

Fraxel® Laser Treatment Clinical Perspectives

Robert M. Adrian, MD, FACP
Center for Laser Surgery
Washington, D.C.

INTRODUCTION

A wide variety of lasers and light sources are currently available for the treatment of photoaged skin. Although the exact mechanisms of photoaging are complex, much is understood about the clinical signs and biochemical features associated with the process. Skin tone and texture are genetically determined, as noted by the differences in skin appearance even among individuals before the damage inflicted by ultraviolet exposure and environmental factors becomes readily apparent. Teenagers and young adults may present with skin tone and texture ranging from the soft, glowing, smooth, small pore, "peaches and cream" skin types to the uneven, acne prone, large pore, sebaceous, oily skin types. However, variability in appearance, texture, and tone increases throughout adulthood, as skin care and protection practices further stratify clinical appearance. While nature is difficult to change, environmental forces may be addressed.

The classic superficial signs of photoaging include facial redness, telangiectasia, lentigines, and uneven skin color (dyschromia/melasma). Skin texture and wrinkling become evident as changes in dermal ground substance result in volume loss as well as loss of collagen and elastin support. The sum of superficial and deep changes in photoaged skin leads to the clinical presentation of aged skin.

At the present time, a multitude of laser and light-based devices are available to treat photoaged skin. The mechanism by which such therapies function is through their ability to target the primary tissue chromophores, or molecules within the skin which absorb light. In particular, laser-tissue interaction is characterized by the response of these chromophores, which include water, melanin (brown), reduced hemoglobin (blue) and oxygenated hemoglobin (red), to laser energy.

Coagulative and ablative devices, such as carbon dioxide (CO₂) and erbium lasers, are considered to be the gold standard for the treatment of cutaneous rhytides and photoaged skin. Unfortunately, the risks and significant downtime associated with the use of these lasers have dampened their clinical utility in a climate where patients are increasingly intolerant of downtime and risk.

The concept of nonablative collagen remodeling was developed in order to address concerns related to the risks and downtime associated with ablative treatments. While initially intriguing to clinicians, devices such as SmoothBeam, CoolTouch, Lyra and others have proved unpredictable and disappointing in the treatment of deeper indications, such as rhytides and scars.

Facial redness, telangiectasia, and pigment abnormalities are known to be easily treated using a variety of laser and light sources targeting vascular and pigment chromophores. Specifically, single wavelength 532 nm frequency doubled YAG, 585 nm pulsed dye, 694 nm ruby, 755 nm alexandrite, and multi-wavelength intense pulsed light (IPL) devices are effective in improving vascular and pigmented lesions associated with photoaging. However, despite claims to the contrary, all of these devices fail to simultaneously produce similarly meaningful, clinically observable improvements in skin tone, texture, and rhytides.

It was not until 2004 that the first novel fractional laser device was introduced (Fraxel® SR750 laser, Reliant Technologies). When I first approached the concept of nonablative fractional resurfacing, I was skeptical, feeling that this was simply another redundant and expensive laser device for treatment of pigmented lesions. Subsequent in-depth conversations with some of the world's leading dermatologists suggested to me that this technology was both unique and effective. Most importantly, every one of these physicians had paid for their equipment, thus removing the obvious bias encountered when interviewing physicians who receive monetary compensation or free equipment in return for their clinical evaluation. Furthermore, I did not encounter a single Fraxel laser user who felt that this technology was not an effective and financially successful addition to their practice. Finally, I was informed that most patients were very pleased with their results, which, after all, is the single most important factor in the ultimate clinical success of any device.

I have been using the Fraxel SR750 laser since April 2004, and more recently the Fraxel SR1500 laser. Each of these devices represent a significant advance in robotic fractional resurfacing. Treatable indications currently include photoaged skin, melasma, fine facial* and periorbital rhytides, pigment dyschromia, acne scars, enlarged pores, stretch marks*, hypertrophic scars* and keloidal scars*. Photodamage of non-facial areas of the neck, chest, and hands have also been treated safely and efficiently.

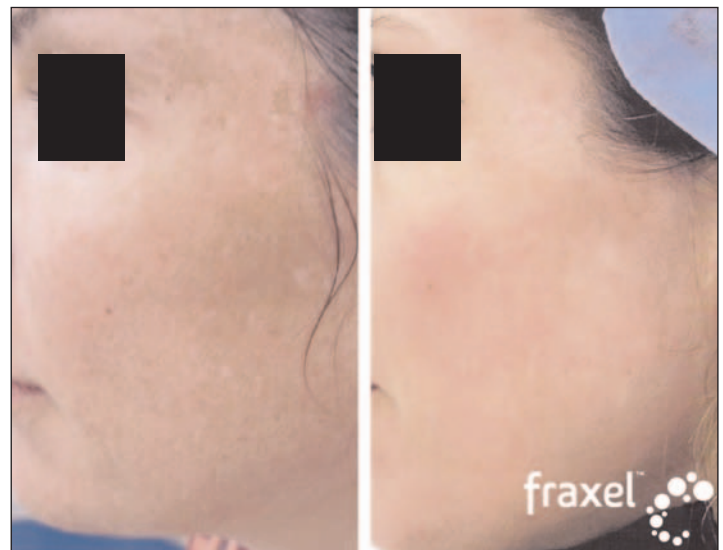
Notably, the unique technology employed by Fraxel devices is safe for all skin types (I-VI) and is not associated with significant post-operative side effects or complications in darker skin type patients.

