

Six years after the first fractional laser shipped, physicians share their views on how to deliver the safest and most effective fractional treatments for a growing number of indications.

Connecting the Dots

Promising results that rival full surface CO₂ ablation with downtimes that rival nonablative lasers, fractional resurfacing devices burst onto the scene in late 2004. The growing number of fractional devices—both ablative and nonablative—on the market today is testament to the high patient satisfaction rates these systems can deliver. But risks remain, and the plethora of equipment options raises questions as to which device is right for specific practice and patient needs.

By Andrea Sercu

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Ablative vs. Nonablative

Since the original 1550nm Fraxel re:store shipped in 2004, several new fractional devices have surfaced offering a variety of wavelengths, spot sizes, scan patterns, densities and pulse widths. Each physician has his favorite, but all agree on one point: The results from an ablative fractional laser significantly exceed the changes you can expect to see from a nonablative device.

"You might think if traditional CO₂ resurfacing ablates 100% of the epidermis, you see 100% improvement. If a fractional CO₂ laser ablates 20% of the epidermis, you get 20% improvement, but that's not true," explains John H. Joseph, MD, Beverly Hills, California. "I tell my patients they'll see a 60% to 70% improvement in fine lines, texture and tone with fractional ablation, and that is what we're seeing. At the same time, patients don't get nearly the wrinkle reduction that we see with full ablation. Fractional ablation is very good for pigmentation problems and fine lines, and you'll see some textural improvement. If the patient has moderate-to-deep lines or severe textural problems, there is improvement, but it's not dramatic."

Erbium vs. CO₂

The three wavelengths used for fractional ablative resurfacing include 10600nm CO₂, 2940nm Erbium:YAG and the 2790nm YSGG wavelength. "Erbium lasers have a greater absorption by water and can ablate tissue at lower fluences (1 J/cm²) compared to CO₂ lasers (5 J/cm²). The CO₂ wavelength delivers a great deal of heat to the tissue during treatment so you get more tissue tightening when compared with erbium," says Rebecca Small, MD, assistant clinical professor at the University of California, San Francisco and director of medical aesthetic training at UCSF-affiliated Natividad Medical Center. "Erbium devices with modified pulse widths, like Sciton's Joule, for example, can offer deep heating. The companies will say the device offers 'CO₂-like effects,' and they achieve this by lengthening the pulse width of the erbium laser."

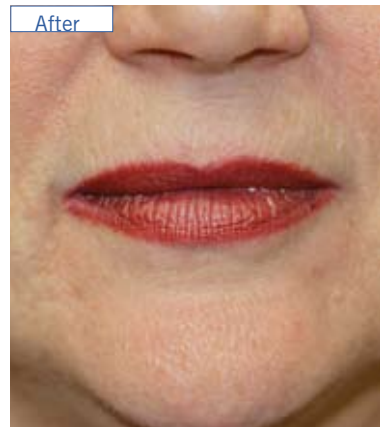
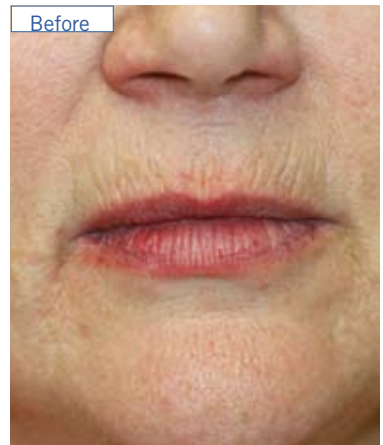
"CO₂ offers better visual desiccation," says Brooke Seckel, MD, Boston Plastic Surgery Associates and medical director, Palomar Medical (www.drseckel.com). "It's so hot that you get what appears to be instant tightening. But long-term studies have shown that the skin tightening results at one year are the same with CO₂ and erbium resurfacing."

Bruce Katz, MD, clinical professor at the Mt. Sinai School of Medicine and director of the Juva Skin & Laser Center in New York City, works with Alma Lasers Pixel Er:YAG and Pixel CO₂ fractional lasers to treat wrinkles, diminish acne scars, tighten skin and lighten sunspots both on and off the face. He finds the Pixel Er:YAG device is helpful for treating melasma in patients with darker skin types IV-VI, who've experienced problems with CO₂ lasers or are prone to postinflammatory hyperpigmentation (PIH).

"I recently lectured in Asia, where I found they're very much into using the Pixel erbium laser, which generates less heat than a fractional CO₂ and is less prone to cause pigment problems in darker skin types," says Dr. Katz.

