

# CLINICAL roundtable

## Traditional Fractional CO<sub>2</sub> Tx Evolves via DOT Therapy Versatility

By Kevin A. Wilson, Contributing Editor

With a degree of versatility previously unseen in ablative laser surgery, the SmartXide DOT by DEKA (Firenze, Italy) takes ablative fractional CO<sub>2</sub> therapy to the next level. The device allows physicians to aggressively treat indications such as photodamage and acne scars with as much or as little downtime as the patient will tolerate. SmartXide DOT is distributed in the U.S. by Eclipsemed, Ltd. (Dallas, Texas).

According to Macrene Alexiades-Armenakas, M.D., Ph.D., assistant clinical professor at Yale University School of Medicine in New Haven, Conn., "The emergence of ablative fractional CO<sub>2</sub> is one of the most important advancements in laser and light-based aesthetic medicine since traditional CO<sub>2</sub> laser resurfacing. It is the culmination of more than 15 years of clinical experience and research."



**Macrene Alexiades-Armenakas, M.D., Ph.D.**  
Assistant Clinical Professor  
Yale University School of Medicine  
New Haven, CT

Ablative fractional CO<sub>2</sub> laser therapy with the SmartXide DOT – known as Dermal Optical Thermolysis (DOT) Therapy – combines the low downtime and safety profile of fractional techniques with efficacy approaching that of traditional ablative CO<sub>2</sub> laser resurfacing. "When the first non-ablative fractional devices were introduced I was very intrigued by the concept, but disenchanted with the results," Dr. Alexiades-Armenakas said, "so I am thrilled with DOT Therapy." According to the manufacturer, the device may be used for a variety of clinical applications including skin texture and laxity, photodamage, wrinkles, pigmentary malformations and even acne scars.

SmartXide DOT utilizes a 10,600 nm CO<sub>2</sub> laser with optical scanner technology to lay down patterns of 350 μm ablative wounds (or DOTs) over the treatment area, with energy and depth sufficient enough to cause visible skin

tightening as treated areas heal naturally. Sections of undamaged epithelium remain between wounds which promotes the rapid healing and minimal downtime that has been a hallmark of fractional technologies since their development. Depending on treatment parameters, little or no anesthesia is necessary and patients typically return to normal activity, including the application of make-up, within 48 hours. The platform itself, which runs on 110 volts, is also relatively compact and easily mobile.

*"Finally we have a safer technology that yields results closer to those seen with traditional, fully ablative techniques, even in a single treatment."*

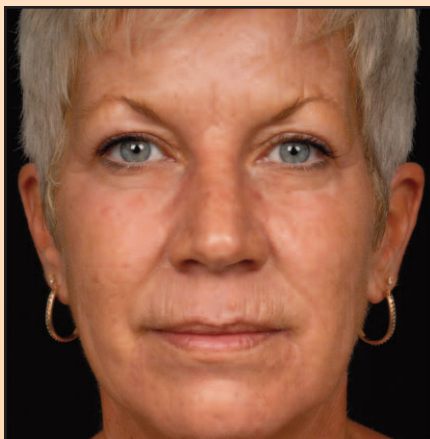
Dr. Alexiades-Armenakas also noted that the difference in risk and downtime between traditional ablative resurfacing and DOT Therapy is extraordinary. "Fractional CO<sub>2</sub> lessens the downtime from several weeks to between three and five days, depending on the treatment parameters. We don't see the delayed healing or hypopigmentation that was evident with traditional ablative resurfacing. Finally we have a safer technology that yields results closer to those seen with traditional, fully ablative techniques, even in a single treatment."