Clinical Conditions and Results in Fraxel Patients

PHOTOAGING

Patients with pigment dyschromia, facial dullness, and fine rhytides have uniformly responded well to a series of three to five treatment sessions at three to four week intervals. Patients commonly report how smooth, glowing, and youthful their skin appears beyond the improvement in pigmented lesions and fine rhytides. Moreover, many new patients who consult for nonablative fractional resurfacing do so after observing the results seen in our previous patients. Quotes such as "Can you believe I look this good without makeup?", "My skin has not looked this good in years," and, "Everyone wants to know how I keep my skin so young," are common and underscore the substantive efficacy of the Fraxel laser in the treatment of photoaged skin (**Figures 1**).

Figure 1. Photoaging - 1 treatment



Photograph courtesy of Dr. Robert M. Adrian

* The Fraxel SR750 and Fraxel SR1500 lasers are not FDA-cleared for the treatment of this indication.

MELASMA

No single pigment disturbance has proven more elusive to treatment than melasma. Although melasma continues to defy simple etiological explanation it is clearly under the control of racial, genetic, pharmacologic and environmental factors. Most patients seeking treatment have exhausted current options such as bleaching agents, Retin A, peels, lasers, and phototherapy. In fact, until the availability of scanned nonablative fractional resurfacing, I had all but abandoned lasers and light sources in the treatment of melasma.

Results in melasma treated with the 1550 nm Fraxel SR laser have been almost uniformly positive with modest to marked improvement in most patients. Although it is clear that the Fraxel Laser does not cure melasma, it can improve it to a degree that can be maintained by standard bleaching programs and complete UVA UVB sunscreens (**Figures 2 and 3**).

Figure 2. Melasma - 3 treatments



Photograph courtesy of Dr. Robert M. Adrian

Figure 3. Melasma - 4 treatments



Photograph courtesy of Dr. Robert M. Adrian

FACIAL AND PERIORBITAL RHYTIDES

Despite the efficacy and safety of CO₂ and erbium laser resurfacing when used by experienced physicians, many patients are unable to tolerate the potential risks and downtime associated with undergoing traditional full-thickness ablative resurfacing because of job or social requirements, or are unwilling because of the associated pain. While not as dramatic as CO₂ and erbium lasers in the treatment of rhytides, Fraxel NFR™ lasers can provide improvement in mild facial* and periorbital rhytides without the risks and downtime associated with other technologies (**Figure 4**). The novel Fraxel® AFR™ prototype device, utilizing ablative fractional resurfacing, offers another intriguing treatment option for deeper wrinkles. In our practice, current patient sentiment trends toward modest improvement without risk and significant downtime rather than more significant improvement with its attendant side effects, risks, and downtime.

Figure 4. Periorbital Rhytides – 3 treatments



Photograph courtesy of Dr. Robert M. Adrian

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PIGMENT DYSCHROMIA

This category includes patients who present with what I refer to as “dirty skin.” Usually these patients present with areas of hyper-pigmentation too poorly defined to call a lentigo and hypopigmentation, which are areas of what most likely represents relatively normal skin. This mottled complexion is predictably improved with one or more Fraxel treatment sessions as the pigment surrounding the hypo-pigmented macules is improved. The resulting outcome is a more uniform skin color and smoothness. Patients with this condition are most appreciative and often comment on how little makeup they now require to create a more pleasing facial appearance (**Figures 5**).

Figure 5. Pigment Dyschromia



Photograph courtesy of Dr. Robert M. Adrian

ACNE SCARS

Few other areas in cosmetic dermatology are as challenging or rewarding than the treatment of acne scars. For more than twenty-six years I have used almost every available medical, surgical, and light-based application to treat this challenging clinical condition. Once again, although CO₂ and erbium:YAG resurfacing are effective in improving this condition, risks, downtime and skin type considerations prove limiting. The Fraxel laser is our current initial treatment of choice in patients of all skin types with mild to severe acne scarring. The ability to select fractional treatment densities, along with the variety of options for treatment depth, promote results that are uniformly positive in most patients. Again, positive post-treatment feed-back from patients about their skin has contributed to the influx of new patients seeking this technology. In a results-driven practice where outcomes must constantly be examined and improved, the Fraxel laser has been an extremely valuable addition both personally and professionally.

