

Digital Image Analysis of Skin Improvement Following Use of a Novel Treatment Cleansing Technology

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INTRODUCTION

The human skin is the outermost layer of the human body, established as the protective barrier. Every day the skin guards the internal organs from outside insults, maintains the protective barrier from internal influences, while going through constant renewal processes. At the end of the renewal processes, desquamation occurs shedding the outermost layer. There are different speculations on the reasons why desquamation occurs. One of the hypotheses is that desquamation is a protective mechanism by which the skin removes the contaminant-exposed outer layer from impacting the skin below [1]. As we age, desquamation slows down [1]. In many cases, skin diseases and conditions manifest as inadequate desquamation [1]. Proper desquamation is a sign of healthy skin, and skin exfoliation by stimulated desquamation, can alleviate the signs of skin aging [2].

Healthy skin is maintained with proper hygiene, which requires the removal of deposits and harmful microorganisms from the skin surface. People go through different cleansing routines based on their personal preferences. In addition, the area of the skin that's exposed to more filth, like the hands, is cleansed multiple times throughout a day, to prevent diseases and other problems. For most people, the face is cleansed twice daily, morning and evening. Surfactants can improve the cleansing efficacy. Mechanical movements on the skin surface can also remove deposits. We developed a novel facial treatment cleansing mechanical device with accompanying treatment cleansers based on common skin types, that will exfoliate the skin by gently stimulating desquamation and remove deposits on the face, maintaining and improving skin health.

RESULTS AND DISCUSSION

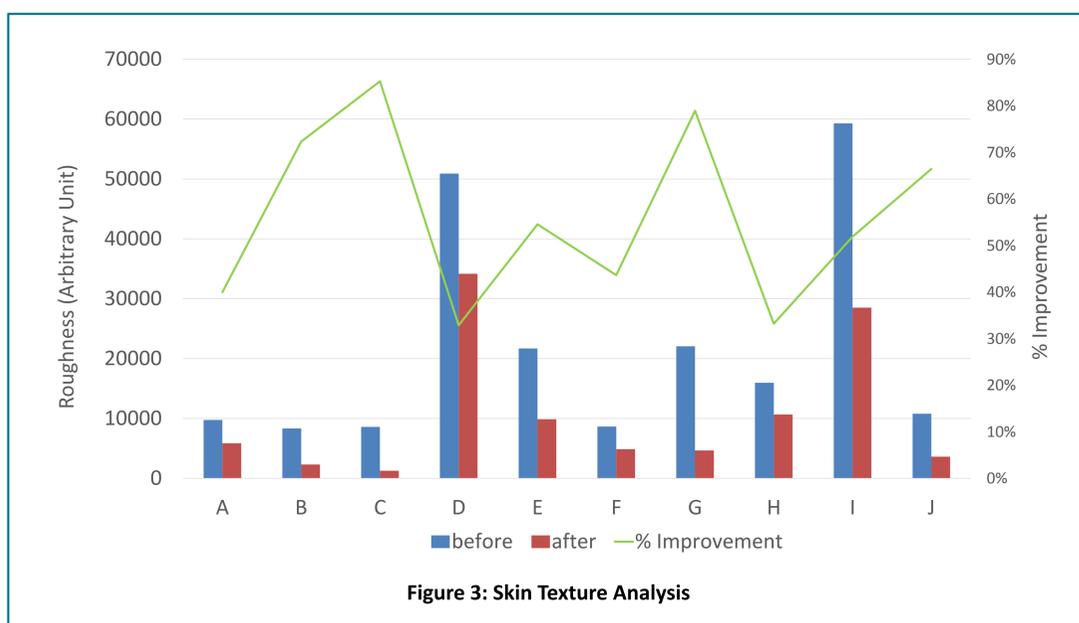


Figure 3: Skin Texture Analysis

Photography was used as a visual record and tool for measuring the efficacy of the test regimen. All photographs for before and after the treatments were analyzed independently followed by comparison to subject-specific images. Before and after photographs were taken using the Matched Scientific Photography™ protocol developed by AMA labs. The pixel image analysis comparing subject photographs before to after product regimen use demonstrated efficacy in improving the appearance of skin texture. The results are shown in Figure 3. The x-axis denotes individual subjects who were in the study and the y-axis on the right represents the raw pixel data for roughness for these subjects. The y-axis on the left, shown as the green line, is the individual's percent improvement. The blue bar graph is before the treatment and the red bar graph is the after the treatment. Overall, all 10 subjects showed improvement to varying degrees. On average, 51% improvement was seen. The maximum improvement was 85% from Subject C and the least improvement was 33% from Subject D. Representative before/after photo comparisons are shown in Figure 4 for two subjects. The subject on the left is Subject I and the subject on the right is Subject G.

All 10 subjects reported improved skin softness and smoothness. In addition, the majority of subjects reported the skin treatment/cleansing regimen to be effective in improving the overall texture and condition of the skin, leaving skin softer, smoother and significantly more hydrated when evaluated immediately after product regimen use.

CONCLUSIONS

- The novel treatment cleansing device was shown to gently exfoliate the skin for skin attribute improvements.
- The device was able to improve skin softness and smoothness, immediately after one use.
- Photography was successfully used as a visual analytical tool to demonstrate the changes in skin texture.
- The product regimen demonstrated efficacy in skin texture improvement.