One important distinction between SmartXide DOT and competing platforms is the thermal footprint of each microscopic ablative wound created by the device. Some systems lay down patterns of deeper wounds that cause significant pain and edema, but may not generate enough collateral damage to create the desired result. Others create shallower, wider wounds that leave smaller areas of undamaged skin between them, which increases healing time. "Wounds created by the SmartXide DOT are deep enough to promote neocollagenesis and narrow enough to allow rapid healing,"

*“Until now we haven’t had an effective, minimally invasive treatment for lines, significant texture changes and photo-aging as another option to confluent laser peels and resurfacing of the past.”*



Before Tx



After SmartXide DOT Therapy Tx

Dr. Alexiades-Armenakas stated. “Several early studies point to partially denatured collagen as the inducer for neocollagenesis, rather than the fully vaporized collagen. Therefore, penetration depth may or may not be as important as the degree of partial denaturation of collagen in yielding the desired clinical outcome.”

SmartXide DOT also offers practitioners a number of other useful features which enhance the treatment experience for both the physician and patient, as well as the clinical outcome. The device can deliver up to 60 mJ per DOT at a maximum power of 30 watts. In DOT mode, laser dwell time ranges from 0.2 ms to 2 ms. Power and dwell time, as well as DOT pattern density and shape, are independently adjustable, giving practitioners a seemingly endless variety of treatment options. Pattern density can even be increased enough for fully ablative use as well as for incision, excision or coagulation of soft tissue. Adjustment of settings during treatment, including switching handpieces, is simple and easy. Additionally, there are no consumables so cost of treatment is minimized. “I’m very pleased with the SmartXide DOT,” said Dr. Alexiades-Armenakas. “The affordability, versatility and effectiveness of this device make it a must have for any aesthetic practice. The precision with which one can deliver patterns of thermal injury allows for the artist to come out in the surgeon.”

**Editor’s Note:**

In the following clinical roundtable, six top dermatologic and plastic surgeons share their knowledge and clinical expertise with fractional CO<sub>2</sub> treatment using the SmartXide DOT. Collectively, these physicians possess dozens of years of experience successfully treating patients with laser and light-based aesthetic procedures.

***How has DOT Therapy enhanced your practice?***

**Deborah S. Sarnoff, M.D.** – The versatility, especially the adjustment of downtime, is a big plus for my practice. We have a lot of busy patients who may not want to deal with downtime normally, but want results, so they are willing to clear their schedule for a week so I can treat more aggressively. I love the ability to go fully ablative or change the DOT pattern with the flick of a switch.

**Macrene Alexiades-Armenakas, M.D., Ph.D.** – SmartXide DOT has increased the size of my patient population as well as the level of results I can expect. There are many severely photo-aged patients who would do best with traditional ablative CO<sub>2</sub> resurfacing but I have stayed away from it all these years because of the complications. Now I can treat them effectively and adjust the settings to the level of downtime the patient is willing to accept.



**Deborah S. Sarnoff, M.D.**  
Cosmetique Dermatology, Laser &  
Plastic Surgery, LLP  
Greenvale, NY

**Douglas Key, M.D.** – SmartXide DOT has been a dramatic addition to the scope of treatment we can offer in our practice. Until now we haven’t had an effective, minimally invasive treatment for lines, significant texture changes and photo-aging as another option to confluent laser peels and resurfacing of the past.

**Thomas T. Jeneby, M.D.** – SmartXide DOT has made downtime the first thing I discuss with patients, because it wasn’t that way in the past. I can simply ask, ‘How soon do you want to be back to work?’ They can choose to undergo one aggressive treatment or multiple less aggressive treatments. Previously, patients had to deal with whatever came with treatment, with SmartXide DOT this is no longer the case.

*“The best results you’ll see with DOT Therapy will be for clearance of photodamage and improvement in fine wrinkles.”*

**Carolyn Jacob, M.D.** – Versatility and low downtime associated with SmartXide DOT are a plus and I’ve been performing a lot of off-face treatments, including scars on the back. It’s nice to have a resurfacing tool that’s safe enough to use anywhere.

**Robert Troell, M.D.** – In Las Vegas and Southern California, where I practice, we have a lot of sun worshippers and smokers, two things which exacerbate aging skin. With SmartXide DOT we finally have a treatment option that combines efficacy, minimal downtime and rapid recovery, which patients are much more receptive to. Patients have been reluctant to undergo traditional ablative resurfacing, so this opens up that segment of the potential patient base.