ENLARGED PORES, STRETCH MARKS AND SCARS

Treatment of enlarged pores, stretch marks, and scars is, in my experience, somewhat controversial and unpredictable. Every physician has seen at least a few examples of modest to marked improvement in these conditions after Fraxel laser treatment*. Unfortunately, some physicians have turned their series of one or two patients into a self-promoting article that they promote to a woman's publication highly visible to the target market. This can drive misinformed patients to physicians whose high hopes are fueled by misleading, public-relations driven pseudo-science.

* The Fraxel SR750 and Fraxel SR1500 lasers are not FDA-cleared for the treatment of striae.

Fraxel treatment has been used successfully for these conditions, but on a case by case basis with less predictability and less efficacy when compared to that of other Fraxel-treated conditions (**Figures 6-8**). Honest informed consent plays a significant role in all conditions; however it assumes an even greater role in attempts to treat this group of patients. A good rule to follow, to avoid both patient and physician disappointment, is to under-promise and over-deliver.

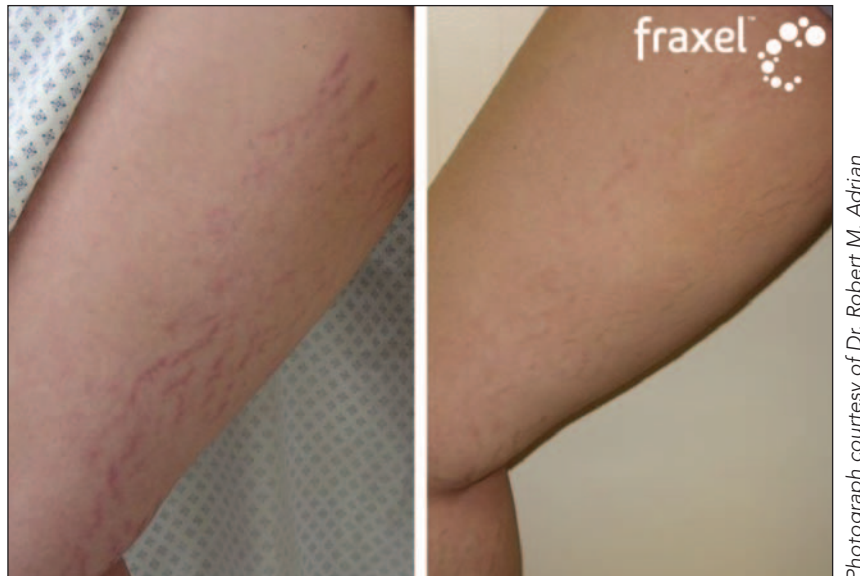
Figure 6. Scar - 4 treatments



Figure 7. Enlarged Pores – Patient’s *left side* of the forehead was not treated with the Fraxel laser (IPL markation remains). Patient’s *right side* was treated with the Fraxel laser.



Figure 8. Stretch Marks*



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FRAXEL SR750 LASER VS FRAXEL SR1500 LASER

In 2006, Reliant Technologies released a second generation device called the Fraxel SR1500 laser. This new device represents a significant advance, ergonomically and clinically, when compared to its predecessor, the Fraxel SR750 laser. The improved handpiece is lighter, more durable, and more ergonomic, resulting in almost no operator fatigue, flawless cutaneous application, and shorter treatment times. The pre-programmed user interface provides a wide variety of programmed settings, allowing users to tailor both fractional density and depth settings to the clinical situation. Variable spot sizes for each energy setting allow for optimal depth of penetration, resulting in greater tolerability for higher energy treatments. Preliminary data suggest the Fraxel SR1500 laser has enhanced clinical efficacy over the Fraxel SR750 laser, particularly for deeper indications such as acne scars and rhytides.

ROBOTIC SCANNING VS STAMPING DEVICES

No discussion regarding fractional resurfacing would be complete without comparing stamping devices and fractional robotic devices. Although sold as fractional lasers, stamping devices fall short when compared to scanning devices. Scanning devices can, at the touch of the screen, provide both variable fractional density and depth of coagulation. These features distinguish Fraxel SR lasers from other technologies which claim similarities in clinical safety, efficacy, and ease of use. Despite claims to the contrary, stamping devices are not the same technology as that used in the Fraxel product line. Further investigation of stamping devices will reveal significant differences and support an educated clinical decision. In fact, given the brand name recognition of Reliant's Fraxel trademark, the time you spend explaining to your patient why you are *not* using the Fraxel laser might be better spent performing the procedure and moving on to your next consultation.

CONCLUSION

In its more than two years of success in the field, the Fraxel SR750 laser has proven its efficacy and been subjected to more than 30 peer-reviewed investigations. My own experience with the laser has been wonderful, and my patients are usually pleased by the uniform and consistent results with minimal downtime. The Fraxel SR1500 laser is an exciting addition to the Fraxel family, and I am pleased with its improved user interface, ergonomic handpiece, increased treatment depth, and decreased treatment time compared with the Fraxel SR750 laser.

Before making a decision whether the Fraxel laser is right for your practice, I urge each of you to speak with any of the countless Fraxel laser users throughout the world. I took the time to interview a large number of Fraxel laser users and only then felt the degree of comfort necessary to purchase this technology.