

Laser Lipolysis: Flaccidity Under Control

Ana Zulmira Diniz Badin,¹ Lea Mara Moraes,¹ Luciana Gondek,¹ Marlon Gouveia Chiaratti,¹
and Luigi Canta,²

¹Curitiba, Brazil

²Napoli, Italy

Abstract. An innovative liposuction technique using a laser device is presented. It is a precise method, less traumatic than the conventional one. The interaction between the laser and the adipocyte causes lipolysis with reduced bleeding and its effect on collagen tone promotes collagen retraction and skin shrinkage.

The results of the use of laser lipolysis on flaccid areas or in areas with the potential for flaccidity are shown. The resulting skin retraction and the pathologic anatomy confirm these claims.

Key words: Liposuction—Laser lipolysis

Introduction

A recent adaptation of the Neodimium YAG Laser (NdYAG) (1064 nm) laser with a new delivery device has made an innovative liposuction technique possible. The objective of the new device is to achieve lipolysis and to affect the collagenous tissue, inducing its retraction and subsequently, skin shrinkage (Fig. 1).

This method of liposuction is called *laser lipolysis*, with its major indication in areas of current flaccidity, or in areas with a potential for flaccidity if conventional liposuction is performed.

Methods

Between January 2001 and January 2002, this technique was performed on 245 patients, six men and

239 women. The average age was 35, with a range of 17–55.

An NdYAG laser, operating in the infrared portion of the spectrum (1064 nm), was used, with the energy delivered via fiber optic through a 1-mm cannula. Indications for this method of liposuction were:

1. Small areas
2. Areas of current, moderate flaccidity
3. Areas with potential for flaccidity, if conventional liposuction were performed
4. Multiple-area, high-volume liposuction in highly vascular areas, such as scapula, waist, flanks (dorsum)
5. Secondary liposuction, in areas with irregularities and/or fibrosis
6. “Difficult” cases: some so-called forbidden areas, including the upper portion of the thigh, upper abdomen, and small areas with minimal excess fat, such as minimal peri-umbilical fat [10,11].

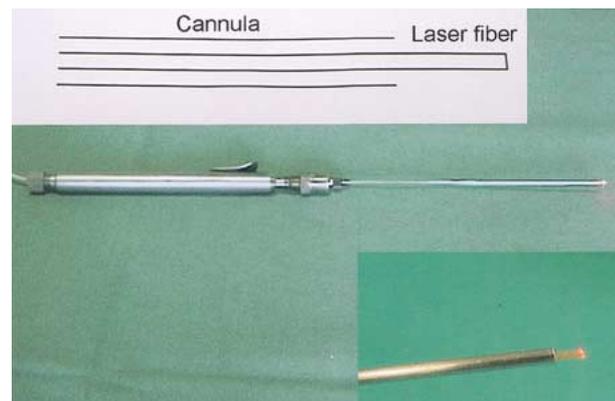


Fig. 1. Laser lipolysis cannula.

