

Beneficial Effects of a Medical Hand Care System in Different Skin Conditions and in Hand Eczema

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Abstract

We investigated efficacy, skin compatibility and caring properties of a medical hand care system consisting of 3 hand creams. The creams are based on o/w emulsions and were developed to meet the specific needs of different skin conditions:

- a cream with a high content of skin regenerating panthenol, moisturizing glycerol and caring lipids for sensitive and intensively exposed skin (Eucerin® pH5 Hand Cream, "A");
- a cream containing 5% urea, glycerol and lipids for dry skin, also in atopic patients (Eucerin® 5% Urea Hand Cream, "B");
- a cream containing UV filter (SPF 15) and the anti-oxidant ubiquinone (Eucerin® Q10 Anti-Age Hand Cream, "C").

For cream A suction blister studies in 30 patients demonstrated a significant enhancement of epidermal regeneration after regular application for 6 days. These results were further substantiated in a broad, open label in-use study in 286 healthcare professionals. Occupational skin stress was rated to be strong by 52% of the participants. Efficacy of the cream was rated in approx. 96% of the cases to be very good or good; assessment of tolerability was excellent (96.8% very good or good ratings).

For creams B and C efficacy tests regarding moisturization, skin roughness and skin protection showed significant results. Furthermore, an urea replenishing effect was proven for cream B.

Clinical studies performed for 2 weeks in patients with sensitive and/or dry skin including chronic dermatoses demonstrated excellent skin compatibility of all creams with no side effects being reported. Skin condition of all patients was normalized or improved at the end of the study periods.

We conclude that the Eucerin® medical hand care system consisting of pH5 Hand Cream, 5% Urea Hand Cream and Q10 Anti-Age Hand Cream is excellently suited for subjects with sensitive or dry skin under all kinds of daily life conditions, even in hand eczema.

Introduction

The skin of the hands is exposed to numerous hazards in the working environment, at home, during hobbies and vacations (1). Chemical substances very often act as skin irritants and sometimes skin sensitizers. The skin of hands is an important port of entry for many biologic agents like bacteria, fungi, or viruses, especially when injured. Skin disorders associated with impaired barrier function as described for atopic dermatitis predispose for developing hand eczema. The hands and fingers are the most common sites of mechanical damage including cuts or abrasions. Physical hazards like UV-rays can promote skin aging and the development of skin cancer.

Therefore, the specific skin conditions of the hands require specific skin-care regimens for the prevention of skin irritation, occupational dermatoses like hand eczema, and premature skin aging. Moisturizing creams containing urea have been reported to improve the physical and chemical status of the skin surface, so as to smooth, soften and make dry skin more pliable (2). Dexpanthenol has been shown to be effective against skin irritation (3). Coenzyme Q10 has been described in preventing the signs of skin aging (4). The following studies investigated efficacy, skin compatibility and caring properties of a medical hand care system consisting of 3 hand creams developed to meet the specific needs of different skin conditions.

Materials and Methods

Test products

A: pH5 Hand Cream: INCI: Aqua, Glycerin, Panthenol, Hydrogenated Coco-Glycerides, Stearyl Alcohol, Paraffinum Liquidum, Stearic Acid, Cetyl Alcohol, Aluminum Starch Octenylsuccinate, Dimethicone, Phenoxyethanol, Tocopherol, PEG-100 Stearate, Glyceryl Stearate, Sorbitan Stearate, Methylparaben, Carbomer, Trisodium EDTA, Sodium Citrate, Propylparaben, Citric Acid, Glucosyl-rutin, Isoquercitrin, Parfum, o/w emulsion

B: 5% Urea Hand Cream: INCI: Aqua, Glycerin, Urea, Glyceryl Stearate, Stearyl Alcohol, Cyclomethicone, Dicaprylyl Ether, Sodium Lactate, Dimethicone, PEG-40 Stearate, Aluminum Starch Octenylsuccinate, Lactic Acid, Phenoxyethanol, Methylparaben, Xanthan Gum, Propylparaben. Perfume free, o/w emulsion

