A novel microcurrent device to improve skin structure and appearance

Microcurrent technology, 25 – 500 uA direct current constant or pulsed, has been used for more than a century to treat a broad spectrum of human ailments, and today the microcurrent facial has become a staple in aesthetic salons claiming cellular rejuvenation, facial toning, and reduction in the appearance of lines and wrinkles. In the literature, many studies can be found supporting the utility of microcurrent technology for wound and bone healing, muscle strength restoration, and pain relief, but few controlled studies exist on the use of microcurrent for improving appearance.

## INTRODUCTION

A transcutaneous electrical nerve stimulation (TENS) microcurrent attachment, powered by the counter oscillating motion of a facial treatment/cleansing device (Figure 1), was developed to deliver low level microcurrents to facial skin. A biphasic modulated waveform (Figure 2) with a maximum current of 250 uA across a total surface contact area of approximately 12 cm² was used in this study.

An IRB approved, single center, evaluator blinded, randomized, controlled, split-face, clinical trial was conducted. Twenty-three subjects, 20-40 years of age, used the microcurrent device and a conductive gel on one side of their face and only conductive gel on the other side, once each day for 4 weeks following a full facial cleansing (performed twice each day, morning and evening) using the counter-oscillating skin cleansing device. Subjects selected one of three cleanser types, Normal/Combo, Dry or Sensitive Skin for the preparatory cleansing step.

Clinical evaluations were conducted at baseline, both before and 15 minutes after microcurrent treatment and at weeks 1, 2, and 4. Three trained clinical graders evaluated 18 facial skin areas subject to treatment or control (Figure 3) for fine lines, overall appearance, radiance, tactile roughness, visible roughness and evenness of skin tone. Controlled position, full-face digital images were taken and analyzed. Subjects answered a self-assessment questionnaire.

## MATERIALS & METHODS

A transcutaneous electrical nerve stimulation (TENS) microcurrent attachment, powered by the counter oscillating motion of a facial treatment/cleansing device (Figure 1), was developed to deliver low level microcurrents to facial skin. A biphasic modulated waveform (Figure 2) with a maximum current of 250 uA across a total surface contact area of approximately 12 cm² was used in this study.

## RESULTS

There was a statistically significant improvement in clinical grader scores for all evaluated parameters at each post-baseline time point with a statistically significant difference in favor of the TENS microcurrent treated side of the face by week 4 (Figure 4). Subject self-assessment analyses revealed statistically significant improvement in responses for skin brightness, noticeability of pores, skin spots and skin softness at week 4 over baseline with the scores for the TENS treated side of the face being statistically significant for a number of assessed attributes at certain time points (Figure 5).

## CONCLUSION AND DISCUSSION

A 250 uA biphasic pulsed electrical current applied over 2 minutes once each day improves the aesthetic performance of a silicone surface, counter oscillating cleansing device. Skin circulatory blood flow, skin extracellular matrix remodeling and ATP synthesis are additional possible mechanisms worthy of additional investigation.

## CONFLICT OF INTEREST

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