AGE MANAGEMENT MEDICINE FOR PHYSICIANS
HealthyAging

Americans are constantly waging a war on fat, whether trying the latest fad diet or burning calories at the gym. Last year, approximately 400,000 Americans turned to liposuction to trim away excess pounds.

As technology improves, however, physicians are using lasers in new ways to fight trouble spots. One such technology, known as laser lipolysis, has recently emerged, melting fat from areas under the chin and on the hips. The technology also improves skin laxity. Recent research shows some promising results, pointing to its practical use as a stand-alone treatment and as an adjunct to liposuction.

In 1997, Apfelberg et al. conducted the first multicenter trial studying laser-assisted liposuction, using an Nd:YAG laser 40 W, 0.2 second pulse duration. The technology used a 600 micron fiber in a 4 mm or 6 mm cannula. Researchers also used cold saline cooling. The study suggested a trend toward decreased ecchymoses, pain, edema and less strain for the physician.[1]However, researchers felt there was no significant benefit associated with laser lipolysis. In addition, the technology was not approved by the Food and Drug Administration (FDA) then. The sponsoring company (Haraeus Lasersonics) abandoned it.

Eight years later, however, Badin researched similar technology. He used a 1064 nm laser fiber inside a 1 mm cannula, with the fiber tip extending past the distal end of the cannula. This method differed from the previous approach because the laser fiber came in direct contact with adipose tissue. Badin found laser-assisted lipolysis was less traumatic than liposuction because the cannula is smaller. In addition, he also found the Nd:YAG system improved skin retraction.[2]Since then, other studies have followed. When comparing laser lypolysis to liposuction, Goldman documented reduced blood loss and ecchymoses, improved patient comfort postoperatively and better efficacy for reducing fat in more dense areas.[3]Imaging technology also has reinforced laser lipolysis' effectiveness in destroying fat. In 2003, Ichikawa used histologic and scanning electron micrograph images that demonstrated 300 um tunnels. These tunnel sizes corresponded to the laser fiber diameter. In addition, the study showed laser lipolysis disintegrated cell membranes, coagulated small vessels and dispersed lipids.[4] Most recently, a 2006 study by Geronemus used magnetic resonance imaging (MRI) to evaluate the volume of fat reduction after laser lipolysis. Submental areas (nine), abdomen (five), upper arms (one pair), thighs (three pairs) and knees (one pair) were treated.

In this study, 10 patients with focal areas of less than 100 ccs of fat were treated using the 1064 nm Nd:YAG laser with a 300 micrometer fiber; 10 patients were treated with the laser followed by bi-weekly treatments with the Tri-active system, a diode laser, to facilitate lymphatic drainage. Ten other patients were used as controls. Adipose tissue was not aspirated after laser treatment.

The 10 patients who had MRI evaluation pre- and post-treatment had an average 17 percent fat reduction in volume. Patients also filled out self-assessment questionnaires at baseline, one week, one month and three months. The average self-reported individual improvement was 37 percent in only three months. It's unclear how the investigators quantified this improvement, but patients also noted quick recovery times and good skin retraction.[5]The FDA opened the door for broader use of this technology when it approved the 1064 nm Nd:YAG laser system (Smartlipo; Cynosure Inc., Westford, MA) in October 2006 for the surgical incision, excision, vaporization, ablation and coagulation of all

soft tissues.[6]Other manufacturers have also recently received FDA-approval for versions of this technology (CoolLipo; CoolTouch, Roseville, CA; Lipotherme; MedSurge Advances, Dallas, TX).

Benefits of Laser Lipolysis

Laser-assisted lipolysis has several benefits over traditional liposuction under general anesthesia. First, patients easily tolerate the procedure. Because they're awake, they may communicate during the operation and can stand. This allows us to optimize evaluation and correction, if needed. In addition, tiny incisions, which do not require sutures, allow drainage, prevent infection and heal within weeks of the procedure.

We're unaware of any studies that compare laser lipolysis with liposuction using the tumescent technique. However, in our experience, the smaller cannula size, coagulation properties of the laser and its fat-melting abilities have made the procedure less traumatic than tumescent liposuction. Less trauma translates to shorter recovery times.

