

MY EXPERIENCE USING THE NEW VENUS BLISS™ LASER AND RADIOFREQUENCY/PEMF SYSTEM FOR FAT REDUCTION AND BODY SMOOTHENING

Suzanne Kilmer, MD
Director, Laser & Skin Surgery Center of Northern California
Clinical Professor, University of California, Davis

OVERVIEW:

Aesthetic treatments using energy-based devices have grown rapidly over the past 20 years. Technological advances have enabled treatment providers to expand from mainstream skin rejuvenation and hair removal treatments to more comprehensive treatments such as non-invasive fat reduction, body contouring, and skin tightening.

While surgical liposuction still remains the most common method to remove fat and contour the body, non-invasive body contouring procedures have seen explosive growth in the past five years, according to ASAPS. More recently, a combination of lasers and other heat-based energy sources have been used to target fat invasively, in conjunction with liposuction. Many potential non-surgical patients, however, are waiting on the sidelines for an alternative that suits their needs. Today's busy patients are looking for less invasive treatments with minimal downtime. In addition, we hear regular inquiries from patients searching for treatments that provide a more "natural-looking" result without undesirable surgical scars. A non-invasive hyperthermic method offers a highly desirable alternative to many patients unwilling or unable to undergo an invasive procedure.

In this overview, I discuss the new Venus Bliss™ system for non-invasive laser lipolysis and my experience using it to treat patients in my practice.

MECHANISMS FOR SUCCESS:

Adipose cells are highly susceptible to temperature increases. It has been shown that a temperature increase of 6°C-7°C can affect the structural integrity of the fat cell and its cellular membrane. In other testing, human adipocyte cells exposed to temperatures in the range of 43°C-45°C demonstrated delayed adipocyte death.

The concept of elevating the temperature of adipocytes to a point where the cells cannot survive has been thoroughly investigated. Heating of the fat layer can be accomplished safely by balancing depth of penetration with high absorption in the targeted adipocytes. The ideal wavelength for this application would be a wavelength that penetrates deep into the fat to accomplish uniform heating. It would also have significant absorption properties in order to generate enough heat in the target tissue to achieve the desired impact. To observe this impact, ultrasound imaging has been used to characterize damaged tissue in the fat layer following laser exposure. These damaged tissues represent hyperechoic regions in which a fat-specific thermal injury has been created. **Figure 1** shows hyperechoic regions that were seen under ultrasound evaluation as early as 48 hours post laser exposure, and remained visible up to two weeks following exposure.

¹ 2018 National Plastic Surgery Statistics, ASAPS

² Goo, B., & Kim, D. S. (2016). Impact of Contactless Apoptosis-Inducing RF on Temperature of Human Skin Surface and Subcutaneous Layer as well as Porcine Histology: A Pilot Study. *Medical Lasers*, 5(1), 29-33. doi: 10.25289/ml.2016.5.1.29

³ Franco, W., Kothare, A., Ronan, S. J., Grekin, R. C., & McCalmont, T. H. (2010). Hyperthermic injury to adipocyte cells by selective heating of subcutaneous fat with a novel radiofrequency device: Feasibility studies. *Lasers in Surgery and Medicine*, 42(5), 361-370. doi: 10.1002/lsm.20925

