COMMENTARY

Commentary on "Comparison of a Fractional Microplasma Radiofrequency Technology and Carbon Dioxide Fractional Laser for the Treatment of Atrophic Acne Scars: A Randomized Split-Face Clinical Study"

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The author has indicated no significant interest with commercial supporters.

I read with interest the article by Zhang and colleagues.[1] The treatment of postacne scars is difficult, as many of us have said over the years. I think we were feeling sorry for ourselves over our inability to have a substantial effect on this seemingly insurmountable problem. We still are unable to reverse scars; we can only make them look less noticeable, maybe not as deep or less colored or more easily covered with make-up.

We compared our results to what can be achieved with rhytides and sun damage that were already so well-targeted using older techniques such as aggressive chemical peeling, dermabrasion, and laser resurfacing. Although morbid and incapacitating for our sun-damaged patients, there was no doubt about the efficacy of these techniques. No matter how severely we dealt with postacne scarring, we could not come close to the results seen with treating sun damage or rhytides. Nevertheless, how things have changed; acne scarring is now attracting the attention of practitioners that it has always deserved. The new enthusiasm comes at a time when scarring is becoming much better managed and, paradoxically, rhytides and severe sun damage less so. Why is this so?

Since fractional photothermolysis hit the literature in the early part of this century,[2] it has been not an evolution but a revolution in the treatment of postacne and other forms of scarring. Here we suddenly had a technology that released us from the apparent direct relationship between efficacy and morbidity and between efficacy and risk. It appeared too good to be true but has been as good as its promise. Suddenly, with nonablative fractional resurfacing that involved making small vertical zones of full-thickness thermal damage using a midinfrared laser, we had a treatment that completely altered the patient experience. Initially, this was the exclusive domain of the 1,550-nm erbium fiber laser, but soon a number of different wavelengths were being used to deliver nonablative fractionated treatments.

Nevertheless, as good as this was to be for the treatment of postacne scarring, it has proven to be a poor relative to fully ablative nonfractional techniques in the treatment of severe sun damage and consequent rhytides. It cannot provide the results we were all getting routinely for these patients 10 years ago using fully ablative

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techniques, but patients now have a taste and an expectation that they will obtain good results with little required downtime and at low risk. We fuel these fires with the propagation of "new is best" and fanciful before-and-after photographs on websites and in advertising literature that may not be routinely attainable with this newer fractional technology.

Nevertheless, this disparity in the effect of new machines on different conditions has rekindled interest in postacne scarring because suddenly this concern is no longer the poor cousin but is an indication arguably better treated using these technologies than any other condition.

An early prospective case series of 53 patients[3] with atrophic acne scarring using blinded observers showed 51–75% improvement in 90% of patients. There was no incidence of dyspigmentation or scarring, and clinical response rates were thought to be independent of age, sex, or skin phototype.

Nevertheless, this probably was a bit optimistic in skin of color. A well-conducted study in Asian skin[4] showed that greater density of the small vertical zones of damage cause more swelling, redness, and resultant hyperpigmentation compared with higher fluences or energy of these zones. Other investigators warned that efficacy was not totally devoid of postinflammatory pigment changes even for nonablative fractional resurfacing, especially when treating Fitzpatrick photoreactive skin types 4 and 5.[5]

Early indications were that fractional ablative laser resurfacing (carbon dioxide, 2,934-nm erbium-doped yttrium aluminum garnet, 2,790-nm yttrium scandium gallium garnet) might further enhance results for postacne scarring treatment, although with considerably more temporary morbidity than with nonablative fractional techniques but less than traditional full-face ablative systems. Studies addressing the use of ablative fractional resurfacing for the treatment of acne scarring have been published,[6–10] including a split-face comparison study of ablative and nonablative fractional resurfacing.[11] Although ablative fractional resurfacing would appear better than nonablative fractional resurfacing for photodamage and wrinkling, not all investigators have found it superior for postacne scarring.[12] Fractional ablative resurfacing in this study did not seem to be more likely to produce postinflammatory hyperpigmentation than fractional nonablative resurfacing. It may be true that ablative fractional resurfacing is preferential to nonablative fractional resurfacing in the older adults or those with photo-damaged acne scars when tightening of the skin is also required, but it is unclear whether it offers any great advantage to the average patient with acne scarring.

The other underrated and interesting technology is that of plasma skin resurfacing. There are few articles on this method of resurfacing when used in a nonfractional manner with regard to scarring,[13,14] although passing reference is made in one manuscript,[15] and its results with traumatic scars is made in another.[16] Plasma skin resurfacing, unlike lasers or intense pulsed light sources, is not a chromophore-dependent treatment. This technology uses a plasma cloud of electrons originating from nitrogen atoms and radiofrequency stimulation of these atoms to discharge a cloud of electrons. It does not vaporize tissue, but leaves a layer of intact, although denatured, epidermis that acts as a natural dressing, favoring accelerated wound healing. Histology on patients undergoing plasma resurfacing suggests continued collagen production, reduction of elastosis, and progressive skin rejuvenation more than 1 year after treatment.[13]

An interesting variation of plasma skin resurfacing involving delivery of this technology is discussed in the article in this edition of Dermatologic Surgery by Zhang and colleagues. We are shown the effect of a microplasma radiofrequency device using an

array of closely applied microperforations in the skin. The handpieces produce a series of closely spaced spicules, which contact the skin and provide a thin air gap between the skin surface and the roof of the electrode. The discharge of radiofrequency energy at a small distance from the skin forms plasma, a gas-like state of matter in which a portion of the molecules is ionized. Because plasma is sensitive to electromagnetic fields, the radiofrequency current triggers microsparks in the plasma between the skin surface and the electrode spicules. These sparks cause mild epidermal ablation and perforate the dermis superficially to form microchannels.[17]

In this article, we are shown a technology with similar efficacy to fractionated carbon dioxide resurfacing in a split-face study. The fact that postinflammatory pigmentation was not seen with the microplasma technology is heartening for treatment of darker-skinned patients with postacne scarring. Anecdotally, it is uncommon to see pigmentary abnormalities with nonfractional plasma skin resurfacing and demarcation problems seem rare.

We also should be mindful that we are discussing surface-related treatments only. Acne scarring of significant degree is three-dimensional, with volume loss in atrophic scars (sometimes even subcutaneous atrophy) or volume excess with hypertrophic scarring. This volume change must often be accounted for with replacement of volume or forcing hypertrophic tissues to diminish. Addressing volume is synergistic with surface treatments and should always be contemplated, but for surface treatment, microfractional plasma resurfacing may make our patients' journey more acceptable and allow for repeat treatments. We should not forget that fractional machines are by definition partial. We require these technologies to be repeatable, and the easier it is for patients to undergo these treatments with a minimum of inconvenience and morbidity (including postprocedural pigment changes), the greater adherence to recurrent treatment is likely to be. Unfortunately, this technology does not come without pain, being somewhat more painful than fractionated carbon dioxide laser treatment according to this study, but with adequate analgesia, it would appear a useful new modality in the continuing battle against atrophic scarring.

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