Laser-assisted lipolysis also appears to tighten the skin and reduce laxity, since the destruction and remodeling of collagen creates a thicker and more organized dermis. This feature makes laser-assisted lipolysis an ideal system for areas of localized adiposity, as well as localized laxity, after liposuction.

Choosing the Right Candidate

Laser lipolysis is designed for liposculpture and body contouring. Patients who have had previous liposuction but still have small local areas of laxity or adiposity also may benefit from this approach. The ideal patient should be healthy with small to moderately sized local areas of adiposity. Laser-assisted lipolysis is good for treating the submental area, abdomen, upper arms, hips, thighs, knees, calves and ankles.

Before the procedure, we give patients pain medication, an anxiolytic, an antihistamine and an antihypertensive. These medications enhance comfort, as well as offset the potential hypertensive/tachycardic effects of the epinephrine used in tumescent anesthesia. We also ask patients to wear protective goggles before the procedure.

We begin the procedure by applying local tumescent anesthesia for about 20 to 30 minutes. We make two to 12 tiny incisions, depending on the treatment area, with an 11-blade. We use these incisions to insert an encased 300 um fiber emitting 1064 nm (Nd: YAG laser system). We manipulate the cannula in forward and backward motions in a crisscross pattern under the skin. This technique and motion allows the laser fiber to come in direct contact with the subcutaneous layer, thereby efficiently melting adipose tissue. The crisscross pattern ensures complete treatment of areas under the skin, preventing "skip" areas. The patterned, deliberate motion also prevents the laser fiber from being in one location too long, diminishing the risk of inadvertently burning the skin.

We continually palpate the tissue during cannulation until it feels soft and more pliable, contrasting with the preoperative, firm, indurated areas. After the procedure, we clean and bandage the person. Patients have to wear compression garments 24 hours a day for one week. They will then need to wear the garments for 12 hours a day during the second week.

FDA regulations mandate suctioning after laser lipolysis treatment. However, many physicians in Europe and South America do not aspirate after the treatment. Physicians there have used laser lipolysis for several years. As we perform more procedures and gather data, we may find that certain, small and localized areas may be performed without post-laser aspiration.

A study by Goldman and colleagues found no significant change in triglycerides and lipid profiles among patients treated with laser lipolysis without aspiration preoperatively, one day, one week and one month post-procedure. [7]

Complications
We've performed more than 400 of these procedures at our facility. We noted one local infection and three minor burns. We've found the technology to be well-tolerated. In fact, the coagulation of small blood vessels by the 1064 nm laser minimizes ecchymoses, edema and bruising. Localized anesthesia ensures far less serious side effects than general anesthesia. However, additional minimal side effects include over-correction and asymmetries.

Physicians must remember that laser-assisted lipolysis is still surgery. Thus, we have a responsibility to inform patients of risks, including infection, burns, irregularities and minor scarring. We also want patients to understand they will have to come for frequent post-operative visits, at two weeks, six weeks, three months and six months. This ensures proper healing and helps us address any concerns or questions they may have.

Managing patient expectations is important. For example, skin tightening often occurs. But it could take up to six months since collagen continues to remodel after the procedure. We also stress a balanced diet and exercise. Areas of fat treated with liposuction, whether laser assisted or not, may return if patients are grossly negligent. We stress the results of laser-assisted lipolysis can last a lifetime when married with a healthy lifestyle.

Laser-assisted lipolysis is an exciting new procedure that provides improved patient tolerability, shorter recovery times and optimal skin tightening. These improvements are safe, require minimal downtime and provide excellent options for patients reluctant to undergo more invasive procedures. The technology can help tackle stubborn areas of isolated fat, creating a desired svelte effect or even the final finishing touches to liposuction procedures.

For a list of references, click on the references toolbar.

Bruce E. Katz, MD, is clinical professor of Mt. Sinai School of Medicine in New York. He is also the director of Juva Skin and Laser Center and Mt. Sinai Medical Center's Cosmetic Surgery and Laser Clinic in New York. Jason C. McBean, MD, is a fellow with Juva Skin and Laser Center.

Disclosure: Dr. Katz indicates that he is a paid consultant for EI-Engineering, an Italian laser company. Dr. McBean indicates that he has no affiliations with any commercial entities, directly or indirectly referenced in this article.