**What type of patients have you been treating with the SmartXide DOT? What indications do you treat with DOT Therapy?**

**Dr. Jacob** – I’ve been treating all age groups with SmartXide DOT, both men and women. On younger patients I’ve treated acne scars on the back or face and mostly wrinkles on the face and perioral area for older patients. I’ve used it for extensive seborrheic keratosis on the face and basic brown lentigines. I’ve also performed a number of scar revisions using DOT Therapy to blend raised edges with adjacent skin.

**Dr. Key** – With SmartXide’s controls for depth and density of DOTs, there is a whole range of patients we can treat, including those with profound acne scarring or severe rhytides. At the other end of the spectrum we’re treating patients with early photo-aging and textural issues. The other dramatic addition is the ability to treat off-face with SmartXide DOT. Solar textural aging of the neck and chest are highly responsive to treatment. In fact, the most common unit I’m treating is full-face, neck and full anterior décolletage or chest all at once. You could never do that with traditional ablative resurfacing. Few patients just have significant facial photodamage without solar aging of the neck and chest, so visually, they go together as well.

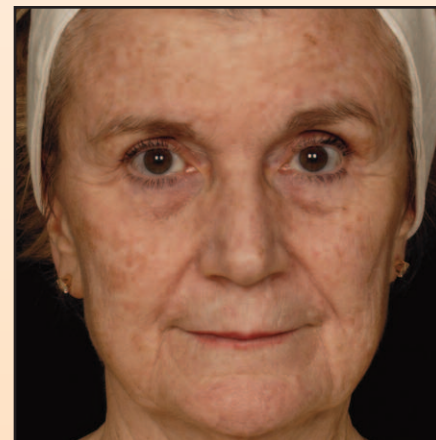


**Douglas Key, M.D.**  
Key Laser Institute  
Portland, OR

**Dr. Sarnoff** – Photodamage is a big one, as are periorbital and perioral rhytides, rejuvenation of the décolletage or back of the hands, crêpey neck and acne scarring. Today DOT Therapy can be combined with dermal fillers and neurotoxins which did not exist at the peak of ablative CO<sub>2</sub> resurfacing. I try to limit treatment to skin types I through III as they are the best candidates, but if you decide to go higher I suggest a test area to avoid post-inflammatory hyperpigmentation.

**Dr. Jeneby** – In general, faces with ruddy skin; large open pores; photodamage with wrinkles, sun damage, or melasma do really well with one to two treatments. The more aggressive patients allow me to be, the less chance they’ll need more than one treatment. For general photodamage, SmartXide DOT is a gold standard laser.

**Dr. Alexiades-Armenakas** – The best results you’ll see with DOT Therapy will be for clearance of photodamage and improvement in fine wrinkles. You have to understand that laxity, rhytides and photo-aging are three different things. Some people have genetic laxity with nice, soft skin, which is distinct from rhytides that stem from both intrinsic aging and photo-aging. Photo-aging, which is secondary to cumulative ultraviolet damage, can manifest as crêpe-like wrinkling with the hallmark findings of dyschromia and elastosis.



Before Tx



After SmartXide DOT Therapy Tx

*“The science behind DOT Therapy proved to be superior. If you look at the thermal footprint created – its versatility – it really is the only choice.”*



Before Tx



After SmartXide DOT Therapy Tx

### How does SmartXide DOT compare to other fractional CO<sub>2</sub> systems?

**Dr. Alexiades-Armenakas** – There are many similarities, however, the main differences are in power output, spot size – which determine penetration depth and wound spacing – and DOT pattern, which determines percent and precision of coverage. What’s interesting about SmartXide DOT is the flexibility and accuracy in its parameters. Also, DOT Therapy is relatively painless with cold air cooling. There is redness afterward but no bleeding, as has occurred with other systems.