C: Q10 Anti-Age Hand Cream: INCI: Aqua, Glycerin, Cyclomethicone, Glyceryl Stearate, Butylene Glycol Dicaprylate/Dicaprate, Cetearyl Alcohol, Ethylhexyl Triazone, Phenylbenzimidazole Sulfonic Acid, Alcohol Denat., Triisostearin, Dimethicone, Butyrospermum Parkii, Disodium Phenyl Dibenzimidazole Tetrasulfonate, Hydrogenated Coco-Glycerides, PEG-40 Stearate, Caprylic/Capric Triglyceride, Phenoxyethanol, Sodium Carbomer, Methylparaben, Trisodium EDTA, Propylparaben, Ubiquinone, Parfum, o/w emulsion

Suction blister study (Eucerin® pH5 Hand Cream, "A")

30 volunteers (16 females and 14 males, mean age: 35,9 years) with healthy skin were enrolled into the study conducted in accordance to GCP. At the start of the study epidermal blisters (6 mm in diameter) were induced by suction with a negative pressure pump on the back of the volunteers. After removing the blister roofs transepidermal water loss (TEWL) values of the lesional skin were documented (baseline level). 30 min later test preparations were applied under occlusion in Finn chambers, (Ø 18 mm). Control areas were treated with physiological saline solution (0,9% SCI). TEWL was monitored daily until day 6 and occlusive treatments were resumed each day immediately after finishing the TEWL measurements.

Open-label application study (Eucerin® pH5 Hand Cream, "A")

286 healthcare professionals (dermatologists) working in private practice participated in this study. Participants were asked for a self-assessment of occupational skin stress, frequency of daily hand washing and symptoms of skin irritation such as dryness, scaling, erythema, and itching. Skin stress of the hands was evaluated on a 3-point scale (slight, moderate, severe), the severity of symptoms was assessed according to a 4-point scale (0= none, 1= mild, 2= moderate, 3= severe). After approx. one week of using the product the hands were re-assessed with regard to the above symptoms and the participants were asked for an evaluation of efficacy and skin tolerability. In addition, the frequency of daily product application had to be documented.

Efficacy tests (Eucerin® 5% Urea Hand Cream, "B", and Eucerin® Q10 Anti-Age Hand Cream, "C")

31 volunteers with healthy skin were enrolled into the studies. At the start of each study a pre-treatment period of 1 week took place without any application of care products. The test products (cream B respectively cream C) were applied twice daily.

Moisturisation, skin roughness and urea content (for product B) were assessed at baseline, after 1 day, 1 week, 2 weeks of treatment and 3 days after last application. 20 volunteers with healthy skin were enrolled into a repetitive irritation test. The products (cream B respectively cream C) were applied 10 min before irritation with a tenside (sodium dodecyl sulfate, SDS). Measurement of skin protection effect was performed by monitoring TEWL.

Clinical in-use studies (Creams A, B, C)

20 patients each with sensitive (creams A, C) or dry (cream B) skin including different dermatoses like atopic dermatitis and psoriasis were enrolled in the open, dermatologically controlled studies. Symptoms such as dryness, scaling, eczema, erythema and itching were assessed by the physician at baseline and after 2 weeks of treatment. Each symptom was evaluated on a five-point scale. After 2 weeks of treatment the skin of the hands was reassessed by the physician and changes in skin condition with regard to the baseline evaluation as well as tolerability of the product were evaluated according to a 4 point scale (normalized, improved, unchanged, worsened respectively very good, good, moderate, poor). In addition, the patients evaluated tolerability and cosmetic performance of the products at the end of the study. Product performance (moisturization, absorption, spreadability, skin smoothness, caring effect, smell, consistency) was rated on a seven-point scale.

Results

Suction blister study

The application of Eucerin® pH5 Hand Cream significantly accelerated epithelial regeneration in comparison to the control solution. This was shown by a reduction of transepidermal water loss in the suction blister lesions (Fig. 1).

