

Energy-assisted liposuction

The body contouring market has grown to meet demand and radiofrequency-assisted liposuction is the latest addition. Dr Diego Schavelzon, Dr Guillermo Blugerman and Dr Stephen Mulholland review the technologies available for energy-assisted liposuction and explain why the BodyTite device could have the edge on its competitors

According to the World Health Organization, the prevalence of obesity has increased by 10–40% in most European countries in the past 10 years (WHO, 2003). Similar trends can be seen in the United States; in 1990, not a single US state had a BMI over 15% but by 2007, only one state had a BMI of less than 20% (CDC, 2009). Body contouring solutions have therefore grown to meet market demands. Pioneered in Europe in the early 1980's, liposuction has quickly spread to be today's most popular procedure.

Almost all types of energy have been combined with liposuction in an attempt to improve patient experience and results. This article is intended to review the energy-assisted liposuction market and outline the specific features, advantages and disadvantages of each method.

Ultrasound-assisted liposuction

UAL is based on selective mechanical destruction of adipose tissue through a cavitation process, created by high frequency acoustic waves generated at the cannula tip. This mechanical action selectively destroys adipose tissue with minimal effort for the physician. In addition, the emulsification of tissue allows for more effective aspiration. This method is popular for the treatment of fibrotic tissue, which is common in male patients, or those who have had previous surgery in the treated area.

An inherent part of the UAL procedure is the use of a plastic port protector, which isolates the skin from the oscillating cannula and minimises the

risk of port burn. The drawback of the protector is an increase in incision size to 5–8mm, which is not favourable for dark and Asian skin, which has a higher risk of hyperpigmentation scars.

Skin contraction is not an obvious feature of UAL. The increase of temperature in the treated area—from the partial conversion of mechanical energy into heat—is not significant, and skin tightening observed after the UAL has not been proven to be superior to traditional liposuction.

Laser-assisted liposuction

LAL is a two-stage procedure. In the first stage, laser energy is delivered to the tumescent adipose tissue through an optical fibre, resulting in the coagulation of adipose tissue which heats the subcutaneous tissue. Liquefied fat is then aspirated gently, with less bleeding.

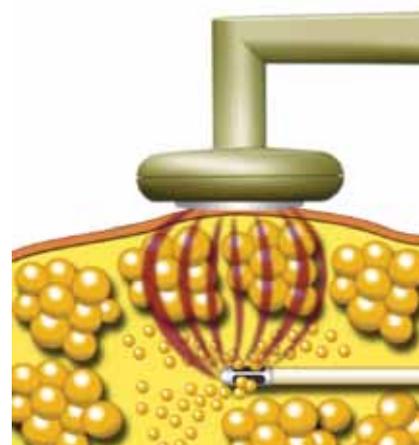
The popularity of LAL was driven by the ability of the laser to provide improved skin tightening. Around 20 types of laser—from an equal number of manufacturers—are available with variations in parameters and features, with all performing the same adipocyte liquefaction.

The added value of the LAL over these liposuction modalities is the heating of the reticular dermis and thermal-induced skin contraction. A comparative study of traditional suction-assisted lipectomy versus LAL shows an average of 17% contraction in surface area following LAL, while natural contraction after traditional liposuction was 11% (ASAPS, 2008).

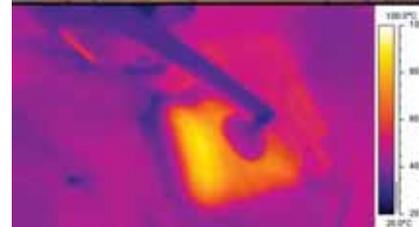
The inherent weakness of LAL is the



Typical thermal distribution on the skin with LAL treatment



Directional RFAL energy and simultaneous aspiration. The internal cannula delivers directional RF current through the adipose tissue up to the external electrode



RFAL thermal distribution in the treated area showing uniform temperature over the skin surface without hot spots or under-treated areas

delivery of power through the tiny fibre having a diameter of less than one square millimetre. The strong concentration of laser energy near the fibre tip creates a risk of hot spots and under-treated areas. Although the small diameter of the LAL cannula allows a smaller incision port size, this can cause the thin cannula to be more flexible, resulting in less control on its position, particularly during treatment of fibrotic tissue.

While LAL provides effective and quick results for small areas such as the neck or arm, it is not a convenient method for treating large areas such as the abdomen, thighs or hips because of the relatively slow speed of treatment. The average treatment time for one thermal zone of 5x5cm is around 4–5 minutes. For a typical abdominal zone, the treatment time is usually longer than one hour.

Radiofrequency-assisted liposuction

RFAL is the newest addition to the liposuction family and can be found only in the BodyTite device, manufactured by Israel-based Invasix Ltd. RFAL uses RF energy to deliver a thermal effect to the adipose tissue, skin and sub-dermal matrix.

RFAL technology uses two electrodes—one external and one internal, connected by a handpiece—which contribute to creating a thermal profile.

The internal cannula delivers directional RF current through the adipose tissue up to the external electrode. This electrode contains a thermal sensor allowing the operator to monitor the skin temperature continually to ensure desired thermal effects are reached.

The internal electrode acts as an aspirating cannula and simultaneously delivers the RF current while aspirating pre-coagulated tissue. This saves the physician time and makes it the only one-stage energy-based procedure on the market.

The BodyTite system provides real-time monitoring of the skin temperature and a power cut-off mechanism. When the desired temperature is reached during treatment, the system automatically turns the RF energy off to avoid overheating.

If the temperature in the zone starts to drop, or when the handpiece moves to a new zone with a lower temperature, the RF energy becomes active again. The cut-off temperature can be adjusted to tailor to more aggressive or conservative approaches.

The handpiece controls treatment depth from 5–50mm, allowing uniform treatment over not only the treatment area but also through the depth of the subcutaneous tissue. This uniform heating is a basis for safe and effective tissue tightening.

Initial contraction studies show im-

mediate linear contraction of 15% and long-term linear contraction of 30-40% over 12 weeks, enhancing the contour results in patients with marginal or compromised laxity. These features and benefits allow RFAL technology to expand the patient base to obese individuals and patients with loose skin who were not candidates for traditional liposuction.

Myriad choices

There are now a myriad of suctioning technologies and devices available to physicians to serve the growing body-contouring market. The most successful and appealing of the liposuction technologies are energy-assisted systems, because the delivered heat results in coagulation of adipose tissue and blood vessels, gentler aspiration and thermally induced soft-tissue contraction.

The RFAL procedure provides an effective tightening effect for increased patient satisfaction by reducing pain, bruising and swelling while providing an effective body contouring figure.

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Patients before the treatment and typical results obtained with the BodyTite system at 12 weeks following the RFAL procedure