

LipoControl Uses Adipocytolysis Effect to Achieve Body Contouring

By Kevin A. Wilson, Contributing Editor

LipoControl from Osyris Medical employs a 980 nm diode laser for laser lipolysis and adipocytolysis. Based on the Phararon 980 laser lipolysis platform (also known as Lipotherme™ in the U.S.), this new device offers features that allow an unprecedented level of control over delivery of treatment energies. LipoControl also relies less on fat emulsion and more on a gradual, heat-induced mass apoptosis of adipocytes for localized fat removal. FDA approval is pending.

May/June 2009

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The very first laser lipolysis device used a 6 watt, 1064 nm Nd:YAG laser. The original plan was to melt smaller volumes of fat with the laser, leaving the body to eliminate liquefied fat naturally. According to Neil Sadick, M.D., F.A.A.D., F.A.A.C.S. a cosmetic surgeon with a private practice in New York City, N.Y., the device worked but the results were unspectacular, and eventually aspiration of the emulsified fat was involved. “The technology as a whole evolved rapidly. Now there are numerous devices utilizing different wavelengths such as 1320 nm or 915 nm, singly or in tandem, and different absorption targets to achieve the same effect of melting fat. We in the aesthetic medical community also observed anecdotal evidence suggesting a secondary skin tightening effect.”



Before Tx



After Tx

Photos courtesy of Jean-Luc Cohen, M.D.

LipoControl is not designed for bulk laser lipolysis or large volume fat removal. Instead, the goal is a more gradual, natural removal of adipose tissue termed laser adipocytolysis. This process involves heating the treatment area to a temperature that causes enough thermal stress to cells that apoptosis occurs but not enough to completely disrupt the cellular membrane. Fat drains out more slowly and eventually the fat and cell debris are eliminated by the body’s waste removal processes. “Treatment with LipoControl disrupts the architecture of the adipocytes,” explained Dr. Sadick. “Essentially, you’re heating the fat cells and causing that cell to disrupt and release triglycerides. The basic principle is similar.”



Neil Sadick, M.D., F.A.A.D., F.A.A.C.S.
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Aspiration is perfectly acceptable, however. “During treatment,” Dr. Sadick said, “some of the fat is absorbed by the body. It is metabolized by the reticulated epithelial system and macrophages and then travels to the liver. However, the majority of it is aspirated and doesn’t get absorbed.”

The real story is in the safety control features, hence the moniker LipoControl. Osyris Medical is still quiet about specifics, but according to Dr. Sadick, operators adjust the amount of energy to be delivered, which can be tracked via real-time visualization on a display monitor. When the color changes, it means you’ve delivered the correct amount of energy, and if you attempt to deliver more energy, the system will indicate that you are over treating. “In this phase, the device is measuring the energy delivered, not the temperature,” he commented. “The most important factor is the amount of energy delivered. If you deliver the suggested energy levels, you’re not going to see the abnormal temperature on the surface.” Also, safety controls within the cannula turn the device off when the cannula is stationary, which helps prevent burns. “LipoControl’s energy control features are a major advance in terms of efficacy and safety.”

Editor’s Note: In the following clinical roundtable, a plastic surgeon, cosmetic surgeon, dermatologist and an aesthetic practitioner share their knowledge and experience with laser-assisted adipocytolysis. Collectively, these physicians have extensive experience performing body contouring treatments, as well as using laser and light-based therapies for a variety of aesthetic medical applications.

“LipoControl is designed for sculpting smaller areas of localized fat by laser adipocytolysis, allowing the body to remove much of the fat so it’s much less invasive.”

What differentiates LipoControl from traditional liposuction and other laser-assisted lipolysis devices?

Neil Sadick, M.D. – In many ways LipoControl is much like other laser lipolysis devices and differs from regular liposuction in the same ways. Instead of using mechanical energy and suction to dislodge and remove fat, you use tumescent anesthesia, tune in the energy you want to deliver, insert the laser fiber in the cannula, then begin liquefying or disrupting the architecture of the adipocytes. There is a coagulation effect which minimizes bruising, and the application of heat energy underneath the dermis enhances skin retraction by tightening the skin and the fibrous lattice beneath. It is a gentler technique and the post-operative course is somewhat diminished. Results are also more uniform due to the new safety features. LipoControl is a major advance in terms of safety and efficacy.

