



fractional **RESURFACING**

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By Inga Hansen

Bridging the middle ground between conventional laser resurfacing and nonablative technologies, fractional delivery systems are taking the cosmetic industry by storm. To help you decide whether fractional resurfacing is appropriate for your practice, our panel of experts discuss the technology behind fractional photothermolysis, appropriate indications, patient selection and the various fractional photothermolysis devices now available.

In the 1990s carbon dioxide lasers revolutionized facial skin resurfacing. Their ability to stimulate collagen formation, fill out wrinkles, and repair pigmentation and acne scars made the cosmetic industry stand up and take notice. Unfortunately, lengthy recovery times and a significant risk of adverse reactions tempered doctor and patient enthusiasm for these procedures.

"While the carbon dioxide laser for skin rejuvenation is widely recognized as the gold standard in terms of efficacy," says Brad Hauser, group manager of product & clinical marketing, Reliant Technologies, Mountain View, California, "There were significant drawbacks, including prolonged recovery times, and risk of infection and dyspigmentation."

One response to patient disenchantment with the procedure was nonablative lasers and light devices. "You do eventually see improvement with a nonablative laser but it takes time, and people are impatient," says Tina Alster, MD, director, Washington Institute of Dermatologic Laser Surgery and clinical professor of dermatology, Georgetown University, Washington, DC.

The development of fractional photothermolysis was spearheaded in 2001 by R. Rox Anderson of The Wellman Center for Photomedicine at Massachusetts General Hospital, Harvard Medical School.



▲ Dr. Elizabeth Rostan, a dermatologist in Charlotte, North Carolina, achieved these results after three Fraxel treatments.

It was designed to offer the benefits of conventional laser resurfacing without significant downtime.

"Fractional resurfacing allows for parts of the skin to be affected while other parts of the skin remain unaffected, which speeds up healing

time," says Stan Kovak, MD, Mid-West Dermatologic, Laser & Vein Centre, Elmhurst, Illinois. "It also reduces the risk of injury, hypopigmentation and scarring."

Fractional Tools

Reliant Technologies was the first to introduce a fractional delivery system with the Fraxel laser, which began shipping in 2004. In early 2006, Palomar Medical Technologies introduced the Lux1540 Fractional Laser handpiece, and since then others have entered the market with fractional resurfacing options.

The U.S. Food and Drug Administration originally cleared Reliant Technologies' Fraxel for soft tissue coagulation and the correction of periorbital wrinkles and sun discoloration. It is the only fractional device to gain FDA clearance for skin resurfacing and treating melasma, acne scars and surgical scars. As a result, extensive clinical trials are available to substantiate the effects of the Fraxel.

The Fraxel's laser microbeams are delivered in a randomized pattern, which creates microscopic thermal wounds, like islands among a sea of healthy tissue, to rejuvenate skin without creating an extensive burn area. To address the specific indications of the patient you're treating, you have the ability to adjust both the energy level and coverage density of the treatment area. The energy setting, which varies from 6mJ to 40mJ/microthermal zone in the Fraxel laser, determines the depth of penetration, while the density setting controls the aggressiveness of your treatment. "If you're treating something superficial like melasma or other pigment problems, you'd choose a lower energy. If you want to treat deep dermal conditions such as acne scars, you'd choose a higher energy setting," says Hauser. "The density controls how many spots you put down per square centimeter. With the Fraxel, you can treat a broad range of surface areas, anywhere from 5% up to about 45%. Normally we cover about 20% of the skin's surface with one treatment."

The company recently introduced its new model, the Fraxel SR1500, which allows for 30% deeper penetration than the original. Both models utilize a 1550 nm wavelength that targets water, which allows the dead cells of the stratum corneum to remain intact.



Fractional Resurfacing

“We spent a lot of time developing the ideal wavelength to penetrate about 1mm into the tissue,” says Hauser. “When you hit the epidermis, which is about 70% water, the laser immediately kills everything within the diameter of the microbeam. We spare only the stratum corneum, which acts as a bandage to prevent infection.”