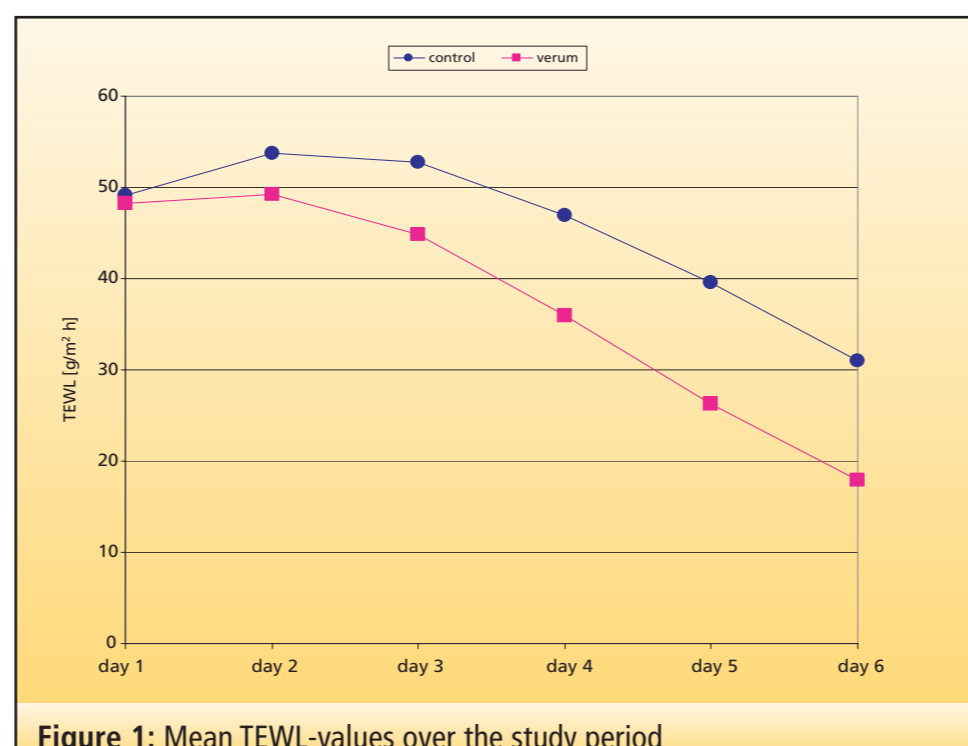


Figure 1: Mean TEWL-values over the study period

Open-label questionnaire and application study

The results obtained in the suction blister study were substantiated in this broad open label in-use study in healthcare professionals. Most participants reported a high frequency of hand-washing and rated the occupational skin stress to be strong. Symptoms most frequently reported were xerosis and scaling (Fig. 2). Using Eucerin® pH5 Hand Cream for approx. one week clearly improved the skin condition. In most cases (64,7%) no more than 5 applications per day resulted in a remarkable reduction of skin dryness, scaling, erythema and itching (Fig. 2). As a result, the overall efficacy of the test product was assessed in 96% of the cases to be "very good" or "good". Furthermore, skin tolerability of the Eucerin® pH5 Hand Cream was excellent with 96.8% "very good" and "good" ratings (Fig. 3).

