

The Safety And Efficacy of 980-nm Wavelength Diode during Laser Lipolysis-Assisted Lipoaspiration

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Summary: The use of Laser Assisted Lipoplasty has helped to refine the technique for traditional lipoplasty. The subdermal laser application provides direct cellular destruction of adipocytes while providing hemostasis and promoting skin tightening. Recently a smaller, less costly, more efficient laser, the 980nm diode, has been introduced for Laser Lipolysis. Rapid adipocyte cell destruction along with pronounced skin retraction was observed in this preliminary report of 25 patients. No adverse effects were observed.

Objective: To evaluate the safety and efficacy of 980 nm laser lipolysis when combined with lipoaspiration.

Background: Laser lipolysis has been widely used throughout Europe, Asia, and South America as an adjuvant to traditional lipoplasty techniques. The objective of laser assisted lipolysis is the destruction of adipocytes by directed thermal damage. Additional benefits include thermal hemostasis and stimulation of dermal retraction and heat-coagulated collagen changes. Nd:YAG 1064-nm laser lipolysis devices were first introduced to the U.S. following many years of safe and effective use in Europe and South America. Important consideration in selecting the appropriate device for laser lipolysis includes the ability to target adipocytes and the degree of efficiency in which that energy is delivered. The ideal optical absorption coefficient for human fat is between the 900-1100-nm spectral band.¹ A recent study by Kim and Geronemus² demonstrated a dose response relationship between the total energy delivered and the degree of adipocyte cell destruction. Simply put, the higher the energy and efficiency of the device used the greater the accompanying cell destruction. The widely used Nd:YAG 1064-nm flash lamp pump system yields an efficiency of only a few percent.³ As compared to the Nd:YAG 1064-nm devices, the 980-nm diode laser offers the advantage of far greater efficiency (30%), lower cost, and higher power (25w or more) in a smaller, lighter, more portable device.

Methods: 25 patients were selected for laser lipolysis combined with lipoaspiration utilizing a continuous 980-nm diode laser (LaserPro-Lipo, Photomedex, USA) at 25W setting. The objective was to achieve desired body contouring with a combination of fatty tissue removal and skin retraction utilizing laser-assisted lipolysis. Areas treated included chin, arms, abdomen, flanks, upper back, lower back, lateral thigh, medial thigh, upper buttock, infra-gluteal fold, and mons pubis. All patients were counseled

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and consented for risks to include the standard lipoaspiration risks as well as the risk of thermal tissue injuries. Photodocumentation was obtained prior to the procedure as well as at 1, 4, 12, and 24 weeks postoperatively.

Tumescent anesthesia was achieved with lidocaine 0.1%, epinephrine 1:1,000,000 dilution in buffered saline infiltration. A 550 micron laser fiber was introduced subcutaneously using 2mm cannula probe. The laser fiber was extended 2mm beyond the cannula tip. Treatment powers were 25w, but decreased to 15w in the neck and chin region. Constant laser fiber motion was used through the desired area of fat disruption using a continuous pulse setting. The desired endpoints were a noticeable decrease in tissue resistance to the passage of the laser probe as well as an epidermal temperature of between 37° and 40°c as measured using a hand-held infrared thermometer. Lipoaspiration was then performed utilizing a 3mm, 3-port radial Mercedes cannula at 25mm Hg continuous suction. Subjects were instructed to wear post-operative stage-1 compression garments for 2 weeks followed by stage-2 garment use until 1 month postoperatively. Subjects were seen at 1, 4, 12, and 24 weeks postoperative for examination, Photodocumentation, and completion of serial satisfaction surveys.

Results: Satisfaction surveys included the subject's assessment of their desired area-specific contouring result, skin retraction, and minimal postoperative pain. All 25 patients reported a high degree of satisfaction with their procedures of combined 980 nm laser lipolysis and lipoaspiration. There was no incidence of adverse effect in any patients treated.

Conclusions: Laser lipolysis is a relatively new technique with many different devices currently under investigation. The interaction with tissue of the 980 nm wavelength is known to favorably compare to the well-studied effects of the 1064 nm wavelength. The 980 nm diode laser has the benefit of being far more efficient, lower cost, higher power, and smaller size and weight. The observations of this trial support the safe and effective use of 980 nm diode laser lipolysis with lipoaspiration as an approach to both effective removal of fat and for enhancement of subdermal tissue tightening.

¹ Conway JM, Norris KH, Bodwell CE, *A new approach to the estimate of body composition: infrared interactance*. Am J Clin Nutr 1984;40:1123-1130

² Kim KH, Geronemus RG. *Laser lipolysis using a novel 1064 nm Nd:YAG Laser*. Dermatol Surg 2006;32:241-248; discussion 247.

³ Koechner W. Nd:Lasers. In: Schawlow AL, editor. *Solid-state laser engineering*. 4th ed. New York : Springer; 1996.