**Dr. Jeneby** – SmartXide DOT is not only a versatile and effective device, it’s also well priced and well marketed. Physicians can afford to purchase it and the marketing of DOT Therapy is creating brand recognition that’s miles ahead of competitors. The lack of disposables is also a plus.



**Thomas T. Jeneby, M.D.**  
The Plastic and Cosmetic Center of  
South Texas  
San Antonio, TX

**Dr. Key** – We’ve treated well over 1,000 patients with a competing device and found significant patient discomfort to be a consistent problem. For complex reasons, the short dwell times and the spot size microdot configuration of SmartXide DOT allows for a high degree of patient comfort. Our patients are extremely enthusiastic about the results they are seeing and the tolerability of treatment.

**Dr. Troell** – I carefully researched and compared competing systems before I chose SmartXide DOT. The science behind DOT Therapy proved to be superior. If you look at the thermal footprint created – its versatility – it really is the only choice.

### SmartPulse technology provides versatility to adjust both the power and dwell time. How do you use this when treating your patients?

**Dr. Key** – We have a tremendous number of different laser manufacturers represented in our office so I could have chosen any of these for fractional CO<sub>2</sub> platforms. SmartXide DOT is indispensable because the physician has a tremendous amount of control over these variables. Dwell time and power determine thermal energies delivered. In treatment there is a physical endpoint we want to reach and immediate skin tightening can be observed. Ability to adjust these parameters is extremely important to achieving that.

**Dr. Jeneby** – SmartPulse allows users to vary the amount of collateral damage on the skin to induce collagen remodeling. For example, the initial pulse achieves effective vaporization but leaving the dwell a little longer will heat the dermis more, so you can actually start to affect the structures beneath the epidermis more effectively.

**Dr. Jacob** – I explain SmartPulse technology to patients as the ability to give a heavier or lighter treatment. But what it means is less downtime with more modest results up to fully ablative resurfacing. I can treat with varying aggressiveness during one treatment session as well. For example, if they have some dyschromia but more severe perioral wrinkles, I can perform a lighter treatment over the full-face and increase the density and power or dwell time for just the perioral region. I can do the same thing for acne scars, blending for a more homogeneous look.

**Dr. Alexiades-Armenakas** – SmartPulse technology allows targeting of specific types of rhytides and photodamage, as well as adjustment for recovery time. Longer dwell times

*“SmartXide DOT’s flexibility allows you to target specific clinical conditions as well as manage downtime.”*

are used for deeper creases, whereas the peak power can be low or high depending on the length of downtime a patient will tolerate. A power of 17 watts may be chosen for a downtime of about two days, whereas 25 watts or more will require five to seven days of downtime but you may reach the desired outcome in as little as one treatment session.

**Dr. Troell** – Every patient is unique and has their individual characteristics including ethnicity, pigmentation, need for correction and tolerance for downtime. Wherever each patient falls in those spectra so to speak, you can adjust the settings to manage. SmartXide DOT is cleared for treating patients up to skin type V.

### [How do you best employ the range of 38 scan patterns available on the SmartXide DOT?](#)

**Dr. Alexiades-Armenakas** – I start with the square/rectangle at maximum size to cover the most surface area. I then change to the triangles to fill in the peripheral regions where the squares meet the hairline and jawline. I can then adjust various shapes, sizes and ratios to get absolutely perfect coverage of each nook and cranny of the face, such as the crows’ feet and nose. It’s artistry in lasers.

**Dr. Troell** – What’s amazing is that you can change the pattern’s size and shape in just a few seconds with one finger on the handpiece, which is a unique advantage. You don’t have to stop, turn to the machine, make adjustments and so on. This contributes to a better overall treatment experience for both the physician and patient. I start with the largest size possible and move down until I’ve completely covered the treatment area. I like the square first, the hexagon for the nose and mandibular border and the rectangle above the lip. This almost completely prevents overlap, which is something you want to avoid.