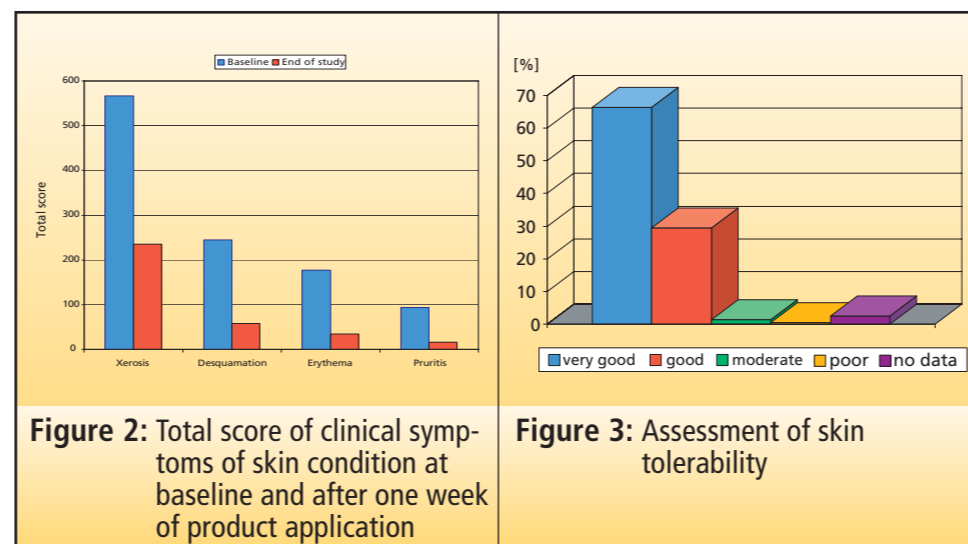


Figure 2: Total score of clinical symptoms of skin condition at baseline and after one week of product application

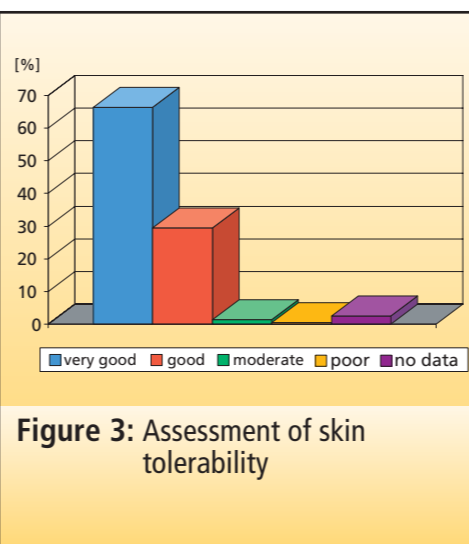


Figure 3: Assessment of skin tolerability

Efficacy tests

The application of Eucerin® 5% Urea Hand Cream improved skin moisturization as shown by an increase of corneometer units (Fig. 4a) and the content of urea (Fig. 4b). This increase of skin urea content was statistically highly significant. The cream reduced skin roughness (Fig. 4c) measured by topometry in the treated areas in comparison with untreated skin and protected the skin against SDS stress (Fig. 4d). Both effects were also statistically significant. The same tests (except urea content) performed with Eucerin® Q10 Anti-Age Hand Cream showed nearly identical results.