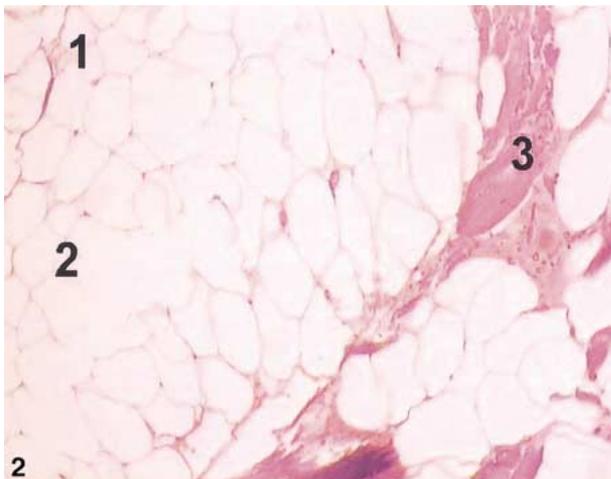
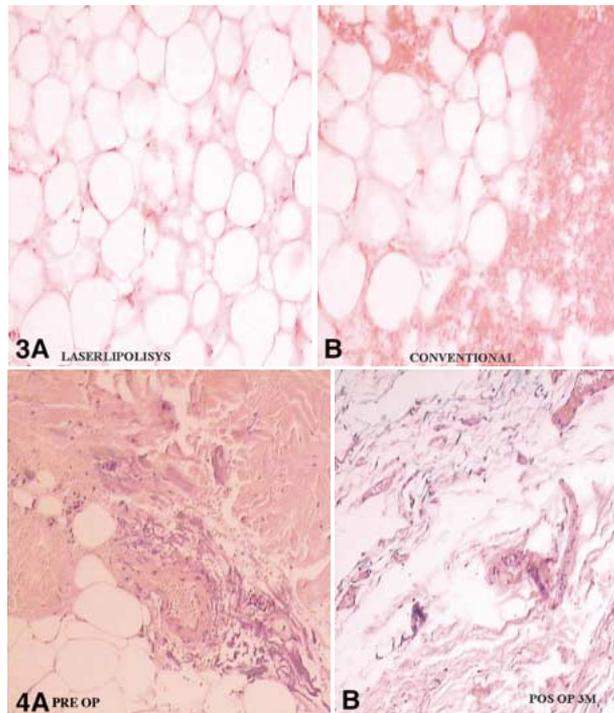


Fig. 2. (1) Balloon effect on the fat cells (different sized cells after laser-fat interaction). (2) Fat cells membrane rupture. (3) Fibrous bands—thermic effect damages the tissue by rupture and remodelling.

Fig. 3. **A** Reduced bleeding resulting from the coagulation of small vessels. **B** Bleeding during conventional liposuction.

Fig. 4. **A** Laser-tissue interaction in the collagenous layer. **B** New collagen, with better structure and skin shrinkage (three months postoperatively).



Technique

Anesthesia may be local, peridural, or general. We use a wet infiltration technique, with adrenaline 1:500,000.

A small incision of 2–3 mm is made, and the cannula is introduced. The cannula has 1-mm diameter with a optic fiber inside. This fiber must be outside the cannula (Fig. 1). The introduction and motion of the cannula must be relatively slow, as compared with conventional liposuction, in order to allow the necessary time for the laser-tissue interaction. As a result, this method requires more time than conventional methods. It is necessary to deliver enough accumulated energy to achieve a sufficient lipolysis throughout the different levels of the fat (superficial, medium, and deep) and into the subdermal plane, to reach the collagenous layer. If this threshold is achieved, the skin will feel warm to the touch.

After the lipolysis, the liquid fat is aspirated using a 3-mm cannula. It is at this point that the clinical results should be seen, when analyzing the immediate body or facial contours.

Micropore™ or Tensoplast™ adhesives may be affixed to skin to better compress and remodel certain areas, such as the banana fold, the external thigh, and the infero-lateral part of the buttocks. The tape remains in place for one week, and compression garments are used for one month.

No activity restrictions are required, except sun exposure should be avoided for a month. Lymphatic

drainage begins as soon as possible, twice a week and continues for two months.

Results

This method was demonstrated to be less traumatic than conventional liposuction methods. The primary reasons for this are the small diameter (1 mm) cannula, and the effects of the laser-tissue interaction.

The laser-tissue interaction causes thermal damage of the cellular membrane through the liberation of heat and alteration of the Na^+K^+ “bomb,” permitting migration of the water into the cells until they rupture [1,2]. This is visible in the pathologic anatomy, where we see cells that look different sized balloons (reversible effect) and after membrane rupture (Fig. 2) (irreversible effect).

In the pathology studies, we can also see the reduction in bleeding resulting from the coagulation of small vessels due to laser and lateral thermal effect (Fig. 3.)