**Robert Troell, M.D.**  
Board Certified Plastic Surgeon  
Las Vegas, NV

**Dr. Key** – The variety of geometric patterns is somewhat helpful. For me, the easiest pattern to control is the rectilinear pattern, but the ease and speed of adjustment from extremely small to the really generous, larger patterns is a real advantage. I also like the repeat mode. The ability to change the closeness, or pitch, of DOTs is very important as we move between different anatomic areas.

**Dr. Sarnoff** – When you use the different patterns you are able to eliminate sharp lines of demarcation you used to get with fully ablative procedures. I tend to use only a few of the patterns available.

### [SmartXide DOT’s “Infinite Delivery Options” allow a wide-range of control over the thermal profile and depth of penetration. Why is this important in the treatment of your patients?](#)

**Dr. Troell** – This is exactly why I chose the SmartXide DOT. This feature and the way it creates an ideal thermal footprint is superior to the competition. More versatility means better overall results.

**Dr. Alexiades-Armenakas** – SmartXide DOT’s flexibility allows you to target specific clinical conditions as well as manage downtime. Higher density with lower dwell times and power would be indicated for a patient with extensive superficial photoaging to maximize removal of epidermal and superficial dermal pathologies. In



Before Tx



After SmartXide DOT Therapy Tx

*“The minimal ablation and rapid healing with DOT Therapy will likely allow us to drop the antibiotic, which is a leftover from the days of traditional resurfacing.”*



Before Tx



After SmartXide DOT Therapy Tx

contrast, patients with deeper rhytides would be treated with higher power and dwell time, and lower DOT density. All three parameters can be adjusted for each condition to meet the desired number of recovery days.

**Dr. Key** – Through the years of confluent CO<sub>2</sub> laser resurfacing we learned to go shallow, seldom beyond the papillary dermis lest we increase the risk of scarring. We observed immediate tightening with one pass and extra passes gave us only modest additional tightening so our target zone might not be as deep as some might propose. The historical and present observational evidence may suggest that it's better to have a shallow thermal imprint into the superficial papillary dermis rather than deep.

**Dr. Jacob** – The tremendous variety of settings is a real advantage, but it also requires an understanding of what you're doing. Those of us who “grew up” on the traditional resurfacing know how to be careful and the manufacturer has set up guidelines for new practitioners to prevent over treatment. Take the time to learn how to do this and start conservatively. One benefit of DOT Therapy is that when I treat acne scars I only need topical anesthesia, which requires more aggressive settings.



**Carolyn Jacob, M.D.**  
Chicago Cosmetic Surgery and  
Dermatology  
Chicago, IL

**What are your pre- and post treatment protocols?**

**Dr. Troell** – You want patients to avoid tanning prior to treatment. We might give hydroquinone or retinol if the patient is predisposed to hyperpigmentation. I provide antivirals two days prior and for eight days after, plus an oral antibiotic to decrease the risk of infection. The minimal ablation and rapid healing with DOT Therapy will likely allow us to drop the antibiotic, which is a leftover from the days of traditional resurfacing.

**Dr. Jacob** – Being a new modality, I've tended to follow traditional precautions with DOT Therapy, but I am probably going to back off some of them. I've been giving pre-operative antibiotics and antivirals, but I don't think the antibiotics are necessary. People tend to heal really fast. After treatment I use the Avène spray from Pierre-Fabre Dermo-Cosmetique (Parsippany, N.J.), then cooling gel, followed by facial soaks. We then apply a combination sunscreen and healing cream called Avène Cicalfate also from Pierre-Fabre. We have patients use that plus facial soaks at home for a few days. We started using this regimen before the company started distributing its own post-op kit, which I'm sure many will use.

**Dr. Sarnoff** – We put patients on antiviral agents for a week, starting one day before treatment. I typically apply a topical anesthetic in a mixture for 30 minutes, then remove it and use a cleanser to degrease. Patients need goggles unless we're treating the eyelid, in which case we put a shield in the eye to protect the globe. We don't do much after treatment, we just use a little ointment such as Aquaphor from Eucerin - Beiersdorf (Wilton, Conn.) or simple petrolatum. We do recommend sunscreens, they are very important.

