Micro-needling is a relatively novel technique that uses needles ranging from 0.5 mm to 2.5 mm in order to create micro-wounds or channels in the skin. The microneedles are designed to penetrate the stratum corneum without traveling into the nerve fibers of the skin. In doing so, micro-needling can create micro channels in the skin relatively painlessly. The channels allow for delivery of macromolecules through the skin, and, while healing, promote collagen production in the skin. As a result, micro-needling is an effective tool for treating aesthetic skin concerns such as wrinkling, as well as delivering transdermal medications and vaccines.

The author aimed to determine average depth penetration of microneedles, as well as the optimal time of topical application to achieve maximum depth of macromolecule dissemination through the skin after micro-needling treatment. In studies I, II, and III, the study utilized low sample sizes of only facial skin excised from Caucasian patients aged 72, 73, and 62, respectively. The use of only these pre-auricular skin strips from a narrow ethnic background limits the study’s broader applications. It would be advantageous to examine needle penetration depth and time-dependent dissemination of macromolecules after micro-needling on skin excised from different areas of the body, and on skin of different age and ethnicity. The author did increase the sample size by examining five sections within each 1 × 1 cm² section of excised skin, though a larger selection of skin samples is still required for a complete study.

Size indeed may not matter for micro-needling. Despite a small sample size, the varying penetration depths of different needle lengths provide meaningful information. The author found that the level of needle penetration was consistent between 0.5 to 1.5 mm, validated by histology and tissue marking. When the investigators used needle lengths of 1.5, 2, and 2.5 mm, the results were less consistent and the level of penetration was greater for the 2 mm than the 2.5 mm. They appropriate indicate the need for additional research for greater length applications and we concluded that outcomes were impressive across varying lengths of penetration, making 1 to 1.5 mm needles an optimal choice for the described indication.

The findings related to the time-dependent dissemination of macromolecules through the skin are of particular importance. With an increased sample size, the massage times of topical products into the skin post-treatment indicated by the study could serve as a guideline for doctors who employ these topical products after treatment. The study results suggest that the optimal time of skin penetration is at 5 minutes and the window of tissue access starts to close drastically after 30 minutes, making a truly essential contribution to the literature.
The author achieved excellent results in treating aged skin, wrinkling, laxity, alopecia, atrophic acne scars, and striae with micro-needling. Both patients and observers unanimously reported aesthetic improvements twelve months after completing micro-needling treatment for every aforementioned category. The minimally invasive nature of micro-needling is enticing for both patients and for healthcare professionals because of its efficacy, low complication rate, and relative simplicity. For patients, the minimal pain of the microneedles is also an alluring benefit over more invasive alternatives.

At the senior author’s (JWF) practice, micro-needling is used to treat aesthetic concerns ranging from static wrinkles, atrophic acne scars, to a wide range of other scars. Occasionally, micro-needling will also be utilized for re-pigmenting skin. Patients opt for micro-needling to treat these aesthetic concerns because of its positive results as well as its relative painlessness. Our results from 100 patients sampled, who underwent micro-needling, have been overwhelmingly positive. Like the study, we encountered few complications other than prolonged erythema and occasional swelling. Aesthetically, our patients also experienced consistent improvement and demand for retreatment has been high. To improve results, the author of the study employed topical platelet rich plasma (PRP) after micro-needling. While the results are significant, we would have liked to see a head to head, blinded comparison between the use of PRP vs placebo. Given the use of microneedles release a variety of growth factors, including platelet derived growth factor, PRP may not add statistically significant benefit.

We congratulate the author for presenting a very elegant, well controlled study on a powerful tool in cosmetic medicine. We believe this study validates the importance of adjunct cosmetic procedures in the plastic surgery patient, as the results shown could not be achieved by surgery alone. Micro-needling shows promise as an effective, minimally invasive tool for long-lasting improvements in skin appearance. The data found on micro-needling depth penetration and time-dependent dissemination of macromolecules are an important step in the advancement of micro-needling for use in other applications such as vaccines and delivery of medication impermeable to the skin.

**Disclosures**

Dr Few serves on an advisory board for Allergan, Inc., (Irvine, CA) and Mentor (Santa Barbara, CA); as a remunerated consultant for Allergan, Inc., Medicis (Scottsdale, Arizona), Palomar (Westford, MA), Ulthera (Mesa, Arizona), and Venus Concept (Toronto, Ontario Canada); as a remunerated speaker for Allergan, Inc., Ulthera, and Venus Concepts; and has received research grants as an investigator for Allergan, Inc. and Medicis. Mr Semersky declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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