

# A NOVEL MICROCURRENT DEVICE TO IMPROVE SKIN STRUCTURE AND APPEARANCE

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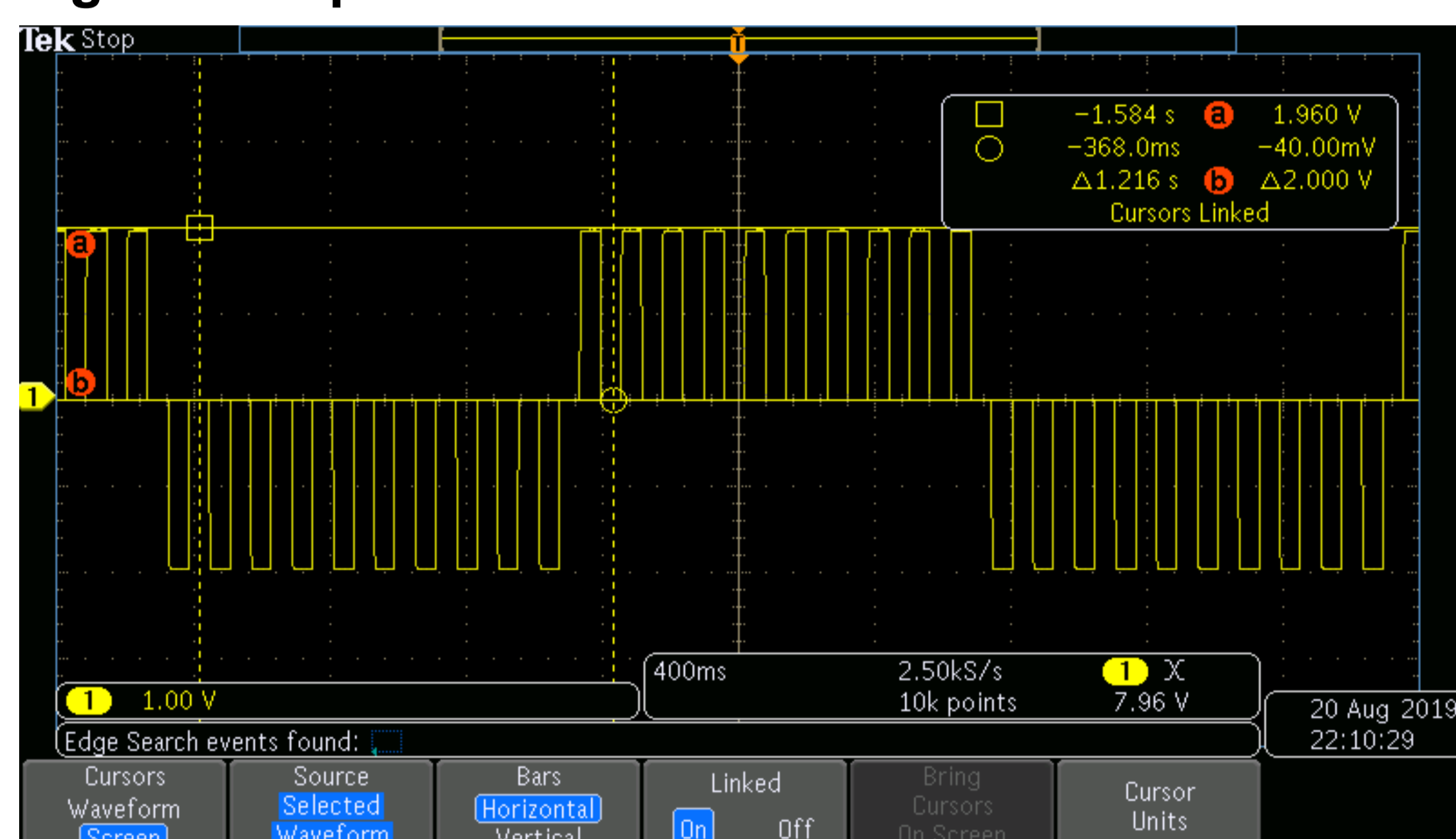
## INTRODUCTION

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.

