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LASERS



Treatment of pre- and post-full face resurfacing for rhytids and photodamage with Reliant Fraxel SR1500 laser.

Photos: Joely Kaufman, M.D.

Fractional resurfacing

Myriad uses, faster healing, reduced downtime, fewer complications driving success

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Ablative laser resurfacing with pulsed carbon dioxide and erbium YAG lasers, when introduced, was considered radical for its day.

It rapidly gained acceptance but diminished in popularity due to undesirable side effects and prolonged recovery times. This led to the development of nonablative devices, which were very safe but produced, at best, modest results.

While ablative laser resurfacing still remains a key component in the armamentarium of laser resurfacing, the development of fractional laser technologies is rapidly gaining acceptance for skin resurfacing for a myriad of dermatologic applications.

Fractional resurfacing employs the concept of “partial” treatment of any given sur-

face area, allowing the preservation of an intact stratum corneum with levels determined by selecting fluence, pulse width and densities. With the treatment of microscopic areas, wound healing will take place via migration of keratinocytes from the surrounding untreated areas. This results in faster wound healing, reduced downtime and a lower complication rate.

So what is the downside? Ablative procedures usually require a single treatment, while fractional resurfacing requires between three to five treatments.

Fractional treatment parameters

The term “fractional resurfacing” is creating some confusion, as true fractional resurfacing employs key parameters while “pseudo-fractional resurfacing” tweaks existing devices and is more marketing than science.

The parameters of a fractional treatment

are determined by the following:

- ▶ What proportion of the skin can be treated at one time?
- ▶ Exactly how big should each individual spot be?
- ▶ What wavelength lasers could qualify for this treatment?
- ▶ Can the spots be placed in a stamp manner, or do they need to be random to allow time for cooling of the surrounding skin?
- ▶ Does depth matter?

The most important factor in true “fractional resurfacing” is that the spot size should be small enough to allow for easy migration from the surrounding untreated areas. How small this should be is probably on the micron level, but the upper limits of what will be acceptable have yet to be determined.

Beware of companies marketing their scanning devices as “fractional” lasers; as

simply treating part of the skin does not qualify the device as a fractional device. Moreover, the mid infra-red wavelengths between 1500 nm and 1600 nm are optimal for nonablative fractional resurfacing, as they achieve appropriate depths with optimal absorption of the chromophore. Other wavelengths are either too superficial or have significant interference with other chromophores, making them less desirable to true nonablative fractional resurfacing.

As the technology is fairly new, we are continuing to understand the significance of these parameters. The Fraxel SR750 (Reliant Technologies) is the first true fractional laser and is cleared by the Food and Drug Administration (FDA) for treatment of skin resurfacing of the face and nonface, periorbital rhytides, acne and surgical scars, melasma, pigmented lesions and soft tissue coagulation.

The second generation Fraxel™ SR1500 laser was introduced in 2006 and refines Fraxel treatments with the ability to deliver higher fluences, wider microthermal zone settings and a more ergonomic handpiece. Fraxel treatments are coined NFR (nonabla-

tive fractional resurfacing). The chromophore for the 1550 nm laser is water, with the appropriate depth of penetration to allow for dermal neocollagenesis, with depths up to 1000 microns. Depth is particularly critical for acne scars and rhytides. NFR with

Fraxel™ treatments require an optical tracking blue dye. The mode of resurfacing is with random patterns with surface area coverage varying from 5 percent to 40 percent based on levels of treatment and fluences up to 40 joules/cm².

An external cooling device such as a Zimmer™ cooler is essential for patient comfort and is now integrated in the Fraxel SR1500 laser. Consumables for the device include a small (7 mm) and large (15 mm) tip, with each tip supporting four to five full face treatments. Edema and erythema usually persist for 24 to 72 hours, followed by a gradual desquamation. No open wounds are noted and results are usually evident at four weeks following treatment and continue for one year following the final treatments. Impressive clinical results with supporting histology are supported by over 20 peer-reviewed publications.



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The Fraxel™ laser, at this juncture, remains the gold standard device for true nonablative fractional resurfacing, and, with the introduction of the SR1500, the ability to optimize results with fewer treatments and less discomfort is being realized.

In development

As with any new idea, further developments usually lead to improvement in results and equipment design.

In development is a fractional ablative laser at the 10,600 nm wavelength (Reliant Technologies), which may have a role in deeper rhytides and for patients desiring fewer treatments.

The concept of fractional resurfacing is one that has opened the door to safer resurfacing techniques. It is rapidly replacing ablative resurfacing in popularity, in part due to patient demand for less aggressive procedures, and more due to reproducible and consistent results.

As this technology becomes more “consumer driven” we will see a proliferation of true fractional devices. **DT**

Disclosures: Vic A Narurkar, M.D., has been reimbursed for clinical trials for Palomar Medical Technologies and Reliant Technologies, but does not own any stock in either company and has purchased both systems. Joely Kaufman, M.D., is an instructor for Reliant Technologies.

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