Syneron, Ltd. (Yokneam, Israel) recently released the eMatrix radiofrequency (RF) device delivering significant skin rejuvenation results. Experts believe that this fractional RF modality, branded Sublative Rejuvenation™, belongs in a treatment category of its own. “Ultimately Sublative Rejuvenation is an RF technology very different from laser fractional rejuvenation,” according to Stephen Bassett, M.D., medical director of ShapeCYMRU (Swansea, Wales, U.K.). “Scientifically, the approach seems to be exactly the opposite of what we see with laser technology because the effect is concentrated in the dermis and almost skips the epidermis altogether. It is effective for a much broader range of patients because skin type is less of an issue.”

continued on page 3
The concept behind fractional technologies is simple: a pattern of energy is applied to the skin impacting fractions of the dermis, surrounded by healthy tissue which helps to speed the healing process. Fully ablative CO₂ resurfacing achieved great results, but despite its efficacy, the associated risks and lengthy downtime caused the aesthetic community to virtually abandon this treatment.

Since the unveiling of non-ablative fractional rejuvenation in 2004, the technology has taken the aesthetic community by storm. Although risk and downtime were reduced, numerous treatments were required to obtain comparatively modest results and darker skin types were unsuitable for treatment. Further developments led to ablative fractional resurfacing, most often utilizing a CO₂ or Er:YAG laser. These modalities offered rejuvenation results approaching those seen with fully ablative CO₂ resurfacing without the disadvantages.

Syneron radically shifted the concept of fractional resurfacing into a new direction by replacing laser energy with bi-polar RF, according to David J. Goldberg, M.D., director of laser research in the department of dermatology at the Mount Sinai School of Medicine (New York City, N.Y.). “By and large, the effect of laser modalities is greatest at the surface, and less below the skin’s surface. The technology has been termed sublative because the bulk of the effect occurs beneath the epidermis and at sub-ablative levels of heating, with little disruption occurring on the surface. This is best for optimal dermal stimulation of neocollagenesis. It’s exactly the opposite of what we expect with laser treatments. This makes Sublative Rejuvenation a radically different approach to skin rejuvenation and with more than 25 years in this field I do not use terms like ‘radical’ lightly.”

“Of course there’s nothing wrong with fractional laser treatment,” he added. “It’s terrific, but there is a limit to how aggressive we can be with that technology because of the energies involved, and its application is very skin type dependant.”

Michael H. Gold, M.D., director of the Gold Skin Care Center (Nashville, Tenn.) agreed; “Post-inflammatory hyperpigmentation is a risk with any of these technologies. For a skilled user, that risk was dramatically reduced by fractional modalities, but it still exists. However, with Sublative Rejuvenation the risk is significantly diminished.”

Sublative Rejuvenation with eMatrix was introduced to the industry in October 2008. The Matrix RF applicator which performs Sublative Rejuvenation is FDA cleared for dermatological procedures requiring ablation and skin resurfacing. “Syneron’s goal was to develop an ablative fractional treatment that was not laser or
light-based,” explained Amy Forman Taub, M.D., dermatologist and founder of the SKINQRI research center (Lincolnshire, Ill.). “Syneron has a lot of experience with bi-polar RF. They wanted to figure out not only how to cause a matrix of fractional ablative injury with this technology, but how to vary the parameters so that the modality would exhibit the flexibility necessary to treat multiple indications in the future.”

“As results were noticed we began to realize that it isn’t about the ablation,” said Dr. Taub, who is a principal investigator for U.S. trials with Sublative Rejuvenation. “When we began using Sublative Rejuvenation, we were amazed at the wrinkle reduction and tightening achieved, because epidermal impact was so minimal. Dermal impact was much greater. Of course you have to go through the epidermis to reach the dermis, but with traditional ablative fractional lasers you get a column of tissue damage, which is actually more of an inverted cone shape, where the hole in the epidermis is larger than the width of the area affected in the dermis. Users of ablative fractional resurfacing are often treating sun damage but they’re also looking for wrinkle reduction and tightening.”

Sublative Rejuvenation provides much more dermal remodeling and tightening than epidermal remodeling, in a completely novel way, Dr. Taub explained. “Only 5% of the skin’s surface is affected by either ablation or coagulation. The unique pyramid shape of this treatment is critical to the overall effect, which is a deep volumetric sub-surface heating.”

According to Moshe Lapidoth, M.D., head of the laser unit at Rabin Medical Center in Tel Aviv, Israel, one breakthrough is that treatment with Sublative Rejuvenation is very tolerable with an excellent safety profile, even for darker skin types. “Because of the shape of the impact the higher concentration of epidermal melanin in darker skinned patients is not an issue making Sublative Rejuvenation a suitable treatment for our patient population.”