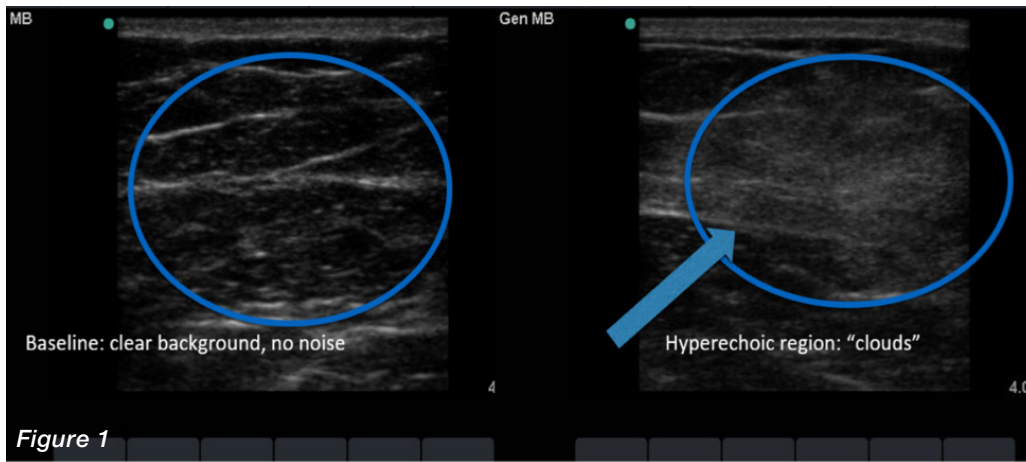


Figure 1

The infrared 1064 nm wavelength represents an ideal choice due to its deep penetration into tissue and strong absorption by water, oxyhemoglobin, and lipids present in the adipocytes and adipose layer. In order to raise the temperature of the adipose layer, laser energy is delivered slowly over a period of time for effective, uniform heating and conduction. Extended exposure times of laser energy to tissues achieves effective heating of the tissue.

Once the appropriate temperature in the target tissue is achieved, the exposure duration is adjusted to modulate the temperature in the fat layer safely and comfortably. Longer laser exposure cycles are used to “build” the temperature to the desired range safely and comfortably for the patient, while shorter laser exposure cycles are employed to “maintain” the temperature during the remainder of the treatment. The Venus Bliss™ uses 24 minutes of laser exposure time to achieve the optimal response in the adipose layer while maintaining patient comfort and safety.

Skin cooling is incorporated to protect the upper layers of the skin from the thermal effects of the laser exposure.

Contact cooling causes vasoconstriction to occur in the dermal layer, reducing the target in the dermis, and allowing the laser to target the water, oxyhemoglobin, and lipids in the adipose layer. Skin is cooled to approximately 14°C, providing adequate protection of the epidermis and dermis.

A wide variety of irradiance settings were examined to identify a range of thermal effects that are safe and comfortable, yet still effective, for patients. Irradiances of 0.8 W/cm² to 1.4 W/cm² have been used safely and effectively to achieve the selective heating of adipocytes without any side effects or thermal injury to the skin.

CHALLENGES:

One of the challenges with heating large volumes of tissue is maintaining a uniform heating profile across the targeted area. The treatment window of each of the four Venus Bliss™ laser applicators is large, measuring 6 cm x 6 cm. Maintaining uniform energy exposure across the treatment window is critical to avoid hot spots, as they can be sources of discomfort for patients during the exposure cycle. The Venus Bliss™ incorporates a proprietary, complex lens system to achieve uniform energy density across the treatment window, as depicted in **Figure 2**.

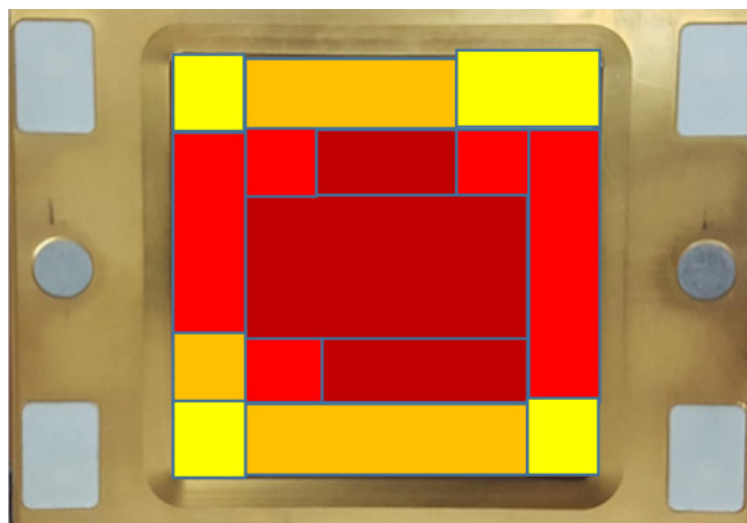


Figure 2

TREATMENT PROCESS:

Study subjects treated at our site ranged from ages 22 to 69 and included 27 females and 3 males. All qualifying subjects received a single laser treatment with follow-up visits at 6 and 12 weeks. Upon arrival, after screening and giving formal consent, subjects were weighed and baseline photographic images were recorded. A physical examination of the abdomen and/or flanks enabled the practitioner to outline the treatment areas. The ideal treatment areas were those with at least one inch of pinchable, subcutaneous fat.