Maurice Adatto, M.D. – LipoControl allows the surgeon to completely control the amount of energy that he puts into the tissue. The surgeon receives live feedback about how much energy is being delivered, with safety shut-offs, so that maximum energy is delivered without overheating. The display also serves as a sort of map showing exactly where and how much energy is being delivered. This is really the main feature that differentiates this device from other laser lipolysis devices.

Jean-Luc Cohen, M.D. – With liposuction we will generally remove more fatty tissue. LipoControl is designed for sculpting smaller areas of localized fat by laser adipocytolysis, allowing the body to remove much of the fat so it’s much less invasive. I do not need general anesthesia. There is also less social downtime because the recovery period is shorter and more comfortable, but the final result will not be seen for several months. The effects of liposuction are obvious much sooner, however the result is not as smooth.



Jean Luc Cohen, M.D.
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Geneva, Switzerland

Eric Plot, M.D. – It’s very different from regular liposuction because you don’t need to manually remove the fat. Another aspect of LipoControl technology is that with the feedback from the safety features, this treatment takes less time than other laser lipolysis devices. I know exactly what I’ve done, where I’ve gone and when I’ve reached the maximum energy level for a treatment site. This prevents over treatment, promotes a more homogeneous outcome and assures me that I have given patients a complete treatment.

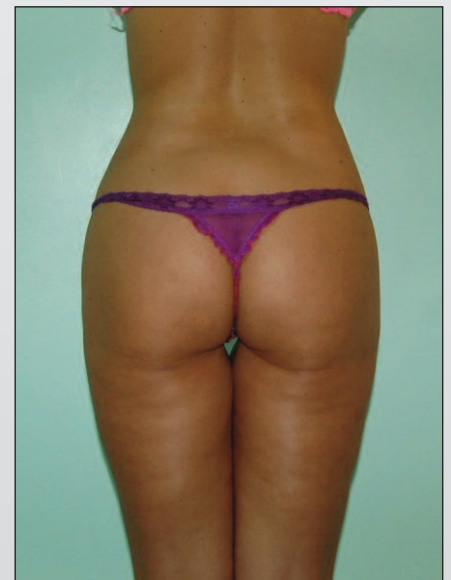
How does LipoControl differ from its predecessor, Phararon 980?

Dr. Cohen – The technique for LipoControl is exactly the same as it is for the Phararon 980 since the device is the same – with the additional safety features giving you control of energy delivery.

Dr. Plot – It’s the same wavelength and same technology, but it is important for me to have an exact plane and exact mapping of energy delivery for the treatment area. It makes a difference. Phararon 980 was very operator dependant. Now I have much more control of my work and more consistent results.



Before Tx



After Tx

Photos courtesy of Jean-Luc Cohen, M.D.

“Improved retraction compared to regular liposuction is one of the things that make LipoControl such a revolutionary treatment.”

What makes the 980 nm wavelength ideal for this indication?

Dr. Adatto – The 980 nm diode laser has a useful absorption spectrum in the hydrated fat. This is important because the procedure is done under tumescent anesthesia, which when injected, hydrates the fat.

Dr. Cohen – I’ve done about 400 procedures and for me, the 980 nm wavelength provides a great combination of fat reduction and skin retraction safely. It has good penetration and a good profile for absorption by water, but it is not for removing the same amount of fat as liposuction. However, LipoControl does cause tightening of the skin, and I like to use it in combination with traditional liposuction. Other wavelengths may have better absorption curves for fat but this wavelength is very good for heating fat and causing tightening. Treatment is very comfortable for the patient.

What about fat aspiration?

Dr. Adatto – At the beginning, we were not aspirating and LipoControl worked well. Now more and more we find that if the surgeon aspirates at the end of the procedure, it’s even better. There is less inflammation after treatment.



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Furthermore, patients don’t leak if you aspirate the residual liquefied fat and tumescent anesthesia. It is more practical and elegant for the patient. However in some European countries, not all physicians are able to aspirate. For example, in France, a physician who is not a surgeon, such as a dermatologist, cannot aspirate. It depends on the regulation of each country. In Switzerland, we can aspirate and in the U.S. there is no such restriction. I now encourage aspiration at the end of the procedure.