Due to the laser-tissue interaction with the collagenous and subdermal bands, we can see the thermal effects, including melting and rupture of the bands (Fig. 4). This liberates the retracted skin and remodels the collagenous tissue, with clinically evident skin retraction [3,12].

Clinically, this tissue interaction produces less swelling, yielding good contour, even in the early postoperative period (Fig. 5).

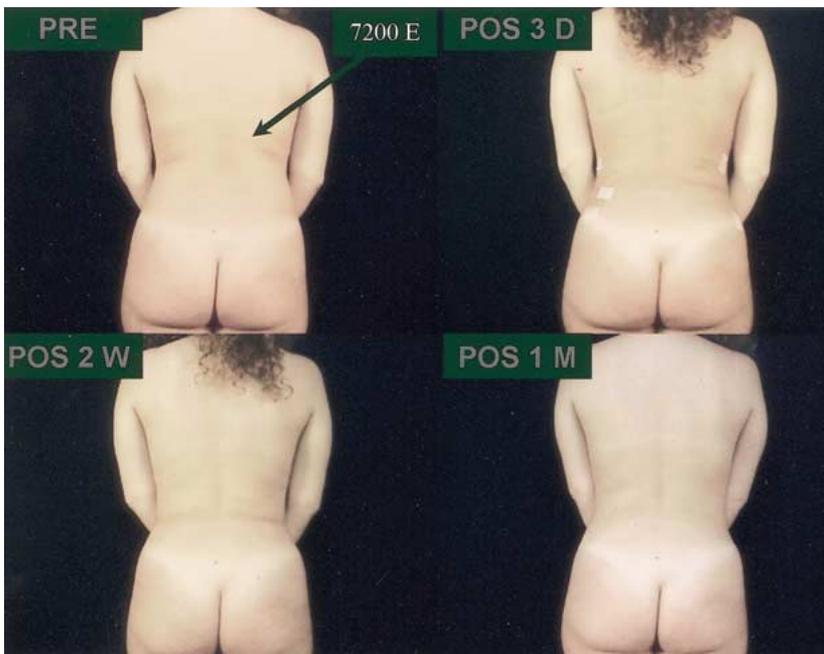


Fig. 5. Swelling comparison: **A** pre-operatively, **B** day three, **C** two weeks, **D** one month.



Fig. 6. **A** Preoperative: a large amount of laser lipolysis in inner and external thigh with skin flaccidity. **B** Six months postoperatively with good contraction of the skin and regularity.

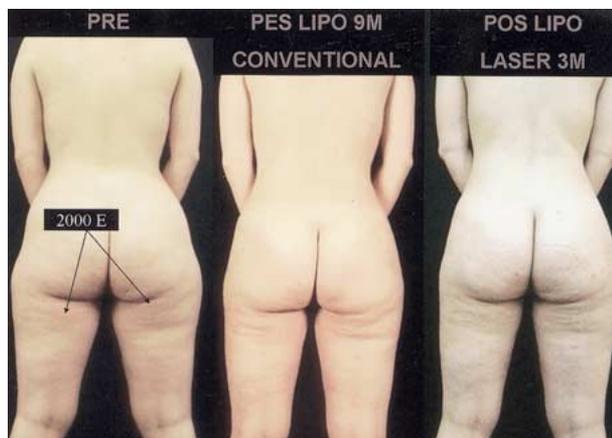


Fig. 7. **A** Preoperative, normal liposuction. **B** Postoperative, normal liposuction with irregularities and "banana fold." **C** Three months postoperatively, laser lipolysis with great improvement in the regularity and contraction of the skin.

Laser lipolysis is a precise, delicate method that has the advantage of the thermal laser effect, which can be used for refinement in very small areas, even the face.

We believe that the best application of this method is in cases where the ability to use conventional liposuction is restricted, contraindicated, or likely to cause unwanted flaccidity. It is not a substitute for conventional liposuction, but a complement to it, to be used alone or in combination with conventional or vibro-liposuction (Figs. 6–10).