**Dr. Jeneby** – We try to get patients' skin in order with hydroquinone and tretinoin if we can. We use antivirals for two days prior and three days after treatment. If they have active sores we'll administer them a week before and continue use for three weeks after. We give a simple post-laser healing kit after treatment. In addition, the day prior and one week post treatment, I'll perform a urine dip test to see if they're smoking. I won't treat smokers because of the healing complications.

*“Patients have expressed absolute love for this procedure. They love the manageable downtime. This is one of the most popular treatments I perform.”*

**Dr. Key** – Our patients tend to like spray hydration with Avène or Skinceuticals (Garland, Texas) products after treatment, plus light emollient care. Because we have so little surface disruption with DOT Therapy, I think it’s a mistake to under emphasize hydration and over emphasize thick emollient care. We stress aggressive use of sunscreens, particularly in the four to six weeks after treatment for darker skin types.

### What can be done to manage potential adverse events?

**Dr. Alexiades-Armenakas** – Preparation is key. Rigorous pre-treatment screening regarding immunosuppression; medications, especially prednisone or Accutane from Roche Pharmaceuticals (Nutley, N.J.); and prior history of skin infections, keloid scarring or collagen vascular diseases, is necessary. Slow healers will add a day or two to downtime. Beware of smokers and recommend that patients sleep on their backs with an extra pillow to reduce potential swelling.

**Dr. Troell** – I haven’t observed a single case of hyperpigmentation, and while I’ve seen some age spots or lightening of color, I haven’t seen hypopigmentation either. I’ve seen no infection – bacterial or viral. Healing is rapid, however swelling may peak at three days post treatment and last about one week. There may be some peeling and pinkness for a few days but it’s nothing to worry about.

**Dr. Jeneby** – Any problems we’ve seen have been around the neck and clavicle area. People tend to burn around the clavicle because bone conducts a lot of energy. When we notice any issues we use a topical steroid. If I observe fungus or other trouble arising I’ll add a topical corticosteroid or an anti-fungal. I haven’t witnessed any problems when treating on the face.

**Dr. Jacob** – It’s important to remember that this is still a CO<sub>2</sub> laser, and that you can accidentally end up causing too much damage, especially over thin skin. Be sure to shield the eyes as a precaution.

### How do your patients feel about DOT Therapy?

**Dr. Jeneby** – Patients have expressed absolute love for this procedure. They love the manageable downtime. Patients tell me what they want and I can make it happen. This is one of the most popular treatments I perform.

**Dr. Sarnoff** – Patients are always looking for less downtime and better results, so as you can imagine the feedback has been overwhelmingly positive.

**Dr. Alexiades-Armenakas** – Thus far, patient feedback is extremely positive. In addition to photo-aging, we’ve observed excellent results on scar patients, including acne and pox scars, which is a welcomed feature.

**Dr. Troell** – Patients who have experienced other procedures are amazed at the ease of treatment, how rapidly their skin rebounds and at how much more youthful their skin looks after treatment.

### What makes SmartXide DOT a good choice for physicians who are new to ablative fractional modalities, or even fractional techniques altogether?

