Power-assisted Lipoplasty

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Efforts to improve lipoplasty results through the application of focused energy continue to arouse interest. The author’s initial experience with power-assisted lipoplasty indicates that this technique is safe, fast, and capable of producing results equal or superior to those achieved through use of traditional lipoplasty.

Traditional lipoplasty remains the gold standard for suction aspiration of subcutaneous fat. Any alternate approaches should demonstrate favorable results in comparison with those of traditional lipoplasty in clinical trials before their widespread introduction into clinical practice is recommended.

Focused Energy in Lipoplasty

One alternative, the application of focused energy to lipoplasty, has aroused considerable interest. Laser-assisted lipoplasty failed to show any advantage over the traditional method in a multicenter US Food and Drug Administration–approved study.1 Debate continues as to whether the benefits (real or perceived) of ultrasound-assisted lipoplasty (UAL) justify the additional costs and training, the learning curve, and the higher complication rates associated with its use.2-4 The development of devices that use less energy with better focus, delivered by smaller-diameter malleable probes or cannulas, could reduce or even eliminate such complications.

The benefits of the application of ultrasound energy after infusion of wetting solutions and before fat extraction by conventional methods (external UAL) have not yet been clearly defined. The idea of using external ultrasound for body sculpting without fat extraction (known to some as external hydrolipoclasia), though attractive to patients, has not yet been proved to provide any benefit.

Power-assisted Lipoplasty

Power-assisted lipoplasty (PAL) equipment is currently available from several manufacturers in the United States and abroad. Although I have used equipment from other sources, most of my personal experience is with the device offered by MicroAire Surgical Instruments (Charlottesville, VA).

The MicroAire lipoplasty handle (Figure 1, A) is powered by medical-grade nitrogen (N₂), compressed air tanks or, more recently, an electric power source (Figure 1, B). Both the power source, which reciprocates the cannula, and the suction are attached to the proximal end of the handpiece. Syringe suction, if preferred by the surgeon, can be used with an adapter.

An array of MicroAire cannulas (disposable or reusable) is available (Figure 1, C). These are attached to the distal end of the handpiece. The cannulas are malleable. When the MicroAire device is used, the cannula reciprocates at 2000 to 4000 cpm with a 2-mm stroke. The speed of the reciprocating cannula movement can be adjusted by the surgeon. The instrument remains efficient as long as the operating speed used is at least 3200 cpm (80% of full power). The device received US Food and Drug Administration approval 510(K) in December 1998 “for removal of tissue or fluid . . . including suction lipoplasty for the purpose of aesthetic body contouring.”

Operative technique

The areas to be treated are marked, and the patient is positioned on the operating table in the conventional fashion. Infiltration is performed, approximately 1 mL of wetting solution being used per milliliter of estimated aspirate. The wetting solution is infiltrated at least 10 minutes before suctioning.

As in traditional lipoplasty, the strategically placed access incisions need only be long enough to comfortably accept the introduction of the cannula chosen for the procedure. My personal preference is to use a skin guard. The MicroAire powered cannula should be moved by the surgeon at a speed slow enough to allow the instrument to break up the resistance that it is encountering. At the
appropriate speed, the cannula’s movement imparts to
the operator’s hand a sensation of “gliding” through the
subcutaneous fat with an ease that is considerable in com-
parison with traditional lipoplasty. The endpoint for suc-
tioning is subjectively determined by the surgeon, using the
same guidelines and aesthetic criteria that apply to tradi-
tional lipoplasty. The rest of the care is similar to that in
traditional lipoplasty. In my practice, this includes suturing
of the access incisions and application of Reston (3M, St.
Paul, MN) or TopiFoam dressings (LySonix, Inc.,
Carpinteria, CA) under postoperative compression gar-
ments, which are left in place until the patient’s first post-
operative visit approximately 3 to 5 days after surgery.

Clinical observations
My initial clinical observations on PAL are based on a
pilot study performed in conjunction with Dr. Peter A.
Vogt. In this contralateral study, volunteer patients served
as their own controls. Traditional lipoplasty was per-
formed on one side, and PAL was used on the corre-
spending contralateral body part. In all other respects, the
patients were treated identically. The results were analyzed
on the basis of postoperative follow-up examinations at 3
to 5 days, approximately 3 weeks, and approximately 3
months (Figures 2 and 3). Photographic evaluation and
subjective ratings of the results were performed indepen-
dently by the operating surgeon and by the patients.

The results of this study and my ongoing experience with
PAL in a large number of patients confirm that PAL is
not only equal to traditional lipoplasty in safety, speed of
recovery, and the aesthetic quality of the results but also
superior to it in several respects.

The PAL cannula breaks up fibrous fat much more readi-
ly than does traditional lipoplasty, so the procedure is
significantly less labor-intensive for the surgeon.
Consequently, it is significantly easier to treat fibrotic
body areas (eg, gynecomastia) and to perform secondary
lipoplasty. Similarly, the device is quite useful for the per-
formance of superficial suction.

PAL can significantly shorten operating time in compari-
sion with traditional lipoplasty. For example, during the
debulking phase of the procedure, it is not uncommon to
be aspirating as much as 100 mL per minute.

Another advantage is that PAL cannulas do not “plug
up” with fibrous tissue debris, as occurs when small-
diameter cannulas are used in traditional lipoplasty, espe-
cially for treatment of fibrotic fat.

The aspirate obtained with PAL is suitable for autologous
fat transfer, and I have so used it in many instances. For
that matter, microscopic studies performed on specimens
from a few patients showed that the aspirate obtained
through use of PAL had no more signs of tissue disruption
than that obtained through use of traditional lipoplasty.

Incidentally, lipocrits were performed on a few randomly
selected patients from the infranatant portion of the decant-
ed aspirate. These were found to be routinely less than 1%.

An immediate concern with any power-driven device is
the risk of increased surgical trauma, the result being a
longer recovery and more complications. This was not
observed in the study.

Disadvantages
As is the case with any new equipment, PAL entails an
additional expense and a learning curve. In this instance,
both are insignificant when compared, for example, with
the expense and the learning curve associated with the
adoption of UAL in one’s practice.

However, PAL can cause some discomfort to the surgeon,
because the vibration of the instrument is transmitted to
the operator’s hand. The level of vibration is directly pro-
portional to the operating speed used, and it diminishes
as this speed decreases.
Another notable disadvantage is the noise associated with operation of the PAL cannula, although the sound generated by the suction machine actually muffles the sound emerging from the PAL device to a large degree. In addition, the use of an electric power source will reduce the noise considerably. In a recent study, the noise generated by PAL compared favorably with that generated by the Mentor internal UAL device (Mentor Corporation, Santa Barbara, CA).

Early on in one’s experience, it might be wise to use PAL primarily as a debulking instrument, treating larger body areas such as the outer thighs, hip rolls, and the abdomen. As the surgeon becomes more familiar with the instrument, its use can be extended to all body regions, to fine sculpting, and to superficial lipoplasty. With the exception of submental suctioning, for which I find the instrument’s bulk to be cumbersome, I currently use this method in place of traditional lipoplasty for all body regions.

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References


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