Although much improved, the downside of fractional ablation remains the downtime. Patients do experience open wounds on the skin and require a healing period of anywhere from a few to 10 days, depending on the aggressiveness of the treatment.

"For the past 10 years, we've been teased with lasers that claimed something for nothing—that is, a quick recovery with dramatic results. So far, that hasn't quite come to fruition. The claim is a little closer because the fractional ablatives offer less downtime and are clearly safer than the older CO₂ lasers, but it isn't yet to the point where treatments offer both little to no downtime and dramatic results. You have to pick one or the other," says Joel Schlessinger, MD, FAAD, FAACS, board-certified dermatologist and cosmetic surgeon, and president emeritus of the American Society of Cosmetic Dermatology and Aesthetic Surgery.



▲ Rebecca Small, MD, combines fractional resurfacing with Botox Cosmetic and dermal fillers to reduce lip lines.

Nonablative Indications

Nonablative fractional treatments leave the epidermis intact, which means shorter recovery times, but also less effect on superficial pigment concerns. They heat the tissue around the fractionated microthermal zones, triggering a collagen remodeling effect. Physicians find they are well-suited to patients with mild wrinkling and those who can't tolerate downtime.

"These are professional people who can't afford to take a week to 10 days off. Recovery time is considerably accelerated with a nonablative," says Vic Narurkar, MD, a San Francisco-based dermatologist who utilizes both the Fraxel re:pair CO₂ ablative and Fraxel re:store nonablative systems in his practice.

The reduced risk of PIH also allows physicians to address overall rejuvenation, acne scars and some pigmentation problems in patients with darker skin types (IV-VI), says Roy G. Geronemus, MD, director of the Laser & Skin Surgery Center of New York.

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The nonablative Lux1540 from Palomar Medical recently received FDA clearance for the treatment of striae. Clinical studies showed an average improvement of 51% to 75% in the appearance of stretch marks at three months post-treatment.

Desired expectations and your patient demographics will determine the best technology to suit your practice's needs. "I always say, 'Know your demographics,'" says Dr. Narurkar, who relies on his nonablative Fraxel re:store to treat a large portion of his young and ethnically diverse patient base.

"I do think there is a place for each of these devices. If you want one treatment to reduce wrinkles, alleviate brown spots and smooth skin texture, you need a fractional CO₂ resurfacing treatment because you must ablate to treat the epidermis. But only a limited number—maybe 4%—of my patient base is willing to undergo 10 days of downtime," says Amy Taub, MD, Advanced Dermatology, SKINQRI, Lincolnshire, Illinois.

"Nonablative fractional treatments improve the overall tone and texture of the skin but they do not specifically address red or brown spots," says Lori Brightman, MD, Laser & Skin Surgery Center, New York. "For acne scars and wrinkles, it does take multiple treatments. The results, even with multiple sessions are generally not equivalent to the results of an ablative laser. I am seeing similar corrective changes in fewer treatments with subablative rejuvenation."

Subablative Rejuvenation

Falling between ablative and nonablative fractional lasers is the eMatrix radiofrequency-based fractional system from Syneron, used to perform what the company dubs "subablative rejuvenation." "The subablative RF of the eMatrix actually burns tiny holes in the skin, so you do ablate about 5% of the skin's surface," says Dr. Taub. "It then heats horizontally in the upper- to mid-dermis. You're essentially poking a hole through the epidermis to put the nonablative energy into the skin

to treat the dermis, as opposed to the epidermis.

"The eMatrix cannot replace an ablative laser for patients with lentigenes, melasma or brown spots," continues Dr. Taub. "But it has allowed me to offer facial rejuvenation and reduce scarring in patients with skin types IV and V without the risk of scarring

or PIH. What is most exciting about the device is its ability to tighten skin. With three to five sessions you can improve skin laxity and wrinkles with results comparable to ablative fractional lasers."

The energy of the eMatrix penetrates in a pyramid versus a columnar form, allowing for minimal injury to the epidermis and increased energy to the dermis. "The subablative RF treatment is also great for red spots, which surprised me," says Dr. Brightman. "Based on the results we were seeing on facial vessels, we have begun investigating the use of the eMatrix for port wine stains. The results we obtained in an initial, informal study led us to open a formal trial, now underway."

Combining Technologies and Treatments

Many physicians are finding that, as each technology excels in specific indications, combining them to treat a variety of concerns can offer the best results.

