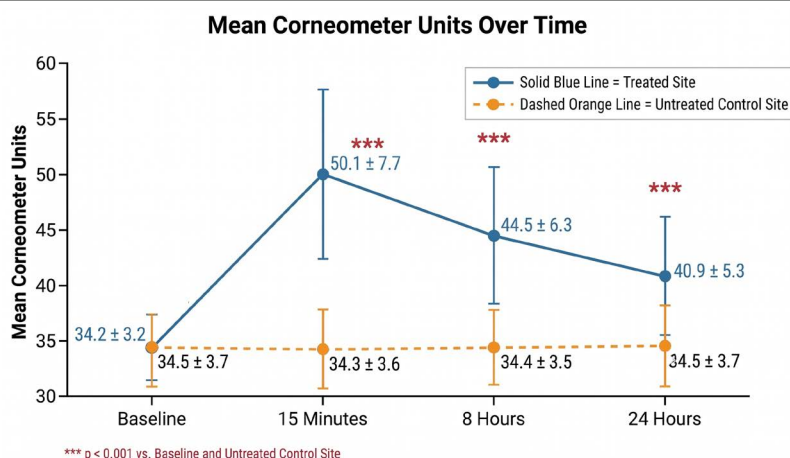


Figure 1. Skin hydration over time. A single application of the test product significantly improved skin hydration immediately (15 minutes) and maintained a statistically significant improvement through 24 hours post-treatment. Mean corneometer units \pm SD. *** $p < 0.001$ indicating statistically significant change versus control site.

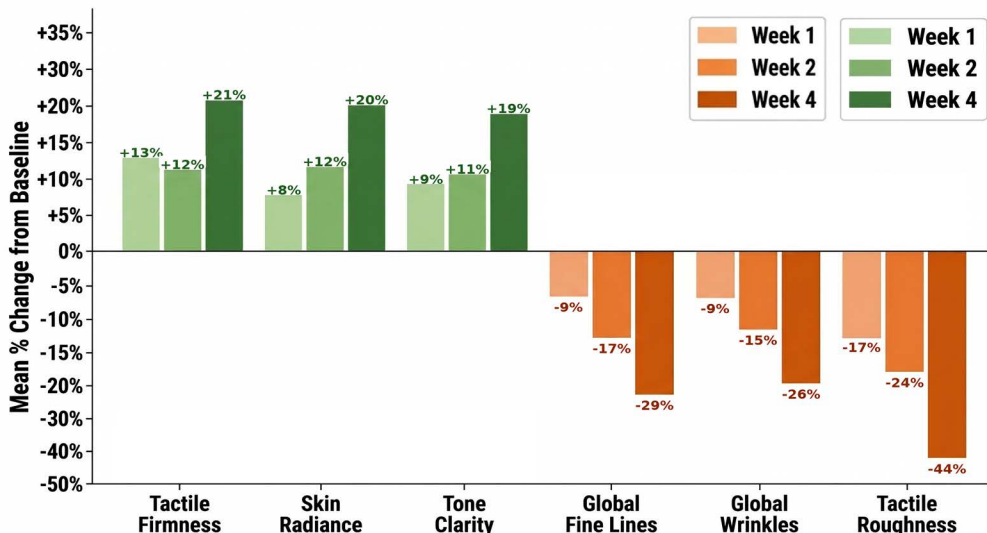


Figure 2. Clinical improvement of key skin aging signs over the course of 4 weeks of product application. Mean Clinical grade \pm SD. * $p < 0.05$ indicating statistically significant change versus baseline and a mean change of >0.25 grades.

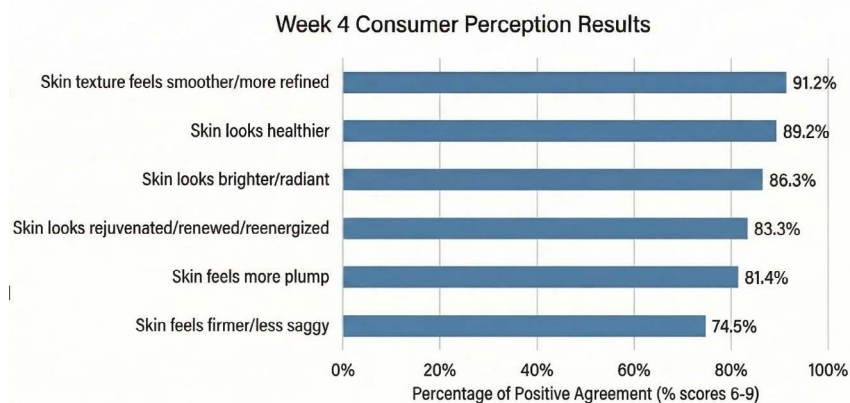


Figure 3. Consumer Perception after 4 weeks of product application. The consumer claim study indicates that the formulation is perceived as a potentially relevant supportive dermocosmetic approach for individuals on GLP-1 medications. The formulation successfully addresses the specific aesthetic and functional skin changes associated with rapid weight loss, resulting in improved skin quality, health, and high user retention.