“Although we can treat patients with darker skin tones, I don’t like to treat patients with a tan.”

In Dr. Alster’s practice, which offers CO₂ and erbium laser resurfacing, along with a host of nonablative laser treatments, Fraxel services have all but replaced her other resurfacing devices.

“This is due to the fact that I can achieve results similar to those you can get with CO₂ or erbium resurfacing without the prolonged recovery or risk of side effects,” she says. “As far as cost to the patient goes, it ends up being about the same. When we were doing full faces with ablative lasers, we were charging \$6,000 to \$8,000. With the Fraxel, people are paying about \$1,600 per session, and they’re having between three and five sessions. Plus they’re not losing as many workdays for recovery.”



The most common indications for the Fraxel are wrinkles and acne scarring, but it’s also used for pigmentation problems, like melasma and blotchiness, large pores and large sweat glands, notes Alster. “The other thing Fraxel offers is the ability to treat off-the-face,” she says. “I can treat photodamage on the neck, chest and hands as well as stretch marks.”

Dr. Ava Shamban of the Laser Institute of Dermatology, Santa Monica, California, and assistant clinical professor of dermatology, University of California, Los Angeles,

is using the Fraxel to treat wrinkles, sagging neck skin, photodamage and stretch marks. “My patients are seeing results with as few as two treatments, but we recommend between four and five treatments for optimal results,” she says. “We generally space sessions four weeks apart, but treatments can be as frequent as every two weeks.”

Palomar added the Lux1540 Fractional Laser handpiece to its StarLux system in 2006 to complement its LuxIR Fractional handpiece, which was developed for soft tissue coagulation.

“The indications for the Fraxel and the Palomar Lux1540 are very similar,” says Dr. Kovak, “They both use a similar wavelength that targets water.” The Palomar offers greater energy, up to 100mj/microbeam, than other devices and, like the Fraxel, can penetrate up to 1mm into skin tissue. Kovak offers his patients a topical anesthetic with the treatment but notes that “some patients use a topical; others have no discomfort so they use nothing during treatment.”

Wrinkle reduction and acne scarring are the most common indications for the Lux1540. “With traditional CO₂ resurfacing there was a risk of changes in skin color where you could clearly see a difference between treated and untreated areas,” says Kovak. “What’s nice about fractional technologies is you don’t see that change in skin color. You can treat a small area, and it will blend very well with the surrounding skin.”

“We’ve been using the Lux1540 since May of last year,” says Robert A. Weiss, MD, of Maryland Laser, Skin and Vein Institute in Hunt Valley, Maryland. “We treat 5 to 10 patients a day for periocular and perioral wrinkles as well as general facial rejuvenation. Typically we—and the patients—see results in two to three treatments, but many patients go on to have four or five treatments for maximum efficacy. We have both the Fraxel and the Lux1540, and while the long-term results are similar, I prefer the Lux1540 for ease of use.

“With the Lux1540 there is much less pain, which means most patients require no anesthesia and no need for blue dye, freeing you to treat with very little prep or clean-up time,” adds Dr. Weiss. This means you can schedule more appointments and avoid the inconvenience of continually reordering costly disposables.

Additional Options

Two other systems using fractional delivery systems mark a return to conventional resurfacing lasers, namely CO₂ and erbium. The Alma Harmony Pixel features a 2940 nm Er:YAG laser, and can achieve

▲ Palomar’s Lux IR Fractional handpiece is an attachment for the StarLux Pulsed Light and Laser System.



▲ Dr. Glenn DeBias achieved these results after one treatment with the Lumenis Active Fx.