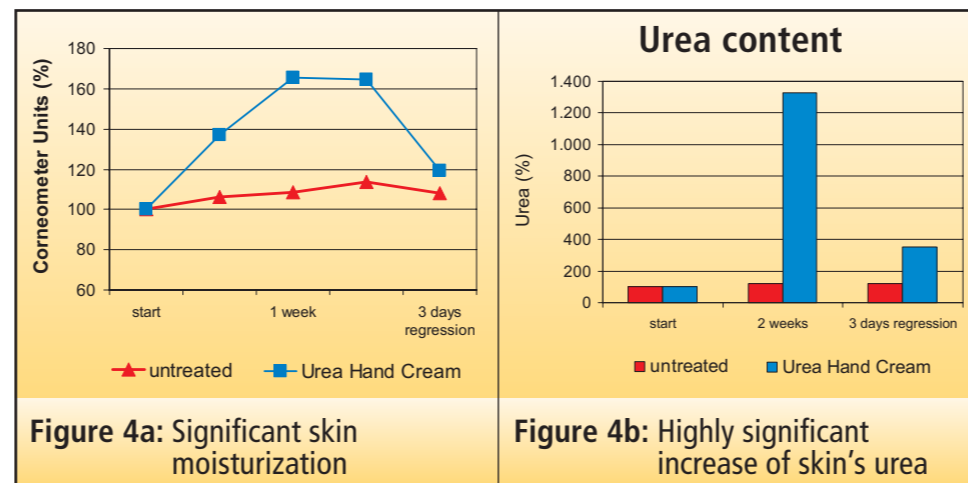


Figure 4a: Significant skin moisturization

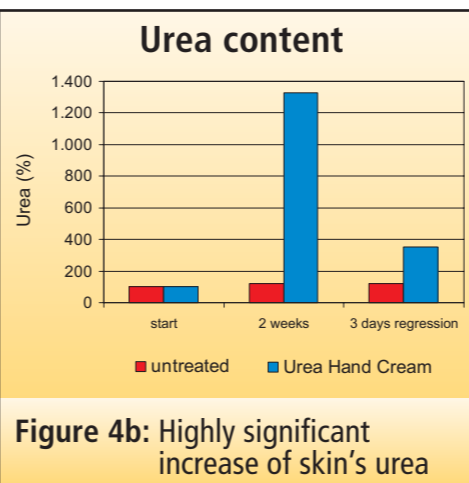


Figure 4b: Highly significant increase of skin's urea

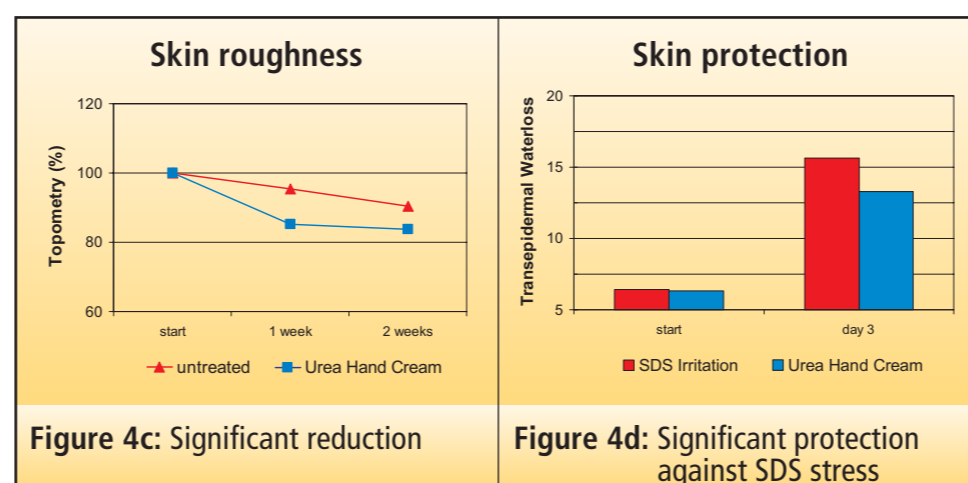


Figure 4c: Significant reduction

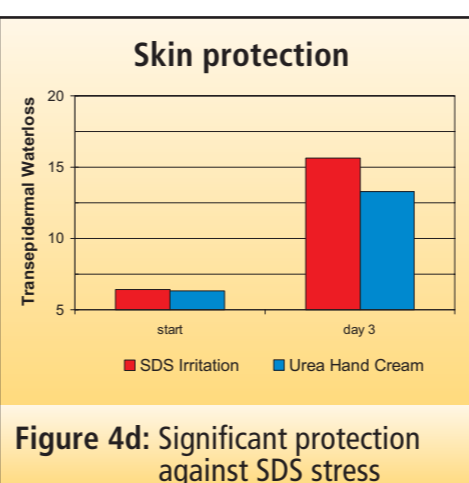


Figure 4d: Significant protection against SDS stress

Clinical in-use studies

When comparing the general skin condition of the hands at the end of the studies to that at the start of the studies, most of the cases had either normalized (A: 7 patients / 35%, B: 10 patients / 52.6%, C: 3 patients / 15.0%) or improved skin status (A: 13 patients / 65%, B: 9 patients / 47.4%, C: 13 / 65.0%). The assessment of the tolerability by the investigators and by the patients was predominantly rated to be "very good" or "good".

