The role of lasers in noninvasive fat reduction and body contouring

By Laura Ninger

According to data from a 2008 survey conducted by the American Society of Aesthetic Plastic Surgeons, liposuction is one of the top five cosmetic procedures. While it remains the most effective treatment for fat removal, the disadvantages of liposuction are well known. Therefore, the quest for noninvasive alternatives that will target selected areas of fat to decrease volume and improve cosmetic appearance continues. Ideally, such a treatment would decrease fat deposits without the incisions, anesthesia, surgical risk, damage to surrounding tissues, prolonged recovery time, scarring, and expense typically incurred with liposuction.

Several different types of treatments are currently available or under study for body contouring and fat reduction, using a variety of modalities including laser, radiofrequency current, cryotherapy, ultrasound, massage, and other means. All of these treatments are intended to target localized areas of fat, such as in the hips, abdomen, and thighs (eg, “love handles”; “saddlebags”) and other areas such as the face, arms, and knees. None of the procedures are intended for weight loss in very obese patients.

Laser-Assisted Liposuction

Lasers of various wavelengths (eg, 924, 975, 1064, and 1320 nm) are being used increasingly in conjunction with liposuction, and sometimes without liposuction, to aid the removal of fat and improve the appearance of cellulite. In this minimally invasive procedure, infrared light is delivered via a cannula through a 2- to 3-mm incision, precisely targeting fat and heating it to liquefy cellulite and fatty deposits. Laser-assisted liposuction potentially improves upon traditional liposuction by emulsifying fat so that it is easier to remove, as well as by decreasing blood loss, improving hemostasis, and providing better skin tightening. It is reportedly less painful than traditional liposuction.

Laser Treatment of Cellulite

A distinction should be made between noninvasive treatments for cellulite (ie., body contouring) and those for fat reduction, according to Mathew Avram, M.D., J.D., director of the Massachusetts General Hospital Laser and Cosmetic Center at Harvard Medical School. “At this point in terms of lasers specifically, we’re still in the infancy of this field and we just need to be very skeptical and honest about what’s effective and what isn’t. Hopefully there will be some truly effective devices.”

– Mathew Avram, M.D., J.D., director of the Massachusetts General Hospital Laser and Cosmetic Center at Harvard Medical School

Several devices have been approved by the FDA to treat cellulite. The illustration above compares a cross section of skin with subcutaneous tissue with cellulite (left) to a cellulite-free cross section.
it is still technically difficult. no laser is “theory of selective photothermolysis,” possibly due to inadequate skin cooling. included swelling, bruising, and pain, possibly due to inadequate skin cooling. despite the promise inherent in the “theory of selective photothermolysis,” it is still technically difficult. no laser is available on the market for noninvasive fat reduction because it is something that requires a lot of refinement in terms of what the proper energy is and how long to have the laser exposed to the fat and how painful it might be,” explains Dr. Avram. “So at this point we know theoretically, we’ve seen in the laboratory and in early experiments that we can do this, but we’re not at the point yet clinically where we can apply this technology to patients.”

Melanie C. Grossman, M.D., a dermatologist and laser specialist in New York City, agrees with this assessment. Based on the research, she says, “It seems to be possible to use laser to noninvasively reach fat and destroy it. How long it will actually take to make a laser that will be clinically used to do that, I do not know.”

In the interim, some of the treatments that are used in the US for cellulite treatment have also been approved in Canada and/or Europe for fat layer reduction and manufacturers have applied for FDA approval for this indication.

Caution and Optimism
Several noninvasive treatments exist for cellulite, and laser may have a role in the effects observed. Other techniques for fat reduction are showing promise in research studies. “There’s a tremendous interest in this field, for obvious reasons, because Americans and people around the world really care about their appearance and how fit they look,” says Dr. Avram.

Noninvasive fat removal has obvious potential for patients who want to avoid an invasive liposuction procedure. Says Dr. Grossman, “I think that this whole topic of noninvasive device-based fat reduction and body contouring, whether it be lasers or other types of devices, is very interesting and very encouraging. That patients would be able to have this type of treatment without having to go under the knife or have any sort of anesthesia is incredibly groundbreaking and will make these types of treatments more available to people.”

The experts believe that several new technologies will emerge over the next few years and will show true clinical effects. However, Dr. Avram warns, “At this point in terms of lasers specifically, we’re still in the infancy of this field and we just need to be very skeptical and honest about what’s effective and what isn’t. Hopefully there will be some truly effective devices. But at least for the next few years, these technologies will target focal areas of excess fat; these are not designed and shouldn’t be thought of as competition for liposuction any time in the near future.”

Dr. Goldberg also points out that some machines currently being studied for fat reduction do not include lasers. He believes that the immediate future lies in combination treatments: “I think the future of fat removal and noninvasive body contouring will involve more than one device. Most people will be treated with more than one approach, because some will be better at tightening skin; some may be better at fat removal. They undoubtedly will include lasers, but a whole variety of other devices, with the goal being to do body contouring and fat removal without surgery. And the day may come when liposuction is no longer being used.”