Case Report
Volume 11:04, 2025

Journal of Cosmetology & Trichology

ISSN: 2471-9323 Open Access

The Efficacy of Ovoderm® to Improve Hair and Nail Condition

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Abstract

Hair loss and brittle nails affect millions of men and women of all ages and ethnicities and may impact their appearance and psycho-emotional well-being. Genetics, chronic inflammation, oxidative stress, internal and external factors (UV light, pollutants, aging, poor nutrition, as well as psycho-emotional stress), can damage hair follicle and nail plate, influencing the health and appearance of hair and nails.

Ovoderm® is a natural eggshell membrane-based oral supplement comprised of collagen, elastin and hyaluronic acid, among more than 400 biomolecules, with a relevant sulphur-bearing amino acid content, with well-known anti-inflammatory, antioxidant and cellular activation properties.

The aim of the present research was to study the effectiveness of Ovoderm® on hair and nails of healthy subjects with self-perceived increased hair shedding and/or nail brittleness.

The oral administration of Ovoderm® for 60 days resulted in significative improvement of hair density and decreased hair loss, as well as the improvement of scalp sensitivity. Likewise, participants in the Ovoderm® group experienced an improvement in their nail overall condition, in terms of nail hardness, growth rate and glow.

The study concluded as well that the ingredient is safe and well tolerated.

Keywords: Ovoderm® • Food supplements • Eggshell membrane • Hair • Nails • Hair density • Hair loss • Scalp • Nail hardness • Nail growth

Introduction

Objective

The objective of this 2-month randomized, double-blind, placebo-controlled study was to evaluate the efficacy of Ovoderm® (eggshell membrane based active ingredient) to improve hair and nail condition in healthy subjects with self-perceived increased hair shedding and/or nail brittleness.

Hair loss is a chronic and progressive common condition affecting both men and women that can cause a significant and well-documented negative psychological impact on self-image and self-esteem [1-3]. The prevalence of hair loss increases with advancing age both in female and male population. Androgenic alopecia (the most common form of hair loss in men) [4] affects approximately 50% of the adult men (progressing up to 70% in later life) [2]. Likewise, 12% of women first develop clinically detectable hair loss by age 29 years, 25% by age 49 years, 41% by 69 years and over 50% have some signs of hair loss by 79 years [5]. The prevalence of hair loss in female population raises during menopause. A recently developed study found that over 52% of women experience increased hair shedding and thinning in the post-menopausal period [6].

Hair loss has been recognized as a multi-factorial condition resulting from multiple endogenous and exogenous factors such as hormonal fluctuations, genetic susceptibility, aging, psycho-emotional stress, chronic inflammation, oxidative damage, diet and environmental triggers (such as pollutants or UV light) [7-10]. These factors contribute to dysregulation of hair follicle biology and functionality with a common inflammatory component identified in most hair loss disorders [11], affecting the follicle through increased expression of pro-inflammatory cytokines, perifollicular micro-inflammation and release of reactive oxygen species [10].

All phases of the hair cycle are subject to intrinsic and extrinsic factors that induce either anagen (hair growth) or catagen (regression and apoptosis), followed by telogen (resting phase). The decrease in expression of anagen-maintaining factors, as well as inflammatory processes, the release of ROS and inflammatory mediators (IL-1, TNF-α) alter the follicle and can dysregulate normal hair cycling, inducing the catagen phase [12-14]. Hair loss is ultimately the result of premature entry into the catagen phase.

On the other hand, nail brittleness is a common disorder characterized by weak inelastic nails that exhibit fragility, flaking and peeling and affects approximately 20% of the population (mainly women over 50 years of age) [15]. People suffering from brittle nail condition usually declare that their nails are weak, easily breakable and incapable of growing long [16]. In addition, nail growth decreases as we age by approximately 0.5% per year between the ages of 20 and 100 [16]. Brittle nails are usually a consequence of factors that alter nail plate production or damage the already keratinised nail plate [17]. Environmental stressors (UV light, pollution, chemical substances…) induce oxidative damage of nail keratin matrix and progressive dehydration of the nail plate, leading to weak and brittle nails [18].