## MATERIALS & METHODS

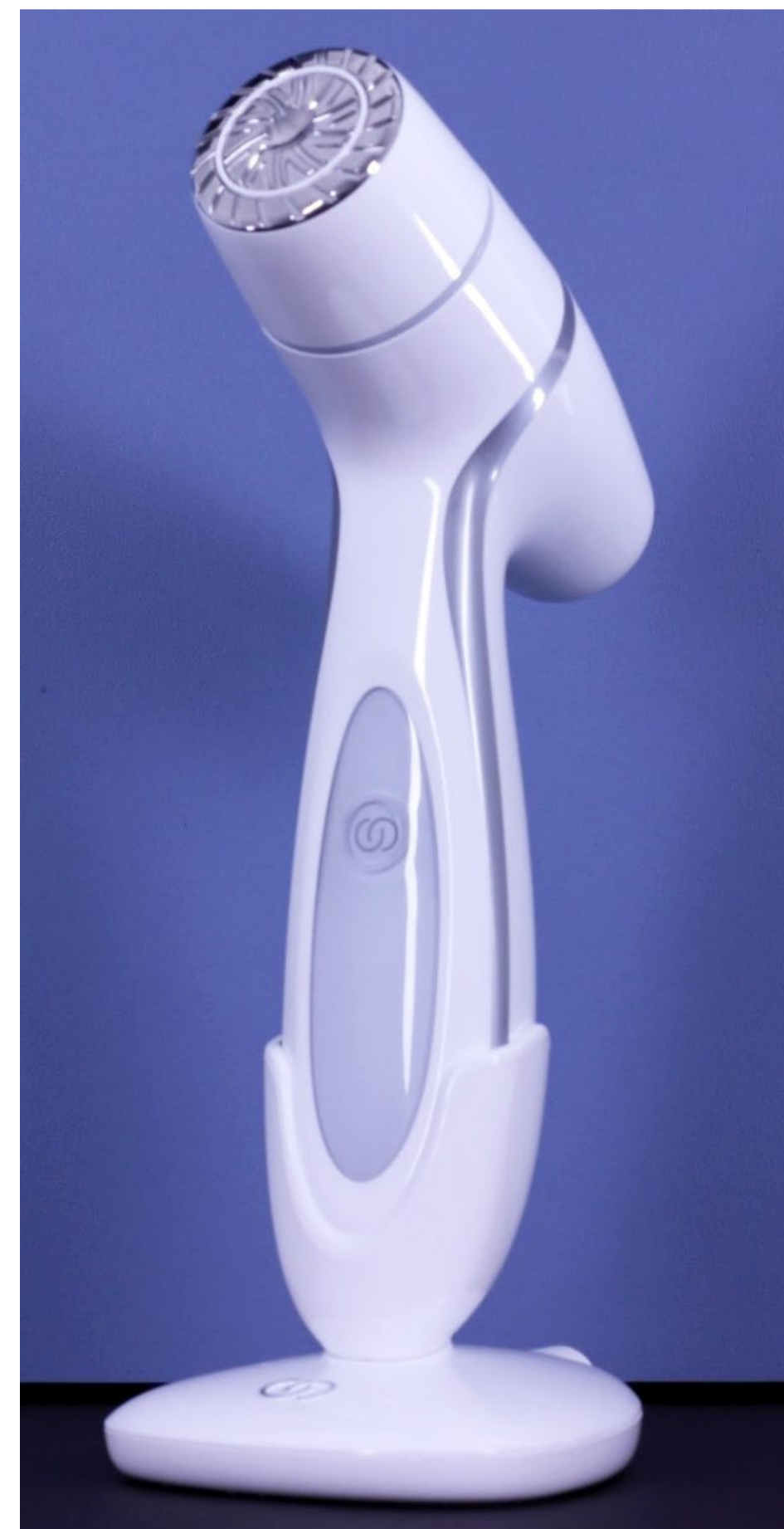
A transcutaneous electrical nerve stimulation (TENS) microcurrent attachment, powered by the counter oscillating motion of a facial treatment/cleansing device (Figure 1), was developed to deliver low level microcurrents to facial skin. A biphasic modulated waveform (Figure 2) with a maximum current of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

Figure 2: Biphasic Modulated Waveform



Electronic output of the aesthetic TENS device. A 250 uA positive charge was delivered over 1.25 seconds followed by 250 uA negative charge over 1.25 seconds establishing a charge balance every 2.5 seconds throughout the 2 minutes of total treatment time.

