

Warriors' wounds: Fractional CO₂ shines when treating soldiers' scars

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San Antonio, Texas — Air Force Maj. Chad Hivnor, M.D., sees wounded soldiers with all types of serious scars — many with 50 percent to 70 percent of their body surface area covered with burns and grafts, he says.

But treatment with fractional CO₂ laser is showing great promise for improving even difficult scarring, the dermatologist says.

“The soldiers often have keloidal and hypertrophic scarring, including where the grafts were placed. Even the harvest sites on some of these patients have become keloidal,” he says. “We see a lot of contractures in various areas — particularly the mouth and elbow area.”

Dr. Hivnor, 59th Medical Wing pediatric dermatology chief, Lackland Air Force Base, Wilford Hall Medical Center, and associate program director, dermatology, at San Antonio Uniformed Services Health Education Consortium, says treating these scars, post-grafting and post-burns, is daunting for burn and reconstructive surgeons alike.

He had long been searching for the ideal treatment, he says, trying fractional (nonablative) and fractional erbium devices. But it was not until he began using a fractional CO₂ device, the Lumenis UltraPulse Fractional CO₂ laser Total FX, that both he and patients were satisfied with the results.

“We would try the three fractional devices on patients, and it got to the point where patients would clearly point out where we had used the CO₂ and request that we use it elsewhere,” he says.

Patients' concerns differ

The patients Dr. Hivnor sees are highly variable in their presentation. Some have diffuse or focal second- and third-degree burns, in addition to flash burns.

“One of our first patients had TEN (toxic epidermal necrolysis),” he says. “Even though

that is an epidermal process, she had 90 percent body surface loss and, on some of the areas, the damage and subsequent scar was down to the mid-dermis. She scarred especially on her chest, back and face.”

Patients' concerns also differ. For example, some patients whose faces are significantly scarred might care more about the function of their elbows because of scarring. An amputee with contractures might care most about a small facial scar, he says.

“Every person is different in what concerns them and where they want your help,” Dr. Hivnor says.

Typically, Dr. Hivnor treats one or two areas and lets the patient determine whether he or she wants to have other areas treated with the fractional laser. It is ideal to record objective measurements to analyze the success of the treatment, he says.

Benefits from treatment with the fractional device takes a long time, and Dr. Hivnor says he will need one to two years to study the full effect of the treatment. Previous studies of full ablative CO₂ laser suggest that improvement of scars and wounds after CO₂ laser treatment occurs three to six months post-treatment and can continue for 12 months.

Treatment considerations

Dr. Hivnor has treated large areas of the body in one session, but recommends a general or other anesthetic be used when doing so.

“On the patient who had toxic epidermal necrolysis, I treated both arms, the entire abdomen, chest, neck and face, all in one session, which was about two hours,” he says.

“Certainly, if you are going to do a large body surface area, have the patient under some sort of anesthetic, because you cannot apply a topical medication to a large body surface area,” he says.

“Remember, too, that, depending on what energy you are using, patients can experience pain for about an hour or two after the procedure.”

It is important to note, he says, that with the fractionated CO₂ laser, energy is proportional to the depth of penetration. So dermatologists would have to use higher settings with hypertrophic scars than with normal or atrophic scarring.

“You have to be able to use different settings in various areas, because these scars are not homogeneous, so there is some experience in knowing how far to push the limits; that really regulates what you are doing,” he says.

Working slowly

Essentially, dermatologists who use the ablative fractional devices are damaging the skin on an area that does not easily heal. To avoid causing patients harm with treatment, Dr. Hivnor says he works slowly and methodically.

Most of his experience is in treating skin types IV and lower; Dr. Hivnor says he has not treated many patients with dark, type VI skin. While he is still studying patient outcomes, he feels that, at least with the lighter skin types, the CO₂ fractional device offers significant improvement of hypertrophic and keloid scarring.

“We have not gotten to the point where we can make post-op patients' scarring go away completely,” he says. “I have treated a few patients with large melanoma excisions, and — although they do tend to improve a little, especially the hypertrophic aspects — they do not go away with treatment.”

“And we still have not perfected (the treatment) on the scars on our soldiers. We are actively seeking the ideal settings, but we are making progress,” he says. **DT**

Disclosures: Dr. Hivnor reports no relevant financial interests.