External Lipoplasty Suction Device

Erik Dillerud, M.D.
Lysaker, Norway

Abstract. Most mobile suction devices specially designed for blunt suction lipectomy are to some degree noisy and several of them could be considered expensive. Their exhaust goes out in the operating room (OR). The potential contamination by aerosoles and fumes favor the use of special outlet filters. The author describes the suction equipment he made in 1984. An industrial high-power vacuum pump is placed outside the OR. The suction tubing goes out of the ceiling in the OR. The machine has double remote pedal control. The exhaust vents out at a hidden place in the clinic's garden, where eventually any AIDS or hepatitis virus will die promptly. This equipment has been used in more than 4200 suction lipoplasty procedures with no technical or surgical complications related to the device.

Key words: Lipoplasty—Liposuction—Suction lipectomy—Suction pump—Liposuction equipment

---

Presented in part at the annual meeting of the Lipoplasty Society of North America, 21 October 1990, Boston, Massachusetts

Address reprint requests to Erik Dillerud, M.D., Bombakken 4, 1324 Lysaker, Norway

(1) Vacuum pressure is not high enough. Vacuum pressure is particularly important when using small cannulas and when performing lipectomy in areas with a great amount of fibrous or glandular tissue.

(2) The pressure build-up time (capacity) is too long. Adequate capacity is important when the tubing is full of fatty tissue (to advance the aspirate to the collection bottle) and at the end of the procedure when the cannula aspirates some air. This "false" air facilitates the advancement of fat inside the tubing but decreases the efficacy of the lipectomy.

(3) The pump is noisy. Some patients feel uncomfortable with the sound level. Piston and membrane pumps, especially those with belt drives, are the noisiest.

(4) Most pumps have one pedal. It is easier when there is one pedal switch on each side of the operating table, especially during bilateral or multiple procedures.

(5) Some pumps' exhaust causes contamination. There is the possible hazard of exhaust aerosoles containing HIV or hepatitis virus. Pumps lubricated with oil may create fumes of unknown hazard. These circumstances necessitate the use of special outlet filters if the exhaust vents out in the OR.

(6) Some pumps are large and heavy. Some suction machines are uneasy to move around in the OR and make it inconvenient for the surgical staff. These considerations are important for small outpatient centers, where lipoplasty procedures are quite often performed.

(7) Some pumps are expensive. Although technically simple, some pumps specially designed for lipoplasty cost several thousand US dollars.

In summary, the ideal liposuction device should have the following properties:

— high negative pressure
— high capacity
—silent
—double pedal switch
—no aerosoles or fumes
—occupy minimal space in the OR
—inexpensive

In addition, the pump must be technically reliable (reputations of the manufacturer and of the distributor are important), should be maintenance free, have ease of measuring aspirate, and have ease of cleaning the tubing and jars. When building a new clinic in 1984, in order to meet these requirements it seemed logical to place the suction machine outside the OR.

Construction

The electrical motor consists of an one-phase electrical motor of 1 hp (Doerr, Cedarburg, WI, USA) which runs at 1425 rpm. It can be used continuously and is thermally protected. The pump unit (Gast, Mfg. Corp., Benton Harbor, MI, USA) is a rotary vane type and is directly built into the motor (Fig. 1). Both units are maintenance free and do not create oil fumes because no part inside the pump is lubricated with oil. The distributor recommends flushing the pump once a year with a special solvent. The pump gives a maximum negative pressure of approximately 0.9 atm in less than half a second at pump level. In our clinic, when using a 12-mm-diameter tube approximately 8 m away and with two 1-L jars connected to it, the maximum negative pressure build-up time is 3 s. Today’s price for this pump is equivalent to $360 (US).

The pump was placed in a separate isolated machine room outside the two ORs. A second backup unit was also installed in case of failure during surgery. The motor was provided with its own electrical circuit, with the circuit breaker in the OR most frequently used for lipoplasty. The pump has a double remote pedal switch (Fig. 2) in both ORs. The suction tubing runs from the machine room, inside the roof, comes out of the anesthesia console (Fig. 3) in the ceiling in the OR, and is connected to two jars in series (Fig. 4). The suction pump can be independently controlled from either of the two OR’s.

The exhaust vents out to a hidden place in the clinic’s garden, where eventually any virus will die promptly. It took both the plumber and the electrician less than two hours each to install the pump with its accessories.

Clinical Experience

Except for a temporary problem with one of the pedal switches (which appeared to be the fault of the electrician), I have been quite satisfied with the system. The pump has been silent in the OR. The