Sublative Rejuvenation holds a lot of promise for a number of reasons; foremost the possibilities for treating darker skin types. “This may be Sublative Rejuvenation’s most important advantage,” noted Dr. Taub. “People with darker skin types age differently than those with lighter skin types, they develop volume loss, loss in laxity and some dynamic wrinkling, without the fine surface wrinkling associated with aging of Caucasian faces. It’s more of a folding. Sublative Rejuvenation promises real softening of even deep lines, resulting in skin tightening and textural changes that dark skinned patients cannot expect with lasers or light-based modalities due to safety constraints. I think this...
technology is also going to help improve acne scars in darker skinned patients because of the constraints of using lasers."

Successfully treating skin of color has historically been a challenge for Hema Sundaram, M.D., F.A.A.D., a dermatologist in Rockville, Md. “Ethnically, my practice is very diverse because it’s located in suburban Washington, D.C.,” she said. “My waiting room on any given day looks like the United Nations, so treating a variety of skin types is a special interest of mine.”

"With laser or light-based modalities we had a catch-22 situation,” Dr. Sundaram continued. “On one side you could increase the fluence for enhanced efficacy, but you’d cause too much collateral damage to the epidermis. This could lead to post-inflammatory hyperpigmentation which is quite distressing to patients. On the other side you could play it safe, by ultimately under treating the patient, leading to less collateral damage and reduced efficacy. However, the patient is left underwhelmed and unsatisfied."

According to Dr. Sundaram, “The technology has advanced gradually. Our understanding of how and why things happen has improved. We’ve refined protocols, improved cooling mechanisms and lengthened pulse widths to maximize thermal relaxation time, but we seem to be at a standstill as far as lasers are concerned. Sublative Rejuvenation sidesteps all this because RF is all about control of the current as it relates to impedance, not absorption, like lasers. The delivered energy creates a pyramid shape in the skin barely impacting the epidermis, which is where the pigment is concentrated. Sublative Rejuvenation almost completely bypasses the traditional problems we expect to deal with for skin of color.”

Dr. Sundaram described how she used Sublative Rejuvenation successfully on a 47 year old woman from Africa with skin type V. “She was experiencing drooping of the malar fat pad and formation of jowls, as we typically see in patients of this ethnic type. There was also scarring from acne and chicken pox which was becoming more apparent with age. She had been to several other practitioners who told her there wasn’t a suitable treatment for her.”

“We wanted to treat all these indications as well as improve the overall texture of her skin,” Dr. Sundaram advised. “Sublative Rejuvenation, coupled with FotoFacial RF to treat her pigmenetary issues, jump started a process that will continue for several months after treatment, with apparent ongoing collagen remodeling. She’s very pleased with the significant improvement in skin texture and quality, as well as the reduced appearance of scarring. Given her experience, Sublative Rejuvenation was a revelation to her. It is a truly advanced modality that belongs in its own category.”

“Sublative Rejuvenation is a different modality than we’re used to,” added Dr.
Taub. “When discussing ablative lasers, we think in terms of light being absorbed by a chromophore, creating a thermal reaction impacting the epidermis, and to some degree the dermis, all in an effort to get heat to where it will stimulate neo-collagenesis as a secondary effect. With Sublative Rejuvenation, we send RF energy through a tiny ablation in the epidermis and it spreads out to literally coagulate demarcated portions of the dermal tissue. It’s more than simple heating, it is more targeted and at a much higher temperature. There is some ablation of tissue, and patients see a sloughing off or peeling of tiny scabs in the first few days after treatment, but it’s the coagulation effect in the dermis that stimulates tightening and the subsequent neocollagenesis.”

Tiny electrodes are arranged in a grid of positive and negative electrode array. “The electricity flows through the array, forming a closed circuit via the skin of bi-polar RF, leaving a pattern of ablative wounds on the skin’s surface just before penetrating the deeper skin zones,” Dr. Taub explained. This is very different than the monopolar RF everyone is used to, which is a single electrode that effects the tissue via a capacitive coupling. With Sublative Rejuvenation it’s the control of the current flow in the bi-polar current array through dry skin, and into the deeper tissue that creates the desired effect. Since it’s a closed circuit, the energy doesn’t wander. The impedance of the skin is what generates the thermal effect and causes coagulation.”

The bottom line, according to Dr. Taub, is that dermal impact is much greater than epidermal impact. “Unlike laser modalities it isn’t simply about the depth and absorption of energy. The electrode configuration and the control of current, determined by tissue impedance, is what majorly controls depth and shape of wounding; therefore, wound depths and shapes are predictable and static.”

The treatment protocol is simple and tolerable. “We use a water based anesthetic for about 30 minutes, which we then wash off. The skin is cleaned and dried with at least 70% alcohol, preferably 90%. The skin must be absolutely dry. This is essential with Sublative Rejuvenation because it helps to increase and equalize the surface skin impedance and contributes to a precise delivery of energy,” Dr. Taub noted. An immediate response of edema and erythema changes the impedance and the energy transmission characteristics so you can’t go over an area again during the same treatment session.”