50 microns of ablative penetration and 75 microns of thermal penetration per pulse. “The pulses can be stacked to achieve deeper ablation,” says Wayne Lura, California regional director, Alma Lasers, Ft. Lauderdale, Florida. “You can triple, quadruple or even quintuple stacks to achieve up to 150 micron

“The fractional approach is the new wave in resurfacing. We’re going to see more and more lasers and wavelengths with fractional delivery systems.”

penetration. The system also offers two density settings. Physicians can choose between a 7 by 7 or 9 by 9 pixel density. With the 49 dot pixel size, you can achieve up to 24 mJ/pixel, while the 81 dot pixel size allows for 13mJ/pixel. “The Pixel 2940 is designed for fractional ablative skin resurfacing on the face, neck, chest and hands,” says Gregory S. Keller, MD, FACS, clinical associate professor, David Geffen School of Medicine, University of California, Los Angeles. “I’ve obtained optimal results with multiple treatments spaced approximately two weeks apart, but treatment intervals tend to vary from one to four weeks depending on the patient’s skin response and healing time.”

The Active FX procedure from Lumenis, the most aggressive of the “fractional” systems, works with a traditional CO₂ laser. Unlike other fractional treatments, the manufacturer recommends just one session with the Active FX for facial skin rejuvenation, and the patient must be aware that there will be significant downtime—three to five days for complete recovery. “The CO₂ laser allows for a greater depth

of penetration than you can achieve with erbium technology,” says Scott Wells, MD, Park Avenue Plastic Surgery, New York. “We can operate the laser like a conventional CO₂ laser or we can use the settings to adjust the amount of energy used, the size of the area treated and the degree of overlap of the spots we’re treating.” To achieve maximum rejuvenation with minimal downtime, Wells uses the Active FX procedure in conjunction with nonablative infrared technologies to reduce wrinkles and acne scarring, improve pigmentation problems and prepare skin for surgical procedures.

Even more competition is being developed as we go to press. At the October Annual Meeting of the American Society of Plastic Surgeons in San Francisco, Dr. Jason Pozner, a plastic surgeon in Boca Raton, Florida, talked about his early research experience with Sciton’s ProFractional technology, described as the delivery of small spots scanned over the skin’s surface. “I’m extremely excited about the early results I’m seeing with the ProFractional,” says Dr. Pozner. “It’s still very early in its development, but already the ProFractional looks like it may become a significant part of my practice.” ProFractional is designed to have proprietary control features not currently available in any other device.

Inclusive Skin Care

One of the benefits of nonablative fractional technology is its ability to treat the darker skin types IV and V. Reliant’s Hauser does recommend using a less aggressive, lower density treatment for darker skin types to avoid any pigmentation problems. Alster says, “The parameters of the treatment have more to do with the condition you’re treating than skin type. I determine energy and density setting on a case-by-case basis; you need to track how the patient’s skin is reacting during treatment.”

While fractional technology allows more patients to enjoy the benefits of laser resurfacing, there are some contraindications.

“You want to be cautious with patients who have skin conditions that can be aggravated or exacerbated by the temporary microablative injuries caused by these lasers,” says Wells. “We premedicate patients with a history of herpetic infections or cold sores to prevent episodes during the postoperative period. Anybody who has healing issues or patients using Accutane are not candidates for any type of ablative or resurfacing service.”

Alster prefers not to treat patients who currently sport a tan. “Although we can treat patients with darker skin tones, I don’t like to treat



▲ Acne scars improved dramatically after three treatments, as shown in these photos provided by Dr. Steven Cohen, a plastic surgeon in San Diego, California.

taking the time to try the different options before making a purchasing decision. “The fractional approach is the new wave in resurfacing,” he says. “We’re going to see more and more lasers and wavelengths with fractional delivery systems. You want to make sure you’re choosing a system that’s comfortable and effective for your patients’ needs.” ♣

Inga Hansen is a Los Angeles-based freelance writer.

patients with an active tan,” she says. Alster advises patients to stay out of the sun preceding treatment to avoid any potential pigmentation problems.”

Following fractional resurfacing, patients will have small white spots where the microbeams have penetrated the tissue. “These spots disappear within about 10 hours,” says Wells. “The face becomes uniformly red and for two days or so there’s a little bit of swelling and redness, then the surface skin begins to dry and flake off much as it would after a sunburn.” Wells does offer pain medication but notes, “What patients often say to me is ‘I feel better than I look.’ Over-the-counter pain medications are usually adequate to handle any postprocedure discomfort.”

With more and more fractional systems hitting the market, Kovak recommends