At this sight, Ovoderm®, an innovative eggshell membrane-based ingredient stands out as a natural supplement to provide a multi-target approach to improve hair, scalp and nail condition in men and women, due to its clinically validated anti-inflammatory and antioxidant properties, as well as the ability to increase cellular activity and stimulate the synthesis of extracellular matrix biomolecules (collagen, elastin and hyaluronic acid), consequently restoring dermal structure and functionality [19-22].

The current study aimed to determine the ability of the daily intake of Ovoderm® to support hair and nail condition.

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Received: 28 May, 2025, Manuscript No. jctt-25-166139; **Editor assigned:** 30 May, 2025, PreQC No. P-166139; **Reviewed:** 14 June, 2025, QC No. Q-166139; **Revised:** 19 June, 2025, Manuscript No. R-166139; **Published:** 26 June, 2025, DOI: https://doi.org/10.5281/zenodo.15704231

Materials and Methods

Food supplement under evaluation

The dietary supplement evaluated in this study was Ovoderm® (Eggnovo, Spain). Ovoderm® is an all-natural eggshell membrane-based active ingredient manufactured by Eggnovo S.L. from upcycled eggshells through a patented manufacturing process (ES 2 181580B1 and ES 2 327087 B2). Ovoderm® preserves the natural composition of the eggshell membrane, predominantly comprised of fibrous proteins such as collagen types I-V-X and elastin [23,24] and moderate amounts of glycosaminoglycans (hyaluronic acid [25], dermatan sulphate and chondroitin sulphate [26,27]. Additionally, Ovoderm® arises as a source of sulphur due to the number of disulphide bonds and sulphur-bearing amino acids that have been quantified [28].

Subjects

The study enrolled a group of 67 healthy adults (18% men and 82% women) with self-perceived hair and nail issues aged from 21 to 70 years old. The mean age of participants was 45.3 ± 12.0 years old, being the majority of volunteers between 40 and 59 years old (63%). A 27% was under 40 and a 10% over 60 years old. 13 subjects identified themselves as Hispanic and the rest as Caucasian.

The main exclusion criteria were pregnancy or lactation; the use of products (supplements (vitamins or others) or topical products) or procedures that could interfere with the results; nail-biting habit and food allergies against the components of the test product.

Subjects agreed to follow study procedures, as well as maintaining their current diet, medications, exercise routines, hair shampooing and colour treatment frequency for the duration of the study. The study was conducted in compliance with good clinical practice. All participants provided written informed consents prior to participating.

Study design

Enrolled participants were randomized to receive 300 mg of Ovoderm® or placebo once daily for 60 days. The food supplement was administrated orally at home according to the instructions given by the investigators.

The study consisted of 3 clinic visits at baseline (day 0), day 30 and day 60 (Table 1). The investigator performed a physical examination at each visit, which included a basic visual evaluation of hair, scalp and nail condition. In addition, hair and scalp condition (including hair loss, hair density, scalp sensitivity and scalp dead skin) were assessed using the Dermoprime® Visio hair and skin analyser at each visit. Photographs on the nails for subsequent assessment were also performed at each evaluation point.

Likewise, subjects had to complete a self-assessment questionnaire at the last visit (day 60) about the perceived effects on hair and nails (Table 1).

Statistical analysis

Statistical analysis of the obtained results was performed. The improvement for each participant was determined for each assessment day comparing to the baseline value, obtaining the intra-subject improvement for each parameter. Results are shown as percentage of improvement compared to day 0. Differences between control and Ovoderm® group by unpaired t-test and between the end value (Day 60) and the baseline (Day 0) were analysed by paired t-test. Results are shown as mean ± Standard Deviation (SD). Statistical significance was considered with P-value of ≤0.05.

Safety

Subjects were queried about adverse events at each clinic visit and were encouraged to contact the investigator at any time to report the possible adverse events.