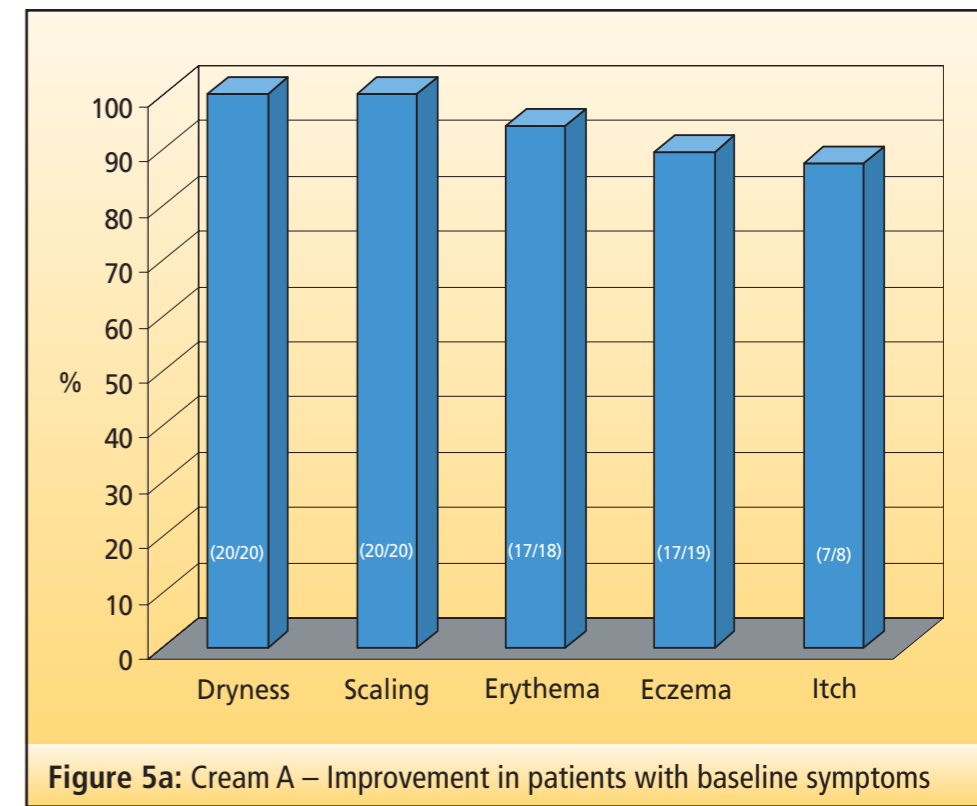


Figure 5a: Cream A – Improvement in patients with baseline symptoms

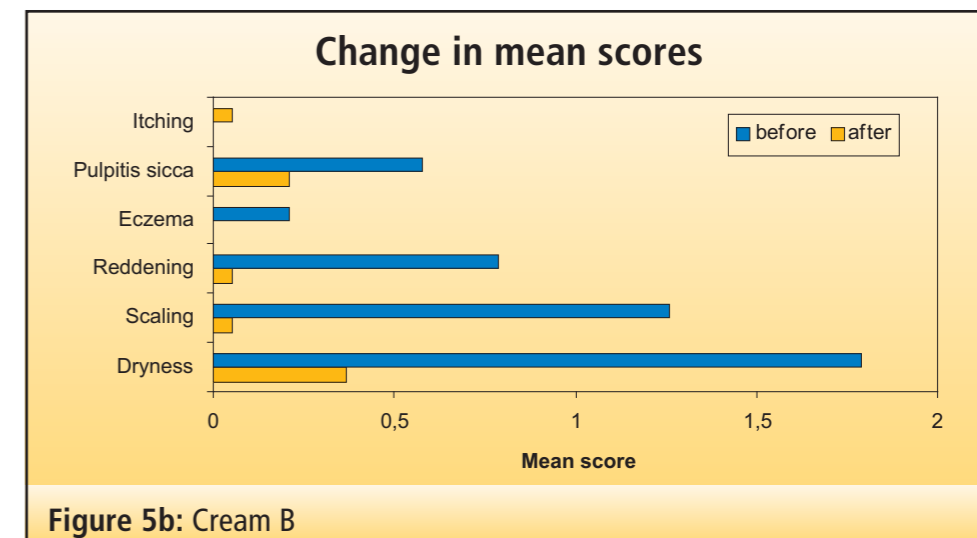


Figure 5b: Cream B

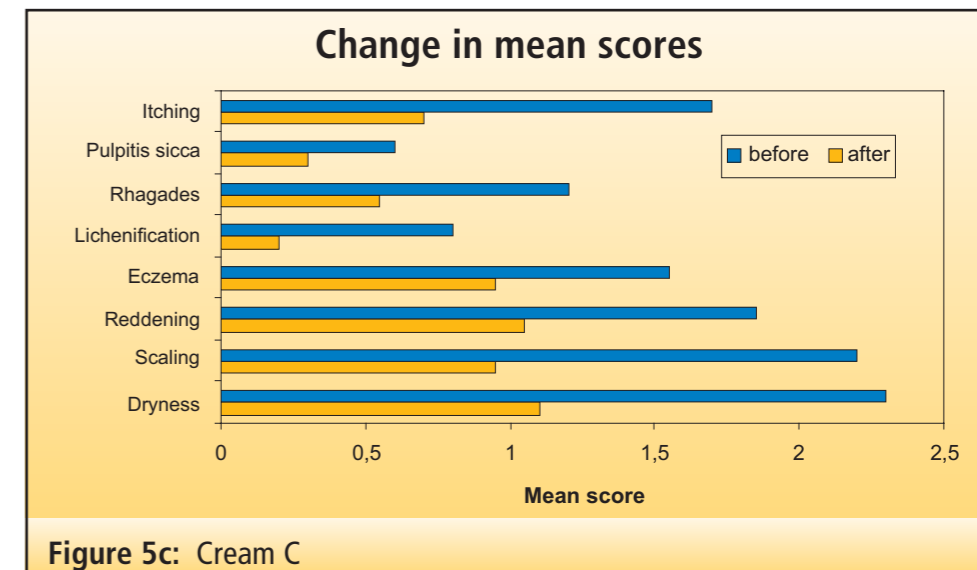


Figure 5c: Cream C

The comparison of the average scores of the assessments of the solicited symptoms before and after the studies showed statistically significant improvements for dryness, scaling, reddening, eczema, and pulpitis sicca (Fig. 5a: Cream A, 5b: Cream B and Cream C). The most pronounced changes were observed for the dryness and scaling of the skin. The assessments of the product properties did not vary a lot between the different characteristics which were judged by the patients predominantly as "very good" or "good". Based on the positive experiences during the studies, the investigators would further recommend the tested hand creams in nearly all cases. Almost all patients indicated that they would like to keep using the tested product after the end of the study.

Discussion and Conclusion

Protective and regenerative measures are essential for the skin of the hands, as irritants and allergens can penetrate easier into the skin in case of a damaged skin barrier. Additionally a disturbed barrier function induces a rapid production of pro-inflammatory cytokines by the keratinocytes (5). Furthermore, chronic exposure to sunlight makes hand skin especially prone to premature skin aging. For medical hand care preparations it is important to meet the specific needs of hand skin in order to treat and prevent successfully common dermatoses like hand eczema and prevent premature skin aging. In the present studies we could show that Eucerin® medical hand care system, especially developed for specific skin conditions of the hands and consisting of pH5 Hand Cream, 5% Urea Hand Cream and Q10 Anti-Age Hand Cream, is excellently suited for subjects with sensitive or dry skin under all kinds of daily life conditions, even in hand eczema.

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