Dr. Cohen – One reason this device is good for European physicians is that in France aspiration is considered a surgical procedure; therefore, you have to be a surgeon to perform it. The rules are different in other places, so for example, in Marseilles, France, I am not properly accredited to perform anything other than the laser adipocytolysis without aspiration of the fat, but I am allowed to perform aspiration while working at my practice in Geneva, Switzerland. There are still patients who I do not feel need aspiration. As well, I still perform regular liposuction without the laser.

Dr. Plot – You have to think differently with LipoControl. With liposuction you aspirate a predetermined amount of fat. Liposuction is better for removing larger volumes, but there are more irregularities. Laser adipocytolysis with LipoControl doesn’t depend entirely on aspiration, because you are trying to heat the area uniformly to a temperature just above 45°C to cause apoptosis, then the body does the rest over time. The result is a much smoother outcome.

When is LipoControl treatment most often called for?

Dr. Cohen – I prefer LipoControl for treating small or moderate adiposities, or for improved skin retraction with liposuction in some areas. I prefer to use liposuction by itself if I believe skin retraction will be sufficient for that particular location, but the skin quality of some areas, such as the inner arm or thigh, limits the amount of retraction one can expect, and in those cases I will use LipoControl to obtain better results. This improved retraction compared to regular liposuction is one of the things that make LipoControl such a revolutionary treatment.



Jawline and neck before Tx



Jawline and neck after Tx

Photos courtesy of Eric Plot, M.D.

"It can be used effectively on virtually any body area. There is nothing specific to this device that makes it different in terms of the areas you can treat."

Who is the ideal patient for treatment with LipoControl?

Dr. Plot – My ideal patient is not overweight, a younger patient with a little excess fat in the wrong place and maybe some laxity there as well. When you have too much fat to remove, LipoControl is not a good idea. I also like to combine liposuction plus LipoControl. It allows me to treat some areas that I would not treat before.



Eric Plot, M.D.
Plastic Surgeon
Paris, France

Dr. Cohen – I do not think in terms of a single ideal patient type with LipoControl because there are many ways even heavier patients may benefit. If you have to choose, patients who have small or moderate adiposities and maybe some laxity will see more dramatic results with this technology, as long as they are properly educated as to what to expect.

What body areas are best for LipoControl treatment?

Dr. Sadick – As with all laser lipolysis devices, it can be used effectively on virtually any body area. There is nothing specific to this device that makes it different in terms of the areas you can treat. Any place on the body can be treated.

Dr. Plot – I like to treat the inner part of the thigh, the arms, or the neck and chin with LipoControl; in fact I like to treat any area where I am anxious about skin retraction. When you're presented with thin or thick skin, you're always afraid the skin will not retract nicely, LipoControl really improves that.

Dr. Cohen – A great location for LipoControl is the lower face. There is some fat to remove underneath the chin, but that area requires good skin retraction, which you get with this treatment, so you may see spectacular results.

Dr. Adatto – You can do chins, inner arms, inner thighs, abdomen, saddle bags, inner knees, ankles, there is no limit. The only limitation with LipoControl is in volume. You can remove a substantial volume of fat if you wish, around one liter or maybe a little more, but that requires aspiration. This device is not for mega-volume liposuction.

What do you tell patients about LipoControl treatment?

Dr. Sadick – LipoControl induces more skin tightening, there is less to do post-operatively, especially in terms of bruising and pain management. Most people are able to go back to the gym within a couple days. It is gentler to the body because you're not tearing through tissue; fat is liquefied.

Dr. Cohen – It's important to take plenty of time to explain to patients what to expect because they need to know this is not regular liposuction. Like many aesthetic treatments it takes months before you see the final result. They should understand how the procedure works; that the body will slowly eliminate the damaged adipocytes and the liquid fat, and that skin retraction will also take time as the collagen remodeling takes place. Liposuction results are obvious sooner, so patients need to understand the difference. Also, some patients ask questions about the dangers of letting the body remove the fat. Does it raise fat or cholesterol levels? These are legitimate concerns but there is



Before Tx

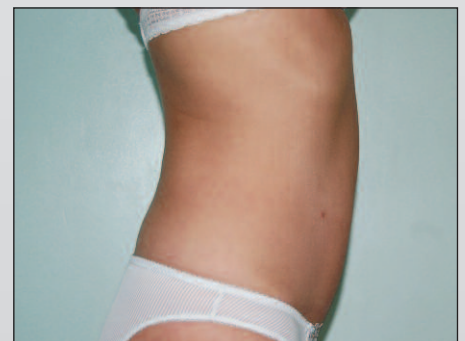


After Tx

Photos courtesy of Jean-Luc Cohen, M.D.



