

## *Clinical Report*

# Body Contouring by Non-Invasive Transdermal Focused Ultrasound

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**Background and Objectives:** The risks of currently available invasive procedures in body contouring motivate a need for safer, non-invasive technologies for improving the appearance of body silhouette. A new device has been developed that uses focused therapeutic ultrasound to reduce adipose tissue non-invasively. The aim of this study was to assess the efficacy and safety of a novel non-invasive focused ultrasound system (UltraShape Ltd, Tel Aviv, Israel) in reducing localized fat deposits to improve body contours.

**Study Design/Patients and Methods:** A prospective study was conducted on 30 healthy patients. All patients underwent three treatments, at 1-month intervals, and were followed for 1 month after the last treatment. Areas treated were the abdomen, inner and outer thighs, flanks, inner knees, and breasts (males only). No other body contouring procedure was used during the study. Efficacy was determined by change in fat thickness, assessed by ultrasound measurements, and by circumference measurements. Weight change was monitored to assess whether reduction in fat thickness or circumference was dependent on or independent of weight loss. Safety was determined by clinical findings, assays of serum triglycerides, and liver ultrasound evaluation for the presence of steatosis.

**Results:** All patients showed significant reduction in subcutaneous fat thickness within the treated area. The mean reduction in fat thickness after three treatments was  $2.28 \pm 0.80$  cm. Circumference was reduced by a mean of  $3.95 \pm 1.99$  cm. Weight was unchanged during the treatment and follow-up period. No adverse effects were observed.

**Conclusions:** This study shows the efficacy and safety of focused ultrasound, using the UltraShape™ *Contour I*, as a non-invasive transdermal method for reducing unwanted fat deposits in the body. Multiple treatments combined with appropriate patient and treatment area selection can produce dramatic improvements in body contour. Lasers Surg. Med. 00:1–9, 2007. © 2007 Wiley-Liss, Inc.

**Key words:** body contouring; focused ultrasound; non-invasive lipolysis

## INTRODUCTION

Greater demand in body aesthetic medicine for non-invasive procedures has motivated researchers to develop new techniques to replace traditional treatments for body contouring. In the past, the only way to achieve dramatic improvement in body silhouette was by removing local fat deposits through liposuction or other surgical procedures. These surgical approaches have drawbacks for patients (hospitalization, general or tumescent anesthesia, pain, post-operative bruising and swelling, long post-operative recovery, and other risks inherent to surgical procedures) and create technical challenges for surgeons [1–4]. Such drawbacks prompted the development of a new device (*Contour I*, UltraShape Ltd, Tel Aviv, Israel) to reduce subcutaneous fat volume in areas that would normally be treated by liposuction, and to provide significant improvement in the contour of these areas while avoiding invasive techniques and their associated disadvantages.

Ultrasound can be used in medicine as a diagnostic method, when used in imaging, or as a therapeutic modality. The UltraShape™ system applies ultrasound in a therapeutic manner. The system emits focused ultrasound waves to deliver concentrated energy into a focal volume at a precise depth in the subcutaneous tissue. This system was designed to use mechanical (non-thermal) energy to disrupt fat cells and without damaging neighboring structures (skin, blood, and lymph vessels, muscles, and nerves), due to their differential susceptibility to mechanical stresses induced by the ultrasound.

The approach of using non-invasive focused ultrasound for tissue disruption differs from other therapeutic ultrasound devices in important ways (Fig. 1). The first and most obvious distinction is between invasive therapeutic

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