THERMAL PENETRATION STUDY

OBJECTIVES:

A novel 1,064 nm laser system with a proprietary skin cooling system underwent further testing as a non-invasive, non-contact laser body sculpting device for abdominal fat reduction.
The power-temperature relationship and cooling system efficiency of this laser device were evaluated using a human abdominoplasty model. The goal was to ultimately increase the amount of energy safely imparted to the patient, thus raising the adipose temperatures to increase apoptosis of subcutaneous fat.

METHODS:

Treated subjects (*N*=7) were planning to undergo abdominoplasty. Prior to the surgery and while under anesthesia, sterile thermocouples were inserted into the subcutaneous abdominal tissue at various depths within the planned abdominoplasty excision area.

Thermocouple position and depth were confirmed *via* ultrasound. The skin surface temperature was monitored with a non-contact infrared sensor manually positioned over the targeted areas. A power meter recorded laser power levels before and after the test. After positioning the laser device above the subject, the laser treatment cycle was initiated and the temperature of the embedded thermocouples, skin surface, and ambient room temperature were continuously recorded during laser irradiation and the cool-down period.

RESULTS:

Over the course of this study, the investigators were able to safely increase the maximum laser energy applied to each treatment area by an additional 60% (from the baseline power used in the initial study), while keeping surface skin temperatures in a desirable and safe range. Deep tissue temperatures were kept within safe limits.

CONCLUSIONS:

Optimization of the laser and cooling parameters has permitted the applied laser energy to be safely increased, without risk of thermal injury to the skin or tissues deeper than the planned treatment volume.