Dr. Seckel treats patients with a nonablative 1540nm fractional laser for deep coagulation and immediately follows with a 2940nm ablative fractional resurfacing treatment. "We presented this technique at the ASPS meeting in Seattle last year," he says. "The results are phenomenal. You get wrinkle reduction like the old CO₂, but the skin is not depigmented. The nonablative laser plumps the skin from underneath so wrinkles are reduced and the skin looks healthy. There's good vascularity and the translucency is improved."

Gilly Munavalli, MD, MHS, medical director at the Dermatology Laser & Vein



▲ Several equipment manufacturers are now offering multifunction fractional systems that include handpieces with a variety of dot patterns and sizes for varying indications.

Specialists of the Carolinas in Charlotte, North Carolina, offers combination treatments with the Lumenis UltraPulse, which includes the Active FX, a superficial treatment head for rejuvenating the face, and the deeper penetrating Deep FX handpiece to treat more severe wrinkles around the mouth and eyes.

Drs. Narurkar and Small are both proponents of combining multiple aesthetic treatments for optimal results. For lip lines, Dr. Small performs Botox Cosmetic injections, "then I perform fractional ablative resurfacing followed by a dermal filler," she says. "You can achieve beautiful results, safely."

"I see combination therapies, such as combining the fractional resurfacing with Botox, dermal fillers and Thermage, as the real future," says Dr. Narurkar. "We can start with resurfacing, follow with skin tightening and then fill the face."

Dr. Seckel recently began offering Botox Cosmetic injections in the glabellar, crow's feet and jowl regions of his patients two weeks prior to resurfacing. "If you relax the muscles prior to resurfacing, the procedure is much more effective because the laser doesn't have to get over little mountains of skin."

Advances in Fractional Resurfacing

One of the latest advances in fractional resurfacing is the Lux2940 Groove Optic handpiece from Palomar Medical. "Instead of drilling tiny holes into the skin, the Groove Optic cuts a linear pattern through the skin," explains Dr. Seckel.

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“Then we go back over the area at a right angle. The result is little square islands of isolated tissue. The geometric pattern results in better skin tightening and a quicker recovery. When you cut the linear flaps, you create more surface area of wounding, which leads to increased myofibroblast production. This may be why downtime with the Groove is only about four days.”

Perhaps the most exciting advance for practitioners is that, as these systems have grown in popularity, they have also come down significantly in price. Alma Lasers offers the OmniFit Pixel CO₂ handpiece that fits onto nearly any existing CO₂ laser, allowing you to perform fractional treatments.

Lumenis recently introduced the AcuPulse Fractional CO₂ Laser System, a mid-priced device based on the company's high end UltraPulse Fractional CO₂ System, and Lutronic is offering its MOSAIC CO₂ fractional laser for under \$50,000.

“I bought the Sandstone Matrix Fractional CO₂ system and I chose it primarily based on price,” says Dr. Joseph. “I tried several pieces of equipment and performed split-face treatments. To make my decision I looked at results, purchase price, consumables, warranty and maintenance package.”

Laser equipment manufacturers are also creating new multifunction systems

Fractional devices are now offering greater variation in spot size, scan size and density for precise targeting of skin conditions.

that allow physicians to perform a range of resurfacing treatments. HOYA ConBio recently introduced the DERMASculpt, an Er:YAG device that includes three delivery systems in one unit for fractional ablation, nonfractional ablation and a chisel tip for pinpoint resurfacing. “The chisel tip is good for raised lesions,” says Dr. Small. “It's very precise. I actually chisel the raised area with the micro-tip and the lesion just flakes off.”

The full-field ablative module is recommended for a treatment the company calls the “Polish Peel.” “This is a new approach to resurfacing where you do a superficial full field ablation down to 10 μ to 50 μ in depth,” says Dr. Small.

Sciton's Joule platform offers doctors a similar option with its Contour TRL and ProFractional-XC modules. “The primary indication for the nonfractional ablative Contour TRL is light micropeels for pigmentation concerns and improved skin radiance,” says Doug Carrow, director of sales development for Sciton.

In nonablatives, Solta Medical recently introduced the re:store Dual Wavelength System with a new 1927nm Thulium wavelength in addition to the original 1550nm wavelength. “The nonablative devices are not great for brown spots because there's no damage to the epidermis, and brown spots are a big issue for patients with sun damage,” says Dr. Taub. “Solta realized this and added the new wavelength to help address pigmentation concerns.”