observed from week 1, with all assessed parameters improved by week 4 (Figure 2). Firmness increased by 21% ($p < 0.001$), while roughness/texture decreased by -44% ($p < 0.001$). Radiance and tone clarity improved by 20% and 19% ($p < 0.001$), respectively. Fine lines and wrinkles were reduced by -29% and -26% ($p < 0.001$). Consumer perception reinforced the clinical observations, with 98% of clinical subjects satisfied with the tested product.

These changes are consistent with the sustained 24-h hydration profile, which may contribute to visible plumping and smoothing effects observed on the clinical study. Previous studies have shown that improved hydration is associated with reduced surface roughness and may correlate with improved firmness and reduced sagging.^{24,25}

Consumer perception in heterogenous GLP-1 population

Consumer self-reported exploratory study targeting a GLP-1 population using the medication mainly for weight loss showed high levels of satisfaction and perceived efficacy, with 89% of participants expressing overall satisfaction (Figure 3). After 4 weeks, 91% participants reported that skin texture felt smoother and more refined. Additionally, 86% reported increased radiance and 89% perceived healthier-looking skin. Notably, perceived improvements in firmness and skin support, frequently the most challenging parameter to impact topically, reached a significant consensus, with 74% of participants agreeing that their skin felt firmer and less saggy and 81% felt their skin was plumper. Also, participants reported improvements in perceived volume and elasticity

often associated with weight loss cohorts. These findings suggest that clinically measured improvements could translate into perceived benefits in individuals experiencing rapid weight loss–related skin changes.

Relevance to GLP-1–Associated Skin Concerns in a Metabolically Diverse Population

GLP-1 receptor agonists and dual GIP/GLP-1 agonists are associated with substantial weight loss, often accompanied by visible facial changes such as volume loss, increased skin laxity, and accentuated wrinkles.^{8,10,12} These effects, sometimes referred to as “Ozempic face,” likely reflect not only adipose tissue reduction but also changes in skin quality, including increased dryness and reduced elasticity.^{12,26} Participants in the present consumer study were specifically selected based on the emergence of such concerns following initiation of GLP-1 therapy mainly for weight loss. However, the GLP-1 cohort also included a subset of participants with T2D and associated comorbidities. Diabetes is known to affect skin barrier function, collagen structure, and wound repair; these factors may have influenced skin condition and response to treatment independently of GLP-1–associated weight loss.

Within 4-week self-perceived improvements were reported in the heterogenous cohort across key domains, including hydration, texture, firmness, and radiance. Moreover, by Week 1, participants began identifying the product’s role in their weight loss journey, with 77% agreeing that the cream was a “great ally/companion” for their skin during this period. While the heterogeneity of the study population and the relatively small size of this subgroup limited the ability to perform stratified analyses, and may have introduced variability in treatment response in general these findings allow to explore the relevance of the formulation as a supportive dermocosmetic approach for individuals under GLP-1 treatment experiencing weight loss–associated skin changes.

Mechanistic Alignment with Anti-Aging and Weight-Loss–Related Needs

The observed clinical and self-reported consumer outcomes could be explained by the complementary actions reported in the literature of the core actives, ascorbyl glucoside, retinyl palmitate/retinoid system and hyaluronic acid. However, mechanistic interpretations are based on known ingredient activity and were not directly assessed in this study. Ascorbyl glucoside is a stabilized vitamin C precursor that can be efficiently delivered into the skin and enzymatically converted to ascorbic acid, increasing intradermal antioxidant capacity, supporting collagen integrity in the face and protecting from oxidative stress that contributes to fine lines, loss of firmness, and dullness

in intrinsically aged and rapidly slimming faces^{14,15,27}. Retinoid technologies (retinol, retinyl esters, and related precursors) activate retinoic acid receptor pathways, up-regulate pathways linked to epidermal renewal and dermal remodeling, and reduce matrix-degrading enzymes such as MMP-2, translating clinically into improvements in fine wrinkles, global wrinkle severity, and photoaging scores.^{28–30} Retinoid-based regimens have also been shown to modify stratum corneum architecture and influence transepidermal water loss, supporting barrier renewal and counteracting the roughness and dryness^{28–30} which are frequently reported after rapid GLP-1–mediated weight loss.