Before Tx



After Tx

Photos courtesy of Jean-Luc Cohen, M.D.

“LipoControl is also a very good secondary procedure for patients who have had liposuction before and experienced irregularity or poor skin retraction.”

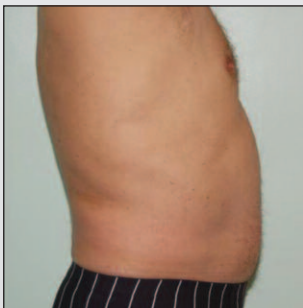


Before Tx



After Tx

Photos courtesy of Jean-Luc Cohen, M.D.



Before Tx



After Tx

Photos courtesy of Jean-Luc Cohen, M.D.

no scientific evidence that this takes place, so there is nothing to fear. Patients are instructed, however, to reduce their daily sugar intake before the procedure and for one or two months after. It is also part of my responsibility as a physician to instruct patients about proper diet and exercise. LipoControl is not a weight loss procedure.

What is the post treatment protocol with LipoControl?

Dr. Cohen – There isn't much social downtime with LipoControl. Patients can return to work one or two days after the procedure. They may be a little uncomfortable for a while, three or four days at most, but there isn't the same post-procedure pain as liposuction because the laser causes coagulation, so you don't have the hematomas or bruising. I give them some medication for the first few days. Patients need to wear a pressure garment for ten to fifteen days, but all day and night only for the first few days. I also must see them once a month for six months after the procedure because it's important to monitor their progress. The full benefit of skin retraction and fat reduction takes five or six months, sometimes more, to be observed.

Have you observed any adverse effects?

Dr. Adatto – I recently presented on the issue of safety and reduced complications. I studied hundreds of cases from three centers. We saw hematomas in fewer than 2% of cases, which completely resolved at three weeks post-op with no sequelae; two cases of seroma; one case of very minor scarring; and no blistering. That was it in over 838 cases. No infections, nothing else, and this is by far the most compelling statistic we have at the moment. There are many papers published in literature about how, in addition to liquefying fat, the laser coagulates tissue so you have less bleeding and few hematomas.

What do patients think of LipoControl?

Dr. Adatto – It's important to remember that patient satisfaction is quite high with traditional liposuction. For LipoControl, patients feel their results are excellent and the procedure is not difficult. Discomfort during and after treatment is much less. There is almost no bruising. Patients can go back to normal activities almost immediately. I usually do my procedures on Thursday afternoons. I tell the patient to stay out of work on Friday and Saturday, do only light exercise or work on Sunday and by Monday they are fine and back to normal life.

Dr. Plot – Patients like laser adipocytolysis with LipoControl because it's a light procedure compared to liposuction. We use only local anesthesia, patients don't need much rest after and there isn't much downtime, so they don't have to spend a lot of time at home. LipoControl is also a very good secondary procedure for patients who have had liposuction before and experienced irregularity or poor skin retraction.

What other indications do you treat with LipoControl?

Dr. Plot – When doing classic liposuction removing larger volumes of fat, I like to finish with LipoControl to improve retraction and obtain an overall smoother result.

Dr. Sadick – I have not yet used LipoControl for skin tightening, but I certainly would for someone who wants tightening in their neck. I think that in some cases the inside/outside approach using an external laser or radiofrequency skin therapy in conjunction with LipoControl may augment the overall outcome. Such a treatment may even be optimal for cellulite or non-invasive body tightening.

Laser Adipocytolysis Versus Laser Lipolysis

Simply defined, laser lipolysis with LipoControl is the destruction of fat cells by direct application of heat energy delivered by laser light. Rapid build-up of thermal energy disrupts the cell membranes of adipocytes, liberating liquid fat for easier removal by suction or by the body's natural processes. According to Pascal Servell, clinical manager at Osyris Medical USA, laser adipocytolysis is the process of using this heat to put fat cells on a path to apoptosis, beyond the point of no return, but before complete failure of the cell membrane's structural integrity causes its triglyceride contents to be spilled into the surrounding area.