Many devices are now offering greater variation in spot size, scan size and density for precise targeting of skin conditions. Soren Eremia, MD, director of cosmetic surgery for the division of dermatology at UCLA, and a dermatologist at the Brockton Cosmetic Surgery, Riverside, California, chose LaseringUSA's MiXto SX fractional ablative for its variable spot sizes, large scan size, random scan pattern and longer pulse width. He feels the combination of factors provides an optimal thermal relaxation time that

reduces pinpoint bleeding and offers better dermal heating for skin tightening.

Dr. Rohrer prefers the Candela QuadraLASE Fractional CO₂ laser based on its ability to vary the placement of the spot. “This eases the comfort for patients, because they don't get as much bulk heating in one area,” he says.

New Indications

As fractional lasers become more commonplace in practices, physicians are widening the spectrum of indications. Many are reporting success using the fractional ablative devices on the neck, arms, chest, décolleté and hands.

William Hanke, MD, medical director, Laser & Skin Surgery Center of Indiana in Carmel, Indiana, has found positive effects on treating the neck with his DEKA Medical SmartXide DOT CO₂. “I had one patient in her 70s who played a lot of golf and had lots of sun damage on her neck. After one treatment with the SmartXide, I could see a huge difference in the skin laxity on her neck,” says Dr. Hanke.

Most recently, fractional ablatives have garnered attention for their ability to treat surgical scars. Dr. Geronemus has seen significant improvement in scar depth following treatment with his fractional ablative laser. “Fractionals work great as a rejuvenating device, but now we're subsequently using them for scarring due to surgery, skin cancer, trauma and acne,” he notes. “What we've learned is you need to use deeper dermal ablation to obtain optimal results. Superficial delivery won't work as well.”

Risks and Adverse Reactions

Although fractional devices gained popularity due to a lower risk of adverse reactions and shorter downtimes, these treatments are not risk-free. “Scarring has been reported on the neck area following fractional ablative treatment, and there have also been reports of scarring on the infraorbital area of the face,” says Dr.

RESOURCES

Alma Lasers, 866.414.2562, almalasers.com

Candela, 800.668.2691, candelalaser.com

Cutera, 888.428.8372, cutera.com

DEKA Laser Technologies, 877.303.5273, dekalaser.com

HOYA ConBio, 800.532.1064, conbio.com

Iridex, 800.388.4747, iridex.com

LaseringUSA, 866.471.0469, laseringusa.com

Lumenis, 877.586.3647, lumenis.com

Lutronic, 888.588.7644, lutronic.com

Palomar Medical, 800.725.6627, palomarmedical.com

Sandstone Medical Technologies, 205.290.8251, sandstonemedicaltechnologies.com

Sciton, 888.646.6999, sciton.com

Solta Medical, 877.782.2286, solta.com

Syneron, 866.259.6661, syneron.com

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“After one treatment with the SmartXide, I could see a huge difference in the skin laxity on her neck.”

Small. “This may be due to the thinner skin in these areas and fewer pilosebaceous units, which aid in healing.”

Dr. Geronemus, who has performed hundreds of fractional ablative treatments on the neck without incident believes the complications may be attributed to “technique and not technology,” he says. The doctors we spoke with all agree that energy levels used off-the-face need to be lower than what is used for facial resurfacing.


Where fully ablative CO₂ lasers carry a well-known risk of PIH, the incidence of pigment loss with fractional ablative lasers is not significant, notes Dr. Geronemus. Nevertheless, fractional nonablative lasers are often preferred for darker skinned patients at higher risk of PIH. “I want to minimize risks so I do not use ablative lasers of any kind on my skin type IV-VI patients,” says Dr. Small.

Herpes outbreaks are also a known side effect with fractional ablative CO₂ lasers. Dr. Katz recommends prescribing an antiviral for use the day before the procedure and five days following to patients with a history of herpes.

Dr. Munavalli likes to prep the skin with Retin-A or Retinol and growth factors prior to fractional ablative procedures to promote faster healing, and he always prescribes stringent sunscreen use prior to and after the procedure. “If you can start a regimen six to eight weeks in advance of the treatment, you can promote optimal post-treatment recovery,” says Dr. Munavalli.

“There are no reports of scarring with fractional nonablative lasers, although prolonged erythema resulting in transient PIH is possible,” says Dr. Small. “Milia and

acne are also common adverse reactions to these treatments.”

Fractional devices have already revolutionized the art of skin resurfacing by reducing risk and shortening downtimes for patients with all skin types. They’ve also become increasingly affordable to practitioners. All of these factors have helped to open these procedures up to a wider variety of patients. All indications are that the trend toward increased versatility, efficacy and safety will continue as equipment continues to evolve and practitioners continue to perfect their techniques and share their outcomes. 

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