Figure 1: Counter Oscillating Facial Device

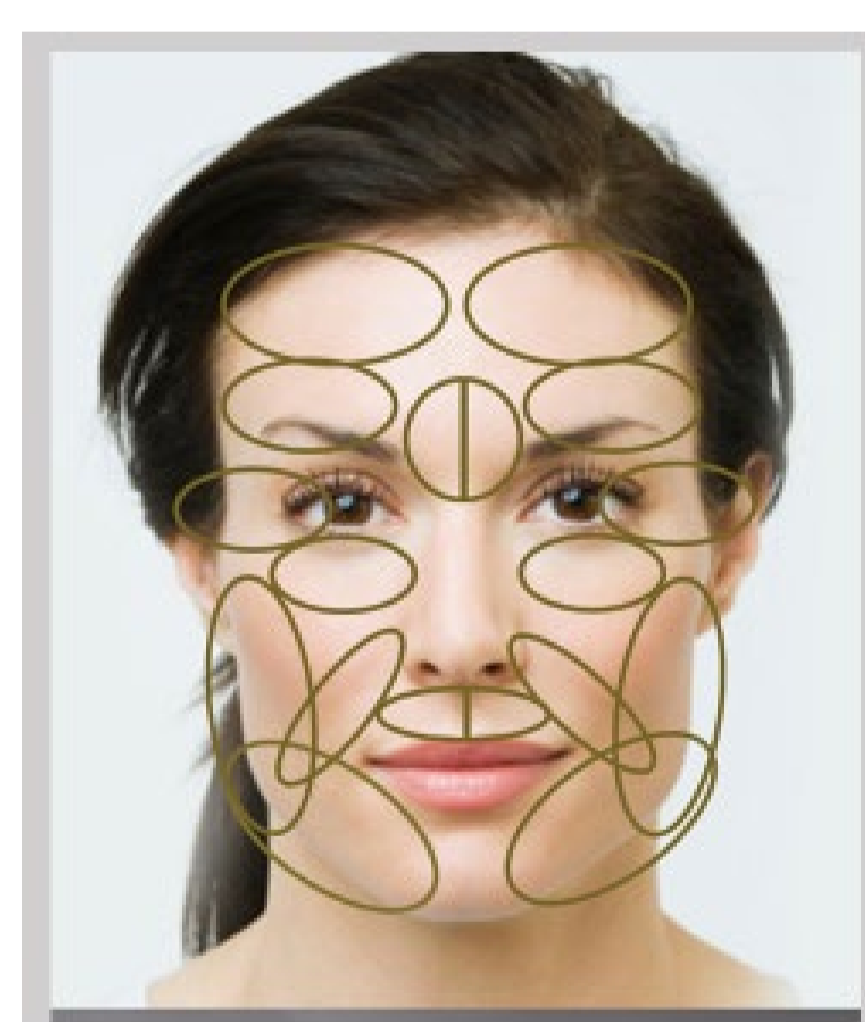


Facial cleansing device with current generating attachment in place. By using the counter-oscillating shaft of the cleansing device, the microcurrent attachment generates a 250 uA biphasic pulsed electrical output.

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.

Figure 3: Clinical Grading Facial Map



Clinical grading and subject self-assessment was focused on nine areas on each side of the face.