Prior to treatment with LipoControl, the adipose tissue hovers around normal body temperature (about 37°C). As treatment begins and the cannula is repeatedly inserted into adipose tissue at the treatment site, adipocytes directly in front of the 1 mm micro-cannula are mechanically destroyed. Relatively few fat cells are destroyed this way during LipoControl treatment, and in fact the cannula is designed with a rounded end (SmoothKit+) to minimize tissue trauma. The tissue temperature is highest near the cannula path, exceeding the level of maximal thermal stress for fat cells (approximately 65°C to 70°C) due to the direct application of thermal energy, creating a zone where true laser lipolysis takes place. Adipocytes in the area immediately surrounding the cannula path, therefore, are victims of laser lipolysis.

As treatment progresses, bulk heating in the larger area surrounding the cannula path increases the temperature of those fat cells as well. The true goal of laser adipocytolysis is the homogeneous application of this bulk heat

In the months following the LipoControl procedure, these damaged fat cells continue to deteriorate and die off and their fatty contents slowly seep into the interstitium.

to increase the temperature of this area to greater than 45°C. At this point irreparable damage has been caused to the nearby fat cells that were not directly destroyed by the laser light and that effect is adipocytolysis in action. In the months following the LipoControl procedure, these damaged fat cells continue to deteriorate and die off and their fatty contents slowly seep into the interstitium.

After treatment, it takes four to six months to reach the maximum volume of damaged adipocytes, and another few months for the final result to appear. During this time, the body's natural waste removal processes take up the cell debris and liberated triglycerides. These processes are limited, however, by the speed at which macrophages and other waste management mechanisms within the body can remove material, which is quite slow. Since the process of adipocytolysis occurs over several months, the body's limited ability to remove the affected material is not overwhelmed. Thus, the body is not forced to retain as much lipid matter. Additionally, if the procedure involves mechanical aspiration using a separate suction cannula, reliance on laser adipocytolysis allows less aggressive suctioning because less material is being removed.

“The learning curve with LipoControl is not difficult. There is a lot to know in order to treat effectively, but the safety features make it much easier.”

Dr. Cohen – I am working on treatment for lipomas using LipoControl. Lipomas can occur anywhere on the body and in great numbers, so if you must surgically remove them there is a chance of scarring. With LipoControl, you could treat the lipomas without scarring no matter where or how many there are.

What are the benefits of adding LipoControl to your practice?

Dr. Sadick – Everything in cosmetic surgery is about safety. With the new features, LipoControl is safer and provides more uniform, efficient liposuction with better skin contraction. Liquefying fat facilitates easier aspiration. This laser enables easier movement of the cannula, even through fibrous fatty tissue, so there’s less physician fatigue compared to traditional liposuction.

Dr. Plot – Before LipoControl, there were some patients I would not treat because they wanted reduction and sculpting of a body area where poor skin quality would have necessitated surgery to remove extra skin, leaving scars. Skin retraction in areas like the inner thigh, for example, is insufficient. LipoControl allows me to treat these patients less invasively because even these areas will respond to subdermal heating with this device.

What is the learning curve with LipoControl?

Dr. Plot – The learning curve with LipoControl is not difficult. There is a lot to know in order to treat effectively, but the safety features make it much easier. You know exactly how much energy you need to homogenize treatment and don’t have to worry about burning or over treating.

Dr. Cohen – LipoControl is very good for physicians learning the technique, because you have strict control over the treatment parameters and how much energy is delivered to each treatment site. One safety feature shuts off the laser if your hand stops moving the cannula during treatment, which makes accidental burning very unlikely.

Dr. Adatto – For physicians with liposuction and laser experience this should not be very difficult, and it depends on the body area because you must exercise more caution in some areas such as the ankles, for example. For true beginners the safety features will help, but you must learn about fat removal and laser treatment extensively before treating patients. Good training is essential.



Before Tx



After Tx

Photos courtesy of Jean-Luc Cohen, M.D.