While standing, subjects were fitted with a proprietary belt system designed to hold the applicators in place during treatment, which was aligned to the respective treatment areas. The belt has several configurations designed to accommodate different body types and treatment plans, customized for each subject. Once the belt was firmly attached, subjects were transferred to either a treatment bed or, in some cases, a chair, depending on the number of applicators to be used and areas to be treated. For treatments on the abdomen, subjects were treated while lying supine, with their head slightly elevated for comfort. For treatments on the flanks, patients were treated lying prone to expose the area. Pillows were used to ensure patient comfort.

SENSATION:

At the beginning of each treatment, the applicators cool the skin for 30 seconds to ensure patient comfort. Subjects typically reported feeling extreme cold during the first minute with a transition to warmth, described as “getting warm” or “getting hotter”, over the next minute or so. Some subjects were able to feel the system switching the laser on and off throughout the treatment. When asked to describe the treatment comfort level, subjects found the treatment very comfortable, scoring an average of 2.3 on a Wong-Baker FACES Pain Rating Scale of 0-10 (0 being “no hurt” and 10 “hurts worst”).

When the treatment sequence is complete, the Venus Bliss™ system alerts the practitioner to end the treatment and disconnect the applicators and belt from the patient. Throughout the study, the treated areas were always inspected post-treatment to ensure the absence of bruises, erythema, and edema. The skin felt cold to the touch and most subjects had mild erythema or trace edema. There were no other side effects noted other than a small purpuric area due to inadvertent pinching of the skin between the belt and the applicator. Subjects returned to all normal activities following the treatments.

STUDY RESULTS:

Overall, 29 subjects completed the treatment and both follow ups – one patient did not follow up. Ultrasound was used to measure the change in the thickness of the fat layer at 12 weeks post-treatment. The average fat thickness reduction measured at the 12-week follow up was 9% on the abdomen and 7% on the flanks. The majority of subjects noticed the changes and reported high levels of satisfaction, with 22 of 29 subjects (76%) rating their satisfaction following a single treatment as “satisfied” or “very satisfied”.

A single treatment, while good from a research perspective to demonstrate efficacy, is not ideal in an aesthetic practice setting. Multiple treatments and customized treatment plans provide greater benefits to patients and likely increase their level of satisfaction.

TREATMENT PLANS:

While the study was designed to test the results of a single treatment, this is not a realistic offering for my aesthetic patients. I offer patients multiple treatments for almost every one of the energy-based systems we have available in the practice. In addition, I combine therapies and customize the treatment plan for each subject to maximize results and increase patient satisfaction.

Figure 4



Figure 5



Figure 6



COMBINATION TECHNOLOGY:

The Venus Bliss™ system is unique in that it also features an additional (MP)² applicator that emits radiofrequency and pulsed electromagnetic fields, and uses vacuum-assisted mechanical massage. **Figure 3** demonstrates both the laser applicator and the (MP)² applicator, which is used to deliver thermal energy to smoothen the treatment area and reduce cellulite.

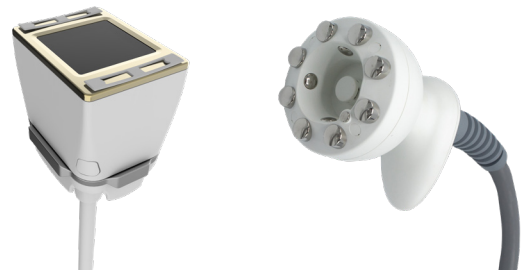


Figure 3: (left) diode laser applicator (right) (MP)² applicator

The (MP)² handpiece delivers radiofrequency simultaneously with pulsed electromagnetic fields in combination with vacuum assisted mechanical massage. This is an ideal follow-up to the diode laser treatments mentioned previously. The delivery of radiofrequency into the tissue induces a heat response and furthers the removal of lymphatic waste, stimulates collagen production and synthesizes angiogenesis.

CONCLUSION:

The Venus Bliss™ system is a new and exciting platform that brings an ideal combination of technologies to address the complex components of body aesthetics. The treatment providers at my practice find the system easy to use, and treatments are tolerated very well by patients. To date, my patients have been very happy with their results. The Venus Bliss™ system is a great technology to have in your arsenal to address the needs of today's patients.

-Suzanne Kilmer, MD