

# Technology Advancements Uphold UltraPulse's Influence in Skin Resurfacing

By Bob Kronemeyer, Associate Editor

In contrast to the comings and goings of a countless variety of aesthetic devices over nearly 20 years, early on Lumenis (Santa Clara, Calif.) intended to establish its UltraPulse laser as the gold standard in laser skin resurfacing for wrinkle reduction.

In the early 90s, "it was a breakthrough technology. It was the first pulsed CO<sub>2</sub> laser on the market," recalled Jeffrey Dover, M.D., a clinical associate professor of dermatology at Yale School of Medicine (Chestnut Hill, Mass.). "It actually revolutionized the way we treated the aging face. It was the first technology that was relatively safe and highly effective in dramatically rejuvenating an aged face. Even today, the UltraPulse is still the most effective way of rejuvenating a wrinkled, blotchy, dyspigmented face."



**Jeffrey Dover, M.D.**  
Clinical Associate Professor of Dermatology  
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A newer, more compact version – UltraPulse Encore, "looks similar to the original UltraPulse, but the pulsed CO<sub>2</sub> laser and computer scanning technology have been upgraded dramatically, so it is now an incredibly versatile device," Dr. Dover continued. "The Encore now has the ability to operate as a traditional CO<sub>2</sub> laser for surgical cutting or for ablating tissue. This system still features the UltraPulse computer pattern generator (CPG) for performing full CO<sub>2</sub> facial resurfacing."

Two newer upgrades for fractional UltraPulse CO<sub>2</sub> resurfacing are ActiveFX (introduced in 2006) and DeepFX (launched December 2007). ActiveFX not only features the traditional UltraPulse CPG, "but there is more versatility in the amount of energy delivered, the spot size is smaller (1.3 mm) and the pattern is much more sophisticated, so the spots are not laid down one right after the other, or side by side," Dr. Dover explained. "They are laid down in a predictable pattern of non-sequential spots to prevent too much

thermal damage to tissue." Results for ActiveFX are best for dyschromia, fine-to-modest wrinkles and dull looking skin.

On the other hand, the spot size of the DeepFX handpiece is 0.12 mm for ablating micro-holes in the skin and removing tissue when treating moderate-to-deep wrinkles and acne scars. These two handpieces give me "the ability to achieve different spacing of the spots and the ability to vary the depth – going from a very light type of fractional CO<sub>2</sub>, almost like a superficial peel, to a very deep treatment where there is skin contraction and remodeling of deep scars and wrinkles," said Robert Weiss, M.D., an associate professor of dermatology at Johns Hopkins University School of Medicine (Hunt Valley, Md.).

Overall, the UltraPulse laser "has adapted to the latest advancements in resurfacing," Dr. Weiss said. Over the past 13 years, "we've gone from a device with very long downtime, but good efficacy, to something that maintains good efficacy but has a much shorter downtime and much more acceptable patient safety." While in the early days, there may have been two weeks of "being pretty raw and possibly several months of redness, now there are only two or three days of that raw look and maybe one week of redness." By dramatically reducing the downtime, "we've been able to achieve at least 75% efficacy of full ablative resurfacing," Dr. Weiss conveyed. "And for patients with deep acne scars, you can go all the way to the base of those acne scars. The UltraPulse can penetrate more than 2 mm in a single pulse."



**Robert Weiss, M.D.**  
Associate Professor of Dermatology  
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Hunt Valley, MD

Typically, patients schedule just one treatment, followed by re-evaluation four to six months later. "Those with very deep wrinkles will probably require a total of

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two or three sessions, spaced about four months apart,” Dr. Weiss said. “But most patients have been very satisfied with only one session.” Within the same session, Dr. Weiss routinely combines ActiveFX and DeepFX. “We first treat the deeper areas with DeepFX, then somewhat fill in the background with ActiveFX,” he said.

Dale Koop, Ph.D., senior vice president and general manager of the aesthetic business at Lumenis, who at the time was with Coherent Medical (Santa Clara, Calif.), developed the UltraPulse in 1990. “We were looking for something that comprised the optimal laser tissue effect, with the right amount of thermal damage,” Dr. Koop recalled. The 10,600 nm UltraPulse “is not only the first truly cosmetic device which kick started the aesthetic laser field, but has been one of the longest-lived aesthetic devices in the industry.” Several thousand have been sold worldwide.

Unlike standard CO<sub>2</sub> lasers, the UltraPulse has a constant irradiance pulse for controlling the ablation rate and the thermal effect. “Most of the other CO<sub>2</sub> lasers use super pulse technology, which gives a spiked pulse,” Dr. Koop noted. “Some of these lasers have a longer pulse characteristic, but nothing with the power and control that the UltraPulse possesses. It’s a very unique technology in that it has an extremely high level of performance and applicability with four or five times the average power of any other CO<sub>2</sub> system.”

The newer UltraPulse Encore “is more compact, more refined and has a better user interface,” Dr. Koop said. “As we learn more about laser tissue interaction, we refine the settings of the system and the delivery devices. We also have a nice pipeline of product improvements and applications for the UltraPulse.” Future enhancements include perfecting some of the latest fractional procedures.

Mitchel Goldman, M.D., medical director at Dermatology/Cosmetic Laser Associates of La Jolla, Inc. and La Jolla SpaMD, in La Jolla, Calif., helped usher in the original

UltraPulse. “The first machine that we came up with had a small spot size of 2.25 mm. Then Dr. Koop developed the CPG, so we had 1 cm patterns for much faster treatment,” Dr. Goldman explained. Several years later, Dr. Koop randomized the computer pattern instead of keeping it sequential. “As a result, there was less thermal damage because the pulses weren’t right next to each other.”



**Mitchell Goldman, M.D.**

Medical Director  
Dermatology/Cosmetic Laser  
Associates of La Jolla, Inc. and  
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Dr. Goldman also noted that the UltraPulse has always had the ability to perform fractional CO<sub>2</sub>, but no one knew how effective fractional CO<sub>2</sub> was. To convert the UltraPulse for fractional treatment, “we simply took the CPG and allowed a few hundred microns of tissue between each spot (ActiveFX). Then to make things even better, instead of having a spot size of 2.25 mm, the size of each spot was reduced to 0.1 mm for DeepFX.”

For wrinkles, Dr. Goldman schedules one or two sessions at three month intervals. “Half of my patients do really well with one treatment and the rest need two,” he said. “I usually do one pass with DeepFX, followed by one pass with ActiveFX. But the best results require longer downtime.” A retrospective study of 426 patients treated with the DeepFX/ActiveFX found that only four patients had erythema lasting longer than five days.

Dr. Goldman also successfully treats acne scars, typically with three or four sessions, spaced three months apart by applying mostly DeepFX. “You can easily attain 50% to 75% improvement,” he said. “We’re now experimenting with treatments for other types of scars and stretch marks with DeepFX.”