Results and Discussion

A total of 62 volunteers completed the full course of treatment and evaluation steps. None of the 5 dropouts were related to any discomfort or adverse reaction derived from the product nor the study procedure. The mean age of participants was 45.3 ± 12.0 years old. The two groups were not significantly different with respect to main study outcomes including hair loss, hair density, scalp sensitivity and nail condition (only scalp dead skin was significantly different between two groups).

Hair and scalp analysis

At every clinical visit (baseline, day 30 and day 60) the investigators measured participant's hair loss, hair density, scalp sensitivity and scalp dead skin using the Dermoprime® Visio hair and skin analyser.

Daily intake of 300 mg of Ovoderm® resulted in a significant increase of hair density after 30 days compared both to the base line and the control group ($p<0.05$). Likewise, hair loss decreased significatively after 60 days compared both to the base line and the control group ($p<0.05$) (Figure 1).

The Dermoprime® Visio hair and skin analyser also revealed a significant improvement in scalp sensitivity ($p<0.05$) after 60 days intaking Ovoderm® compared to the first evaluation day (reduction of 22%), as well as a tendency of scalp desquamation (dead skin) to decline (while increased in the control group).

Nail physical evaluation

Obtained photographs of the nails of the participants at each evaluation point were used for the subsequent objective evaluation of the response to the treatment.

The investigators evaluated the brittle nail symptoms and overall improvement of the nails at each visit. The assessment of the brittle nail symptoms included nail peeling, edge irregularities and nail stretch marks and was performed according to the grading system proposed by Sherber NS, et al. [29]: none, slight, moderate and severe.

Likewise, the investigators assessed the global improvement was defined as excellent, good, fair, no improvement, or worse, as described in the subjective 5-point scale [29].

From the evaluation of the obtained nail images, the investigators concluded that Ovoderm® decreased frequency of broken nails, improved nail glow and hardness and reduced hangnails and nail stretch marks (Figure 2).

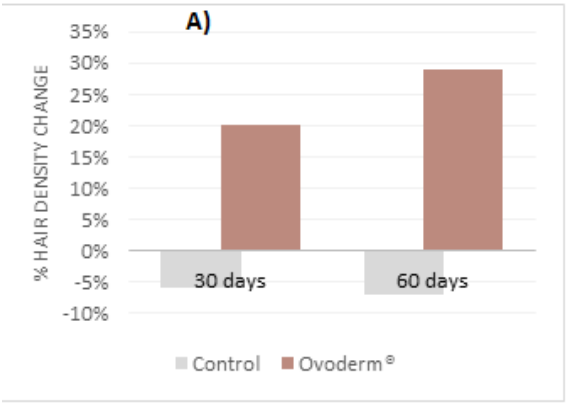
Self-assessment questionnaires: Hair and nail condition

At the last follow up visit, participants were queried about the impact of the daily intake of 300 mg of Ovoderm® during 60 days on different parameters related to their hair, scalp and nail condition.

Hair self-assessment questionnaire consisted of 10 questions about different parameters related to hair and scalp quality (Table 2).

Table 1. Assessment protocol description.

Screening Visit	First Follow Up	Second Follow Up
Day 0	**Day 30**	**Day 60**
Primary evaluation of all participants	Visual examination of hair and nails	Visual examination of hair and nails
Written informed consent signature	Hair and scalp measurements	Hair and scalp measurements
Visual examination of hair and nails	Nail photographs	Nail photographs
Hair and scalp measurements	-	Self-assessment questionnaire completion
Nail photographs	-	-



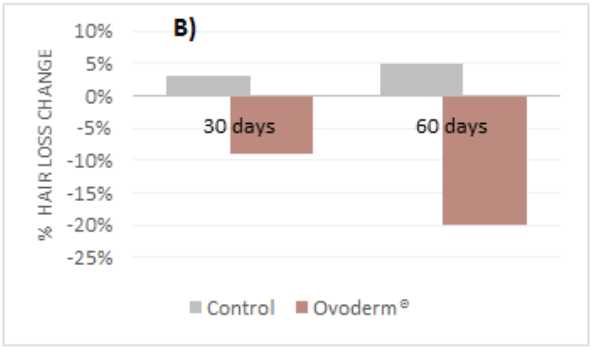


Figure 1. Change after 30 and 60 days of treatment in Ovoderm® and control groups. **A)** Hair density and **B)** Hair loss.