## 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.

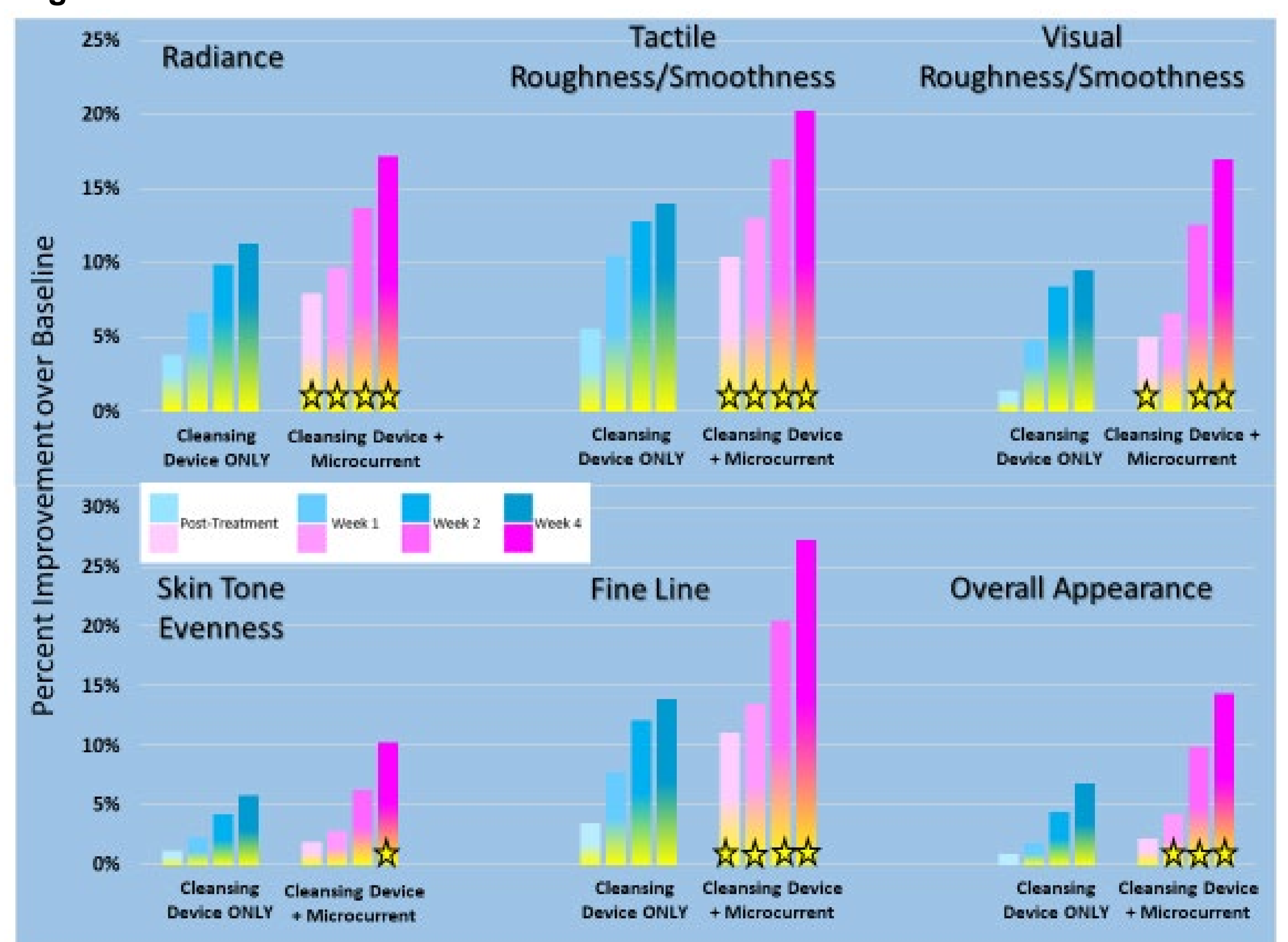
## CONFLICT OF INTEREST

Dale Kern, Melanie Riggs, and Helen E. Knaggs are employees of Nu Skin Enterprises, Inc.

