Does microneedling have a role in aesthetics?

BY DOUG BRUNK
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SAN DIEGO – When Jill S. Waibel, MD, first saw a dermal roller microneedling device around 2004, it reminded her of a weapon that might be conjured up by the character Dr. Kaufman, a professional assassin who appeared in the 1997 James Bond film, "Tomorrow Never Dies."

"I'm thinking, that thing looks super painful," Dr. Waibel said at the annual Masters of Aesthetics Symposium.

First described in 1995 in Dermatologic Surgery (1995 Jun;21[6]:543-9), microneedling is a percutaneous collagen-induction therapy that involves rolling or gliding a needling device across the skin. The process creates thousands of vertical channels of injury, which triggers a healing response. "There's no heat, no chromophore like a laser; there's no coagulation of collagen," said Dr. Waibel, a dermatologist with the Miami Dermatology and Laser Institute. "It's a simple, office-based procedure that lasts 10-20 minutes."

Dr. Jill S. Waibel says microneedling is a good option for younger patients and those who desire little to no recovery

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Patients seek microneedling treatments to rejuvenate skin; to treat acne scarring, other scars, striae, and rhytides; and to improve pigmentation. Its mechanism of action remains elusive. The hypothesis for microneedling's effects on superficial rhytides, the wound that it creates induces production of new collagen and that multiple tiny wounds in the skin stimulate the release of various growth factors that play a role in collagen synthesis. When used on atrophic scars, the hypothesis is that microneedling breaks apart collagen bundles in the superficial layer of the dermis while inducing production of collagen. Authors of a recent systematic review on the topic found that the procedure showed noteworthy results on its own, particularly when combined with radio-frequency features (J Plast Reconstr Aesthet Surg. 2017 Jun 17. pii: S1748-6815[17]30250-4. doi: 10.1016/j.bjps.2017.06.006).

"However, there were shortcomings with most of the research: There were small numbers of patients, studies that were not randomized, not controlled, and further research is needed to see if microneedling truly works," said Dr. Waibel, who was not involved with the analysis.

Microneedling devices come in many forms, including manual rollers, fixed-needle rollers, electric-powered pens, and devices with a new light-emitting microneedling technology. Of the five devices currently cleared by the Food and Drug Administration, four feature bipolar radio frequency and insulated needles, while one is a bipolar radio-frequency device (Infini) that contains noninsulated needles. Dr. Waibel favors the electric-powered pens, such as the StrataPen and the Eclipse MicroPen, that enable the user to adjust operating speed and penetration depths from 0.5 mm to 3.0 mm, as well as feature disposable needle tips and disposable needles. These devices allow the depth of penetration to be changed according to what part of the face is being treated: "So on thinner areas of the face, like the forehead and the nose, you're going to treat with a depth of 0.5 mm-1.0 mm, whereas in thicker areas, like the cheeks, you go up to 3.0 mm," she said. "Typically, we do vertical and horizontal passes, repeating three to six times. When you see pinpoint bleeding, that's the sign to stop. You can stop prior to that as well."

One split-face study compared microneedling with nonablative fractional laser in 30 patients with atrophic scars, who underwent five sessions 1 month apart (Dermatol Surg 2017; 43:S47-56). At 3 months, the side of the face treated with the laser showed a 70% improvement, compared with 30% for the side treated with microneedling (P less than .001). The researchers observed significantly lower pain scores with the laser procedure, but microneedling had a significantly shorter down time. A separate study of 12 healthy adults found that pretreatment with an ablative fractional laser significantly intensifies protoporphyrin IX fluorescence to a larger extent than curettage, microdermabrasion, microneedling, and nonablative fractional laser (JAMA Derm. 2017;153[4]:270-8). "So the message is that lasers are still superior, but there may be a role for microneedling," Dr. Waibel said.

Since she began dabbling with microneedling in her practice over the past year, Dr. Waibel has found it is a good option for younger patients and for patients who desire little to no recovery time. "These are not expensive procedures for someone who doesn't have a lot of skin damage," she said. "It's also good for difficult indications to improve, like striae. If I charge patients a few hundred dollars for a laser treatment, maybe I can do two or three follow-ups with the microneedle to stimulate collagen. This has become one of my go-tos with the radio-frequency device. I'll do one fractional ablative laser treatment, then I'll do two of the radio-frequency microneedle devices 1 and 2 months later. Then I'll reassess to see what they need next. Or you might tweak [the course of treatment] after isolated laser treatments."

Using a microneedle device requires meticulous cleaning of the intended treatment area prior to the procedure to avoid introducing bacteria or makeup into the skin. Dr. Waibel uses topical anesthesia for 20-30 minutes and then applies hyaluronic acid gel on the treatment surface to facilitate the gliding action of the device. "The technique involves perpendicular device placement with manual skin traction for smooth delivery of microneedles, going in vertical, horizontal, and oblique motions," she explained. "Pinpoint bleeding is your guide for the pens. You don't get pinpoint bleeding with some of the actual devices. Use manual pressure with ice and water to stop the bleeding."

Contraindications for microneedling include patients with an active infection (such as herpes labialis), acne, and a predisposition for keloid scarring. Caution is advised with concomitant use of topical products of any type during a microneedling procedure because of the risk of granuloma formation. In 2014, researchers published a case series of three patients who developed biopsy-proven foreign-body granulomas after the application of topical products during microneedling, including two cases that involved topical vitamin C (JAMA Dermatol 2014;150[1]:68-72).

"These are new devices, and we have new questions," Dr. Waibel concluded. "I think they have a role, but we don't fully understand the mechanism of action, and we have to be very careful about putting pharmacology down these channels. We don't know the best treatment intervals, and we don't know the best devices," she added, pointing out that many of the devices have no indications cleared by the FDA yet.

She also noted that the FDA has put a hold on many microneedling devices from being sold in the United States until appropriate safety and efficacy data are collected.

Dr. Waibel disclosed that she has conducted clinical research for Strata Sciences, Aquavit, and Lutronic. She is also a member of the advisory board for Lutronic.

dbrunk@frontlinemedcom.com