

TECH BUZZ



Tattoo removal

There's a lot of buzz among dermatologists around picosecond lasers, particularly for tattoo removal.

"Never before have we been able to get pulses so short and powerful. That's significant because of the way we approach different targets in the skin," said Jeremy B. Green, MD, of Skin Associates of South Florida in Coral Gables, Florida, and voluntary assistant professor of dermatology at the University of Miami. "Some of the pigment becomes fragmented into small pieces that we couldn't treat with traditional nanosecond lasers. We'd hit a plateau and it would leave a smudge. But now we can make pulse duration fit the size of the particles of pigment."

Dr. Green added that shorter pulse duration can result in less scarring. "With nanosecond lasers, some pulses were too long for the target. Heat spreads, so even though they were the right wavelength, the longer pulse duration would result in collateral heat spread damaging the skin. Picosecond lasers have a quicker zap, so the heat doesn't spread and we are not seeing scar-like textural changes in the treated skin."

He added that picosecond lasers have been particularly helpful to him in removing double-tattoos, in which a patient had an existing tattoo covered up with a new one. "Patients with double tattoos that I treated with my nanosecond laser experienced blistering due to the longer pulse and pigment-rich target. That hasn't happened with my picosecond laser."

Three different kinds of picosecond lasers offer dermatologists options, said **Min-Wei Christine Lee, MD, dermatologic surgeon and director of the Skin and Laser Treatment Institute in Walnut Creek, California.**

"Cynosure's picosecond laser (Picosure) is 750 picoseconds which is seven times shorter pulse duration than lasers with the next shortest pulse duration of 5 nanoseconds. The picosecond laser is more effective than traditional nanosecond lasers on resistant tattoo colors such as green and blue," **Dr.**

Lee said, noting that these two colors have typically been the hardest to remove. "Picoway (Syneron) and Enlighten (Cutera) have 2 wavelengths — 532 nm and 1064 nm — and higher peak power compared to Picosure which has one wavelength, 755 nm. Having one wavelength of 755 nm limits the laser to treating only certain colors such as green and blue, whereas the dual wavelengths of 532 and 1064 nm allow for treatment of wider range of colors." **Dr. Lee** noted that the Enlighten and Picoway combine a picosecond and nanosecond laser with the 532 and 1064 nm wavelengths in one package.

Douglas Naversen, MD, of Dermatology and Laser Associates of Medford in Oregon, said the reduced treatment times with picosecond lasers have been a boon, especially when also using topical perfluorodecalin, which resolves the whitening and gas bubbles and allows treatments to happen one after another. "We used to have to wait 20 minutes between sessions and that would potentially clog up the waiting room, but now it's 10 seconds between sessions. We're getting tattoos resolved 50 percent faster."

Although picosecond lasers were designed with tattoo removal in mind, dermatologists are using them for other conditions. In the April 2015 *Dermatologic Surgery*, Cameron Chesnut, MD, then of the University of California, Los Angeles, division of dermatology, and colleagues documented the treatment of three patients with nevus of Ota with the Picosure laser (2015 Apr;41(4):508-10). All three patients experienced lightening of their skin and none had redarkening at follow-up two to seven months later. The side effects included edema and erythema, which resolved within two days.

"The laser doesn't know the difference between natural pigmentation and tattoo pigment. It just destroys everything in its path," said Dr. Chesnut, now clinical instructor of dermatologic and cosmetic surgery at the University of Washington School of Medicine, and dermatologist at Dermatology Specialists of Spokane. "The

old lasers could create heat just fine, but not the acoustic aspect needed to break up the particles. It would take more treatments and there would be more collateral damage. Now it only takes between two and four treatments.”

Although picosecond lasers offer dermatologists new options for tattoo removal, they’re not the only show in town, according to **Dr. Lee**.

“Newer nanosecond lasers have more wavelength options. The QX-Max (Fotona) has four wavelengths: 532 nm, 585 nm, 650 nm, and 1064 nm. It also has a higher peak power, which makes it much more effective on all colors, including resistant colors, than other traditional nanosecond lasers,” **Dr. Lee** said.

Dr. Lee also noted the Micropen TR device (Eclipse), which uses microneedles to deliver a solution into the skin that expels pigment from the skin.

“It’s similar to placement of the tattoo but in reverse. It has the advantage of being ‘color blind’ and requiring fewer treatments,” **Dr. Lee** said.

But they’re not perfect, she added. “With laser treatments, tattoos have a gradual fading. With micropen removal treatments, there are scattered white polka dots interspersed between residual tattoo. The appearance of the tattoo between treatments looks more unusual and bizarre, so one would not want to start this procedure without finishing it.”

Pain is a consideration during tattoo removal, as well. In a paper in the July 2014 *Lasers in Medical Science*, a British researcher reported that applying a glass microscope slide firmly to the treatment area and applying the laser pulse through the glass slide resulted in significantly less pain and epidermal damage for nearly all 31 patients in his study.

Picosecond lasers

There are uses for picosecond lasers beyond tattoo removal. Jeremy Green, MD, has also used picosecond lasers to treat patients with nevus of Ota. “I had a couple of patients who had plateaued with the nanosecond laser. Then when I used the picosecond laser, it made a difference in cleaning up [the remaining pigmentation].”

Dr. Green is now trying the Cutera Enlighten picosecond laser for melasma. “I’ve had some encouraging results, but it’s still too early to say how successful it is because so much of melasma is driven by hormones from inside the body as well as the sun.”

Picosecond lasers may also be an option for skin rejuvenation and treating acne scars, Dr. Green added. “Picosecond lasers are able to stimulate collagen production, so they may be helpful there.”

Cameron Chesnut, MD, feels the jury is still out on that. “Although there’s certainly a huge market for photo-rejuvenation and picosecond lasers may help, it’s not what they’re best at or the best choice for it.”