METHODS

Ten healthy female panelists ages 25-65 years of age, Fitzpatrick skin type I-II with normal healthy skin were recruited for an IRB-approved single-visit clinical study of a skin treatment cleansing regimen consisting of a novel treatment cleansing device (Figure 1) and an associated treatment cleansing topical product. Subjects were required to abstain from using any facial anti-aging/anti-wrinkle and exfoliating products for a period of one week prior to the study visit.

On the day of the visit, the test subjects reported to the facility with their face area devoid of topical treatments. After acclimation to the ambient environment for 30 minutes, a clinician examined subjects and baseline high-resolution photographs were taken. Photographs of the whole face were taken with a fixed camera background, distances, angles, settings, lighting, automated subject positioning, color bars, white balance, standardized and digitally certified unretouched. Subsequently each subject was given a treatment/cleansing device, a treatment-cleansing topical for the dry skin type and provided with written and verbal instructions on the proper execution of the treatment/cleansing regimen (Figure 2). All subjects were required to follow the test regimen and were monitored by clinical staff during execution to assure compliance with the sponsor supplied instructions. Fifteen minutes following product regimen use, high resolution matched digital photographs were again taken and subjects completed a self-assessment questionnaire.

All photographs were evaluated and analyzed by a proprietary PhotoGrammetrix™ image analysis system, which uses individual pixels and software to analyze a digital image. A Student's paired t-test analysis was used to compare post-regimen measurements to baseline with statistical significance of $p \leq 0.05$. No adverse effects or reactions of any kind were observed on any of the subjects.

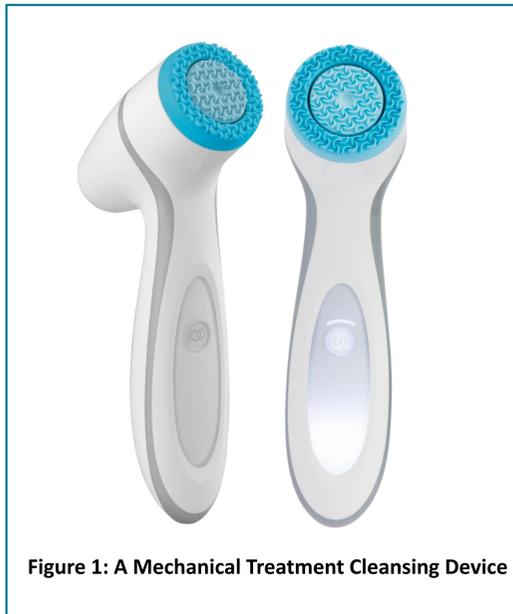


Figure 1: A Mechanical Treatment Cleansing Device

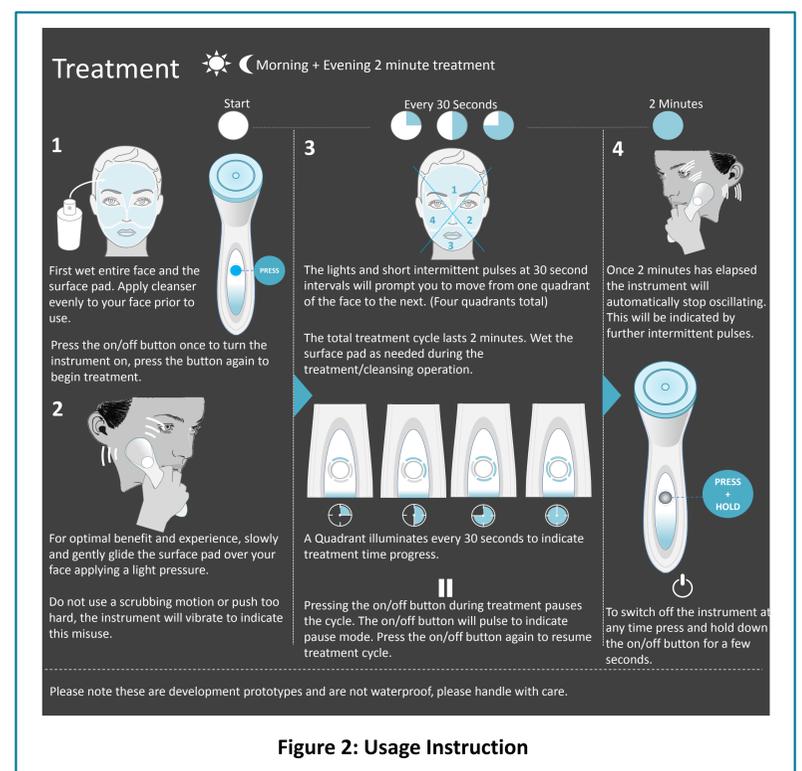


Figure 2: Usage Instruction



Figure 4: Before/After Photo

REFERENCES

1. Milstone, LM. Epidermal desquamation. Journal of Dermatological Science 36: 131-140 (2004).
2. Rawlings, AV. Molecular basis for stratum corneum maturation and moisturization. British Journal of Dermatology 171 (Suppl. 3): 19-28 (2014).

ACKNOWLEDGEMENT

AMA Laboratories, Inc. facilitated the clinical study and analyzed the images using their proprietary software.