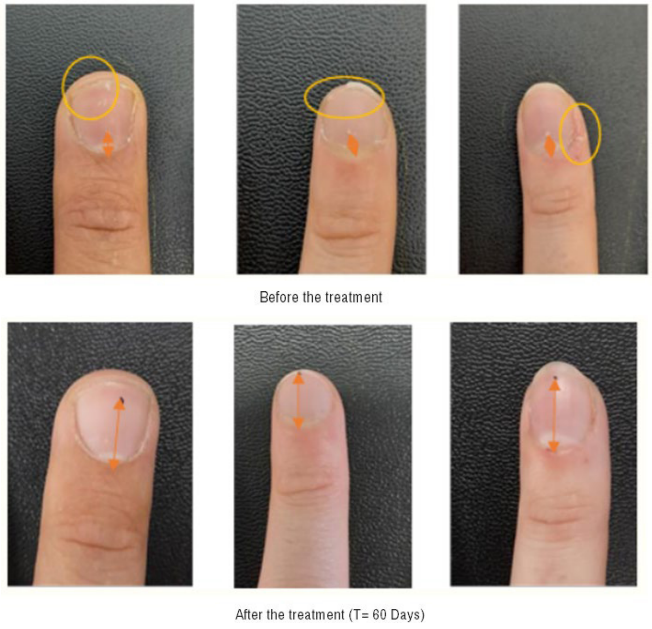


Figure 2. Images of the nails before and after 60 days of treatment in Ovoderm®.

Table 2. Hair self-assessment hair questionnaire results: % of participants that improved after 60 days intaking Ovoderm®.

Improved Parameter	% Subjects
Hair volume	74%
Hair thickness	59%
Hair loss	80%
Hair glow	65%
Hair hydration	68%
Scalp desquamation	33%
Scalp sensitivity	44%
Oily scalp	49%
Overall hair condition	82%

Table 3. Nail self-assessment questionnaire results: % of participants that improved after 60 days intaking Ovoderm®.

Improved Parameter	% Subjects
Nail growth	66%
Brittle nails (Lamellar peeling and edge irregularities)	61%
Nail strength	70%
Nail glow	50%
Hangnails	50%
Overall nail condition	70%

A significant percentage of subjects receiving Ovoderm® reported improvement in hair volume (74%) and hair overall condition (82%), as well as decreased hair loss (80%). In addition, the 40% of the participants indicated new hair growth when queried about the effects perceived after 60 days of treatment with Ovoderm® in an open-ended question.

Nail self-assessment questionnaire consisted of 6 questions about different parameters related to nail condition (Table 3).

A 70% of participants declared improved nail hardness and overall condition after taking Ovoderm® for 60 days and a 66% perceived increased nail growth rate.

Safety

No treatment-related adverse effects were reported during the study.

Conclusion

The results of the current study demonstrate that the oral administration of Ovoderm® improves the overall condition of hair and nails. Ovoderm® appears as an effective, safe and well tolerated dietary supplement that comprehensively addresses various of the multiple factors that affect the follicle and nail plate.

The daily oral supplementation of 300 mg of Ovoderm® for 60 days resulted in a significant increase of hair density and decreased hair loss and scalp sensitivity, Likewise, nail condition also improved remarkably in terms of nail hardness, growth rate and glow.

The vast majority of the participants perceived these improvements on their hair and nail condition and the 83% of the participants reported that they would recommend Ovoderm® to other people.

Acknowledgement

None.

Conflict of Interest

Authors have no conflict of interest.

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How to cite this article: Iriberri, Oihane Nieto, Erena Gil-Quintana, Andrés Aguirre and Alicia González del Pozo. "The Efficacy of Ovoderm® to Improve Hair and Nail Condition." *J Cosmo Tricho* 11 (2025): 331.