Reduced caloric and lipid intake during GLP-1–mediated weight loss may also negatively impact epidermal lipid availability and barrier function, potentially contributing to increased skin dryness.³¹ Adequate lipid levels are essential for maintaining the integrity of the stratum corneum and limiting transepidermal water loss.³² Hyaluronic acid provides immediate hydration by increasing water retention in the stratum corneum.²³ Additionally, niacinamide another active ingredient present in the formula supports barrier function through stimulation of epidermal lipid synthesis, enhances skin brightening through melanosome transfer modulation, and promotes collagen and elastin production via fibroblast stimulation and its antioxidant properties.³³

Together, these actives may propose a useful ally of GLP-1 massive weight loss journey, providing short-term benefits (rapid trans-epidermal water loss reduction and several-hour hydration) and longer-term benefits (reinforced barrier, improved hydration, and defense against oxidative damage). The mechanisms described in the literature offer a plausible explanation for the observed and self-perceived improvements in hydration, skin texture, and firmness, addressing both intrinsic aging processes and potential changes associated with rapid weight loss.

Tolerance and Consumer Acceptance

Across studies, the test product showed a good tolerance and acceptance profile. In the clinical trial, all participants agreed that the formula felt gentle, and rated its sensory profile as non-greasy and non-sticky, which likely contributed to very high satisfaction rates and adherence. In the GLP-1 user cohort, 89% reported that their skin looked healthier after 4 weeks, and intent-to-continue-use exceeded 80%. These findings indicate that the formulation can be integrated into daily routines of both aging individuals and GLP-1 users without compromising comfort—an essential requirement for long-term use in real-world settings.

Strengths, Limitations, and Clinical Implications

A key strength of this work is the triangulation of instrumental data (24-hour hydration), expert-graded clinical outcomes (wrinkles, firmness, texture, radiance, clarity) with a 4-week study, and finally consumer-reported results in a targeted real-life heterogeneous GLP-1 population.

However, several limitations should be considered. The 4-week duration of the clinical study may not fully capture longer-term dermal remodeling effects, particularly those associated with retinoid activity and the absence of a vehicle-controlled comparator limits attribution of observed effects to specific active ingredients. The GLP-1 consumer study relied on a monadic, self-reported design without a control group, limiting causal interpretation and introducing potential expectation bias. In addition, variability in treatment exposure and weight loss among participants was not controlled and the study lacked instrumental assessments since GLP-1 consumer outcomes were based on self-reported measures without objective or clinician-assessed endpoint. Also, potential confounding factors, including dietary changes and concurrent skincare practices, were not controlled and may influence outcomes. Finally, mechanistic interpretations were not directly assessed and are based on known ingredient activity. Longer, randomized, controlled trials are warranted to confirm effect durability, quantify incremental benefit versus vehicle, and further characterize safety with extended use in non-diabetic GLP-1-users seeking weight loss.

Overall, data supports the test product as a potential multi-benefit dermocosmetic that addresses both chronological aging and GLP-1 rapid weight loss associated skin concerns. By coupling rapid, clinically proven hydration with significant improvements in wrinkles, firmness, and texture and self-perceived benefits in GLP-1 users, the formulation may represent a useful adjunct to daily skincare routines to modern weight-loss therapies and as a core anti-aging cream for broader populations.

Conclusion

This multi-faceted evaluation might indicate that the test product proposes an adapted skincare solution that effectively addresses both chronological aging and the specific skin concerns associated with rapid weight loss. By bridging instrumental findings of 24-hour hydration with expert-graded clinical improvements in wrinkles and firmness, the study implies an effective anti-aging potential of the tested product. Moreover, consumer perception data further reinforced these findings, with 98% of clinical subjects satisfied and 89% of GLP-1 users reporting that their skin looks healthier. More importantly, a vast majority of GLP-1 users agree that the cream was a “great ally/companion”

for their skin during this period. Consequently, this formulation is uniquely positioned to serve as an essential skincare companion for diverse populations, providing anti-aging benefits while supporting the specialized needs of modern weight-loss medication users.

List of abbreviations

HA: Hyaluronic acid

ECM: Extracellular matrix

GLP-1: Glucagon-like peptide 1

GIP: Glucose-dependent insulinotropic polypeptide

T2D: Type 2 diabetes

Conflict of Interest Statement

All authors are employees of L'Oréal.

Authors Contribution Statement

Most authors contributed equally on conceptualization and supervision of the manuscript preparation. BL was the lead scientist of the clinical study and MH the lead scientist of the GLP-1 consumer study. All authors have read and approved the final manuscript.

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Ethical Approval and statements

The study respected local legal requirements and was performed according to the principles of the Declaration of Helsinki. According to current USA regulations the studies were classified as a cosmetic one, so no approval was required prior to the study start. All subjects provided informed consent before each study.

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Conflict of Interest Statement

All authors are employees of L'Oréal.

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