Pain during treatment has been reported as 0, 1 or 2 on a scale of one to four. “Some patients don’t even ask for a break during treatment, it’s that tolerable,” Dr. Taub shared. “You’ll never need anything more than topical anesthetic.” Cold air is not used during treatment and since Sublative Rejuvenation is not laser or light-based, goggles are also unnecessary. Treating a whole face should take 20 minutes or less.

“Afterward we apply an emollient cream on the patient before they leave,” Dr. Taub continued. “They might look a little red or swollen for a couple of hours, but it goes away quickly. Occasionally patients feel a heating up – a sort of burning sensation – within half an hour after treatment.”

According to Dr. Taub, the primary indication for Sublative Rejuvenation

**Acne scarring before Tx**

**Acne scarring one month after one Sublative Rejuvenation Tx**

Photos courtesy of Michael H. Gold, M.D.
“Usually to get this kind of tightening, you need a very high energy treatment and considerable laser surface coverage, which means a lot of downtime.”

technology will be wrinkle reduction leading to tightening, as well as overall rejuvenation, at least in the short term. “We can even tackle forehead lines, crow’s feet or nasolabial folds, things you might not effectively treat with a laser unless you’re going highly ablative. “Usually to get this kind of tightening, you need a very high energy treatment and considerable laser surface coverage, which means a lot of downtime,” Dr. Taub stated. This is significant because the entry point into the dermis is very small with Sublative Rejuvenation, so downtime is very short.

“There will also be a market for those afraid of botulinum toxin injections, laser treatments or those who don’t like the idea of maintenance, especially with injections,” Dr. Taub added. “This is especially true for men. Many of my male patients who seem to be turned off by injectables or the idea of repetitive treatments have been open to the concept of Sublative Rejuvenation.”

Dr. Taub feels it is also important to point out that Sublative Rejuvenation does not provide pigmented correction. “Sublative Rejuvenation is not a laser or light-based modality, so you cannot treat lentigines or pigmentation as the surface coverage is so small – only 5%. However, what does happen – and this is a key difference between Sublative Rejuvenation and laser rejuvenation – is that the skin quality changes. Every patient describes a smoothing of the skin, a textural change that cannot be observed in before and after photography. It’s difficult to explain and is most likely related to dermal impact but that is what patients notice most.”

Dr. Taub is currently studying Sublative Rejuvenation combined with Matrix IR (Syneron’s fractionated diode laser with bi-polar RF) for acne scars. “We’ve enrolled 20 subjects and a high percentage of them have skin types IV and V. Less than one-quarter have actually completed the course of five treatments with three months of follow-up; however, preliminary results have been promising,” she reported. “Most patients feel they are improving or their spouses and/or co-workers have noticed a difference. Patients will undergo four or five treatments and those who’ve had a higher number of treatments are seeing better results. We’ve had no complications so far.”

Before Tx

After three Sublative Rejuvenation treatments
Photos courtesy of Serge Dahan, M.D.

Before Tx

After one Sublative Rejuvenation Tx
Photos courtesy of Stephen Bassett, M.D.

Dr. Bassett has also seen excellent results with Sublative Rejuvenation for resurfacing and treatment of acne scarring. “Patients think it’s fabulous. They find it to be very tolerable. I like that it works even on old acne scars that have been previously resistant to therapy. This is a big issue in the U.K. because the quirks of our medical system have stunted the growth of acne scar treatment until recently so there’s a huge market.”

Lori Brightman, M.D., of the Laser and Skin Surgery Center of New York (New York City, N.Y.) has started using Sublative Rejuvenation. With a single treatment, Dr. Brightman has observed results. “I have seen some good results with off label treatment of stretch marks as well, which I didn’t
expect. Interestingly, I have also noted a reduction in telangiectasia of the scars I have treated."

As often happens in science, a fortuitous mistake spawned a burgeoning study of Sublative Rejuvenation for port-wine stains. “I accidentally treated only half a scar and during recovery we noticed the vessels in the treated side of the scar were gone. There was a clear line of demarcation,” Dr. Brightman elaborated. “When I treated a patient with striae rubra, we saw a similar effect. Now I am further exploring this unique finding for other treatment indications.”

Another future application is perioral lines, although in Dr. Taub’s opinion, the energy isn’t quite high enough yet. “When the next generation is created it might be useful for perioral lines because it not only softens lines, it tightens the surrounding area.”

Dr. Lapidoth presented on Sublative Rejuvenation at a recent meeting of the American Society for Laser Medicine and Surgery. “Our histological and clinical results with Sublative Rejuvenation are very encouraging and interesting. In my experience, Sublative Rejuvenation is comparable or even better in some cases than non-ablative or ablative fractional laser rejuvenation. Superficial damage is minimal, and the effect is greater as you reach deeper into the dermis. Downtime is generally low depending on the treatment parameters, adjusted accordingly to the patient’s condition and tolerance.”

“In my experience, Sublative Rejuvenation is comparable or even better in some cases than non-ablative or ablative fractional laser rejuvenation.”