**Dr. Troell** – With previous resurfacing there was no room for error because the risk



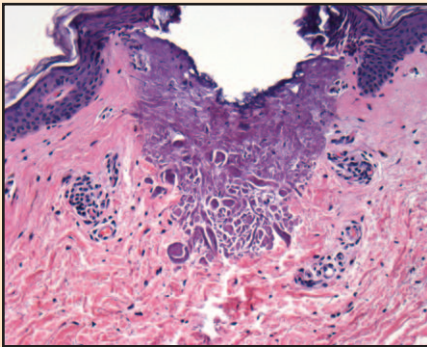
Before Tx



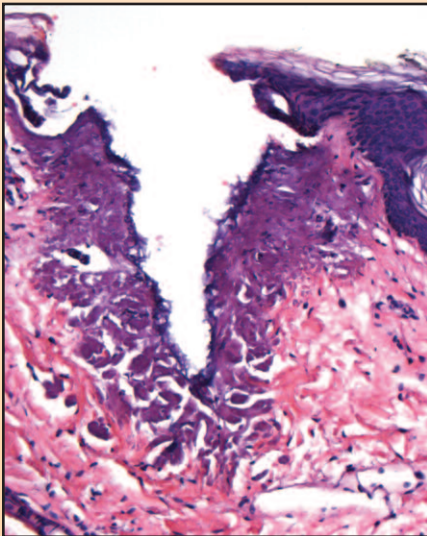
After SmartXide DOT Therapy Tx

*"I think SmartXide DOT is great for beginners because it is easy-to-use and has an excellent safety profile."*

Micro-ablative lesions produced *in vivo* and immediately biopsied. Each ablative zone surrounded by zone of coagulation and residual thermal damage.



Single pulse



Three stacked pulses

Histologies courtesy of Deborah S. Sarnoff, M.D.

of injury, scarring or other adverse events was too great. With SmartXide DOT you can start conservative and take your time to learn the ins and outs before being aggressive. The learning curve is not bad at all. A physician new to these techniques can get the same result as a veteran, it just might take an additional treatment session until they learn how aggressively they can safely treat.

**Dr. Alexiades-Armenakas** – SmartXide DOT is very flexible, effective, relatively easy-to-use, painless when used with a cold air cooler and there is no post treatment bleeding. These are crucial to those who are new to ablative or fractional technologies. Also, the device's flexibility makes it easy for newcomers to start with conservative parameters.

**Dr. Jeneby** – You can get into trouble with ablative therapy if you're not careful, so the training package that comes with the device is great. New users can receive Core Dimension Training with the purchase of every machine free for one year. This program is excellent and taught me a lot. Representatives will monitor you and your staff for one year and any time you employ a new staff member you can send them to the school in Dallas, Texas or Phoenix, Ariz., for training.

**Dr. Sarnoff** – I think SmartXide DOT is great for beginners because it is easy-to-use and has an excellent safety profile. It offers all the bells and whistles to reach higher levels as one gains experience. The platform itself is portable and its configuration is a big advantage in an office where space is at a premium.

**What treatment advice would you give other practitioners?**

**Dr. Jeneby** – I like 20 watts for the face, anywhere from 900 to 1,400 dwell time and anywhere between 250 and 500 pitch for the face and neck. For patients receiving treatment on their eyes for the first time I recommend 15 watts plus 500 dwell time, 500 pitch.

**Dr. Sarnoff** – I combine DOT Therapy with other procedures, many on the same day. For perioral wrinkling with deep nasolabial folds, I might begin filling the folds with hyaluronic acid, then treat periorally with the SmartXide DOT and finally inject a bit of BOTOX from Allergan (Irvine, Calif.), off-label, in the upper lip to relax the orbicularis oris muscle. Studies have demonstrated a possibility of smoother collagen growth in connection with relaxation of this muscle.

**Dr. Jacob** – I think it's important to practice and collect as much information as you can about what SmartXide DOT can accomplish before you embark on a resurfacing career. I do not think ancillary staff should use this tool since it can perform standard resurfacing and there's room for misuse of the laser by non-physicians. Limit use to physicians who know the laser's physics. This device is very safe, but with the push of a button it can quickly become more intense.

**Dr. Key** – I mentioned we do a lot of full anterior chest, full anterior neck extension and full-face treatments together in a single session. However, I recommend additional treatments. We select aggressiveness based on the degree of change desired. For mild changes we do one treatment, then observe. Even with single treatments I believe that optimal results may not be observed for four to six months. For patients who want the best results, I propose a two or three treatment sequence. You don't have to do it all at once.