## RESULTS

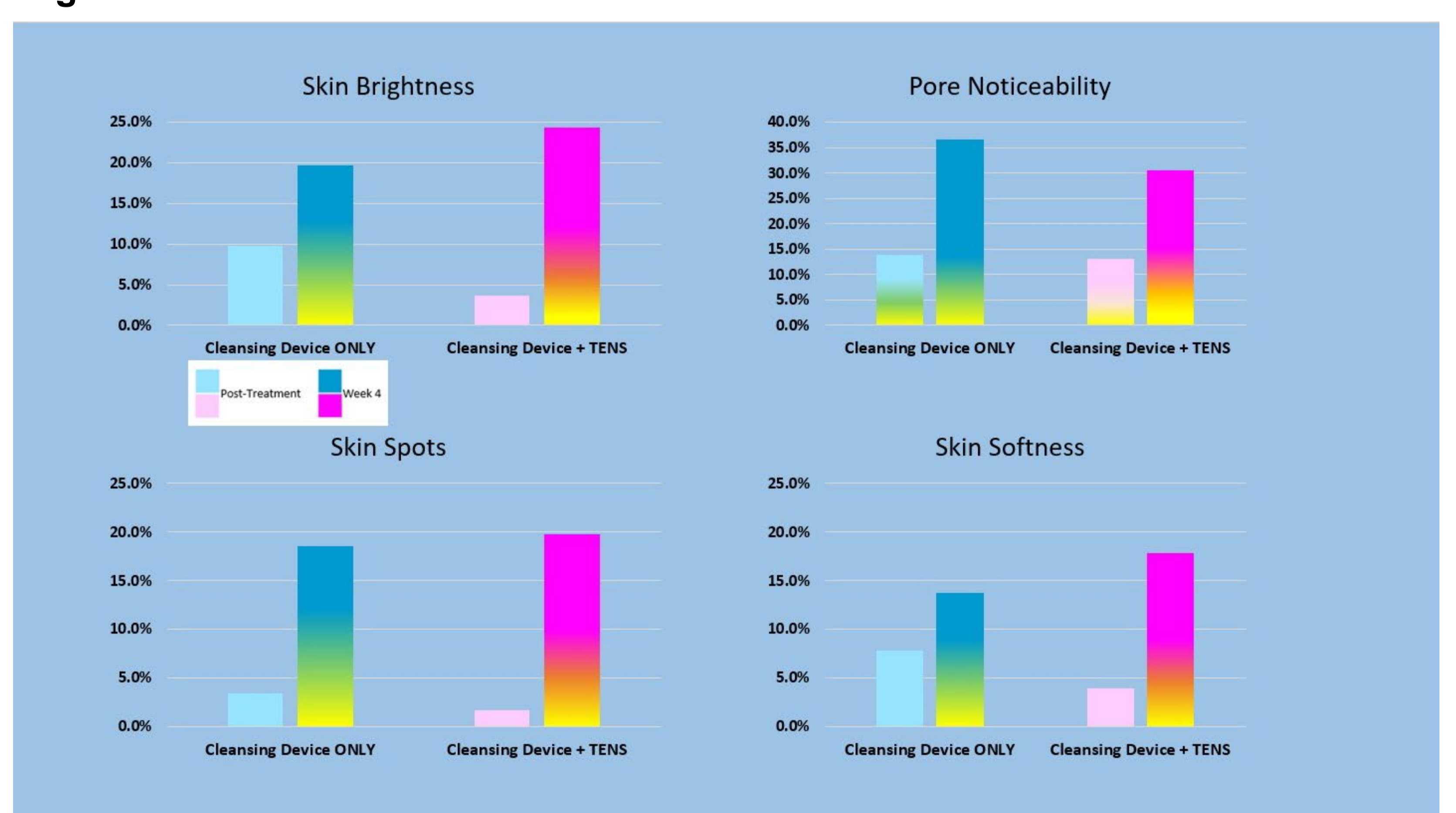
There was a statistically significant improvement in clinical grader scores for all evaluated parameters at each post-baseline time point with a statistically significant difference in favor of the TENS microcurrent treated side of the face by week 4 (Figure 4). Subject self-assessment questionnaire 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).

Figure 4: Clinical Grader Scores at Post-Baseline Time Points



Improvement over baseline of clinical grader results at 1, 2, 3 and 4 weeks of treatment (individual bars). Star denotes statistical significance over non-aesthetic TENS treated side of face. Yellow base bars indicate statistical significance over baseline, stars indicate statistical significance of microcurrent treated over non-microcurrent treated.

Figure 5: Self-Assessment Scores at Week 1 and 4 Time Points



Improvement over baseline of subject self-assessment results at 1 and 4 weeks of treatment (individual bars). Star denotes statistical significance over non-aesthetic TENS treated side of face. Yellow base bars indicate statistical significance over baseline, stars indicate statistical significance of microcurrent treated over non-microcurrent treated.

## CONTACT INFORMATION

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