Disadvantages are the cost of the machine and its maintenance, a moderate learning curve, and increased procedural time.

The only clinical problem we experienced was under-correction, in our earliest cases, resulting from insufficient accumulated delivered energy, and part of our initial learning curve.

It is possible to cause thermal skin damage, but only if the technique is applied imperfectly. We did not experience this type of complication, or any other.

Conclusion

This new technology offers a method that addresses problems previously considered difficult or impossible to solve with conventional liposuction and also

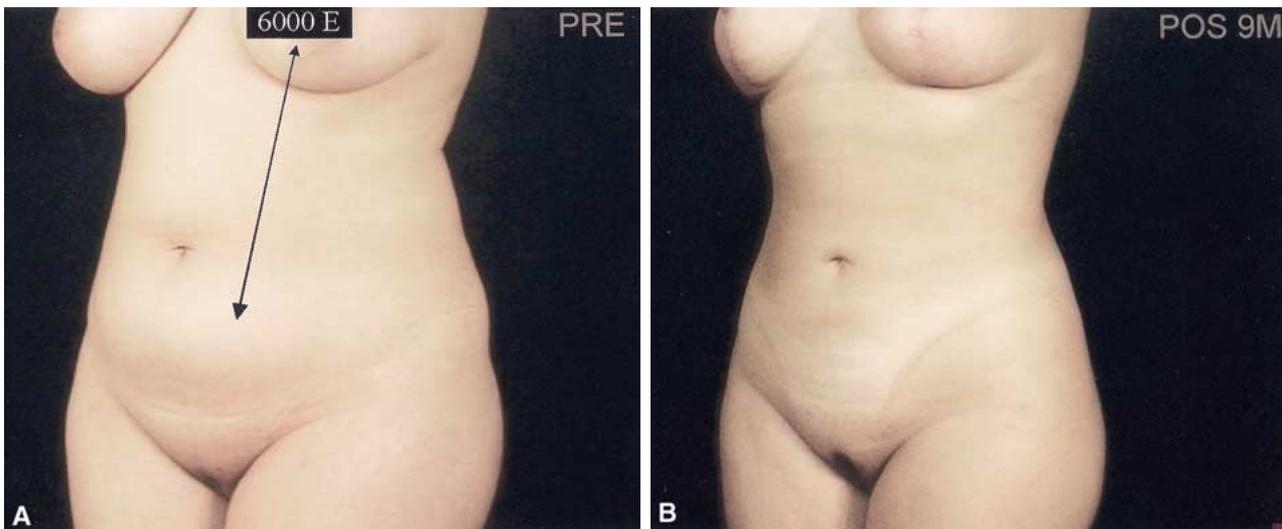


Fig. 8. **A** Preoperative: a large amount of fat. Potential area for flaccidity postliposuction. **B** Nine months postoperatively with good result and contraction of the skin. No postoperative flaccidity.

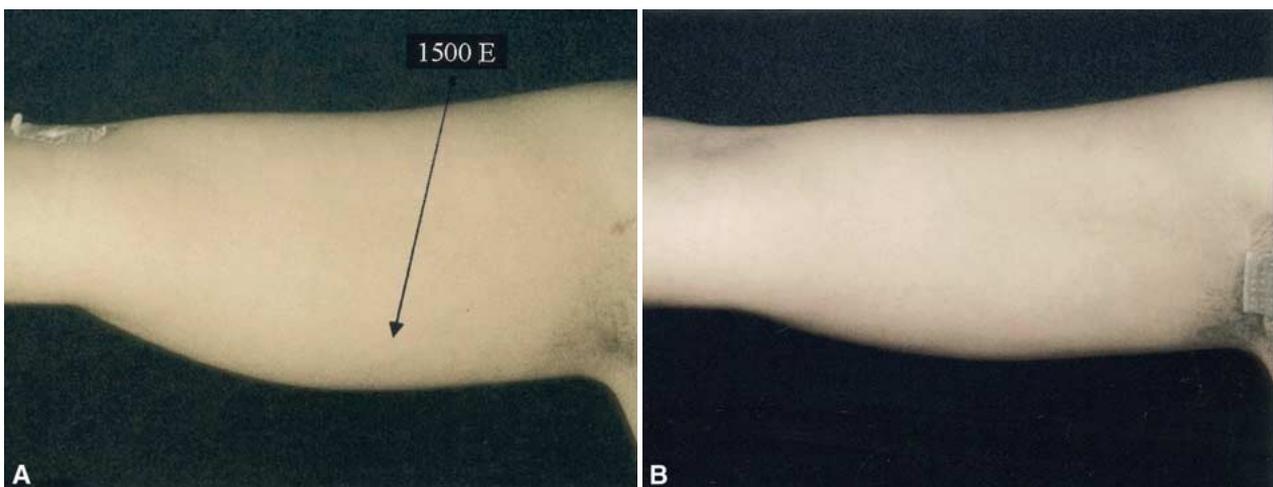


Fig. 9. **A** Preoperative fat and flaccidity in arms. **B** One year postoperatively with better contour and skin retraction.



Fig. 10. **A** Preoperative submental and mandibular fat with skin flaccidity. **B** Five months Postoperatively good contour and skin retraction.

permits treatment of nearly any area of the face or body needing liposuction, a clear advantage over ultrasonic liposuction.

We are now able to add to our armamentarium an unprecedented and excellent tool for particular cases, including areas of moderate or potential flaccidity, small or minimal areas, secondary liposuction and difficult cases. In our clinical experience it has proved to be less traumatic, with less bruising and swelling, and improved skin retraction, all demonstrated in our pathology studies.

References

1. Apfelberg DB, Rosenthal S, Hunstad JP: Progress report on multicenter study of laser-assisted liposuction. *Aesth Plast Surg* **18**:259, 1994
2. Apfelberg DB: Results of multicenter study of laser-assisted liposuction. *Clin Plast Surgery* **23**:713, 1996
3. Badin AZD, Laserlipólise: flacidez sob controle. Trabalho apresentado no III Congresso Brasileiro de Laser, São Paulo, Brasil (In Portuguese)
4. Badin AZD, Moraes LM, Gondek L, Chiaratti M: Poster laserlipolysis: In: Abstracts IMCAS 2002, International master course on aging skin. Paris, 2002
5. Blugerman GE, Schavelzon D: Laserlipolisis: la modulación corporal del nuevo milenio. Studo Grafico, Buenos Aires, Argentina, 2000
6. Dressel T: Laser lipoplasty: a preliminary report. *Lipoplasty 50C Newslett* **7**:17,1990
7. Goldman A: Achados anatomopatológicos da laserlipólise. Trabalho apresentado no III Congresso Brasileiro de Laser. São Paulo, Brasil (In Portuguese)
8. Goldman MP, Fitzpatrick R: Cutaneous laser surgery: the art and science of selective photothermolysis, second edn. Mosby, St. Louis, 1999
9. Grippaudo FR, Mazzocchi M, Arelli F: La laserlipolise interstiziala report del folow up a 5 anni. 50°. Congresso Nazionale della Societá Italiana di Chirurgia Plastica, Ricostruttiva ed Estética. Roma, 2001
10. Illouz YG: Histórico da Técnica lipólise—lipoaspiração. In: Avelar JM, Illouz YG (eds) *Lipoaspiração*. Hipocrates Editora, Rio de Janeiro, pp 24–31 1986
11. Illouz YG: Lipoescultura y cirugía de la silueta. In: *Encyclopédie Médico-Chirurgicale*. Edition Scientifiques et Medicales, Elsevier, Paris, 2001
12. Noronha L: Alterações cutâneas induzidas por laser. Tese de doutorado UFPR, 2001
13. Yamaguchi C: Laserlipólise: III Congresso Brasileiro de Laser. São Paulo, Brasil (In Portuguese)