

Water Jet-Assisted Lipoplasty

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Water jet–assisted lipoplasty channels a thin, targeted, fan-shaped jet into adipose tissue to loosen tissue structure and release adipocytes. According to the authors, water jet–assisted lipoplasty facilitates preinfiltration of modified tumescent solution to create analgesia, resulting in painless or near painless lipoplasty. The authors contend that, with this method, patient safety has increased considerably, even in extensive procedures. (*Aesthetic Surg J* 2007;27:342–346)

Ever since Klein¹ wrote about the tumescent technique for lipoplasty with local anesthesia, the removal of unwanted fat deposits has become one of the most common aesthetic surgery procedures in the world. Several mechanical methods for infiltration of fluid and aspiration of fat deposits have since been developed, further extending these concepts.²⁻⁵ However, the basic idea has not changed; administration of fluid, sometimes in considerable quantities, is intrinsic to the performance of lipoplasty. However, medications in these fluids can cause unwanted side effects. Aside from volume-related electrolyte shifts and resulting circular reactions,⁶ the added analgesics can produce several unwanted effects^{7,8} that can appear days after the procedure.⁹

To avoid the side effects of high doses of active medications, many surgeons perform aspiration with the patient under general anesthesia. The number and severity of complications increases considerably for procedures with tumescent techniques that are carried out with patients under general anesthesia.¹⁰⁻¹⁴

Analysis of current lipoplasty techniques, demonstrating strengths, weaknesses, and potential risks, indicates that swelling of tissue in preparation for aspiration of fat cells is always the main variable. No modern procedure, regardless of the type of anesthesia used, can proceed without it. Therefore the challenge in performing lipoplasty is in the seemingly unavoidable side effects associated with the use of tumescent solution. To answer this challenge, a method was developed to maximize the advantages of the tumescent method, while minimizing the drawbacks.

Background

Water jet–assisted lipoplasty (WAL) uses a thin, targeted, fan-shaped jet, called *Body-Jet* (human med, Mecklenburg-West Pomerania, Germany), to apply fluid during WAL. The purpose of the fluid is not to cut sharply through tissue, but to loosen fat cells with as little damage as possible. The jet is channeled into adipose tissue to loosen the tissue structure and release adipocytes. This is an active process, replacing the traditional mechanism of passive entry of fluid through diffusion and osmosis.

Using *Body-Jet* WAL, a pressure system directs the infiltration solution through a closed tubing system (via a piston pump) into a very thin application cannula (Figure 1). The application cannula is surrounded by an external cannula that can vary in diameter and arrangement of openings, depending on its purpose. The flow rate of the infiltrate, as well as the application pressure can be selected from several different levels through a software guidance system. For technical reasons a pulsating jet is produced instead of a continuous jet of fluid. This effective jet delivers an impact comparable with a powerful shower head. Therefore there is no possibility of a traumatic “tearing up” effect. Because the pressure systems for infiltration and suction operate independently, these processes can be controlled separately. A premarket approval application for *Body-Jet* has been submitted to the Food and Drug Administration.

Modified Infiltration Solution

A two-stage process, with two different tumescent solutions, provides long-lasting, maximum anesthetization with minimal side effects. First, preinfiltration produces rapid generalized anesthetization and vasoconstriction in the entire treatment area. Then, to increase the analgesia effect and to maximize vasoconstriction, aspiration is performed with a “rinsing solution,” containing only small quantities of analgesic. The infiltration solution (on the basis of pharmacokinetics), consists of a relatively short-acting analgesic with rapid uptake combined with a long-acting analgesic with slow



Figure 1. *Body-Jet device.*

uptake. This formulation is intended to increase the spectra of effectiveness, while keeping the side effects of each agent minimal.^{15,16}

Presently, we use lidocaine and ropivacaine, which are both considered very safe when administered in appropriate doses.^{17,9} Additionally, we use epinephrine for vasoconstriction.

Preparation, Infiltration, Rinsing, and Suction Aspiration

Prepare the patient for the procedure as usual. Typically, you should be able to reach the suction area from at least 2 sites to facilitate aspiration via a “criss-cross” technique. Advance the cannula relatively near the surface, and glide it smoothly through the adipose tissue.

After you have performed infiltration, it is not necessary to wait before starting the aspiration. Anesthetization and vasoconstriction take place over a shorter period of time because of controlled high infiltration and simultaneous suction.

After you swap the infiltration cannula for the suction cannula, immediately begin the aspiration process. As a general rule, the fluid leads the way; the cannula simply follows and penetrates “soft areas.” The functional structures are displaced by the jet and thereby protected from mechanical trauma. A smooth and force-free method of working is always a sure sign of an atraumatic and safe procedure.

When you have almost finished reducing the fat deposits, rework and shape the details, using the additional cannulas to conclude the lipoplasty. The best way to evaluate your work is with the patient standing; therefore, at several junctures during the aspiration process, have the patient stand.

In total, we have carried out more than 800 treatments since 2001, using this procedure. These clinical trials were performed in Hamburg, Germany. Here is a summary of our results:

- Compared with the quantity of tumescent solution used in conventional manual lipoplasty, an average of 20% to 30% was used in preinfiltration, depending on the findings of the authors.
- The length of time tumescent solution remains in the tissue, as well as the resulting absorption times, are all considerably lower for the recommended infiltration solutions compared with all other tumescence-based lipoplasty techniques.
- The average patient satisfaction rate for both the procedure and the final outcome was higher than 94%.

Conclusion

On the basis of our clinical experience administering Body-Jet WAL with the patient under local anesthesia, we have found that:

1. WAL presents a new and safe method that is suitable for all types of lipoplasty.
2. In almost all cases, WAL facilitates use of preinfiltration of modified tumescent solution to create analgesia that is suitable for the performance of painless or near painless lipoplasty. Therefore lipoplasty with the patient under general anesthesia or sedation that suppresses consciousness is no longer necessary.
3. There is significantly reduced pain-related impairment during and after the procedure compared with standard tumescent technique. Patients recover quickly and return to normal daily activities rapidly.

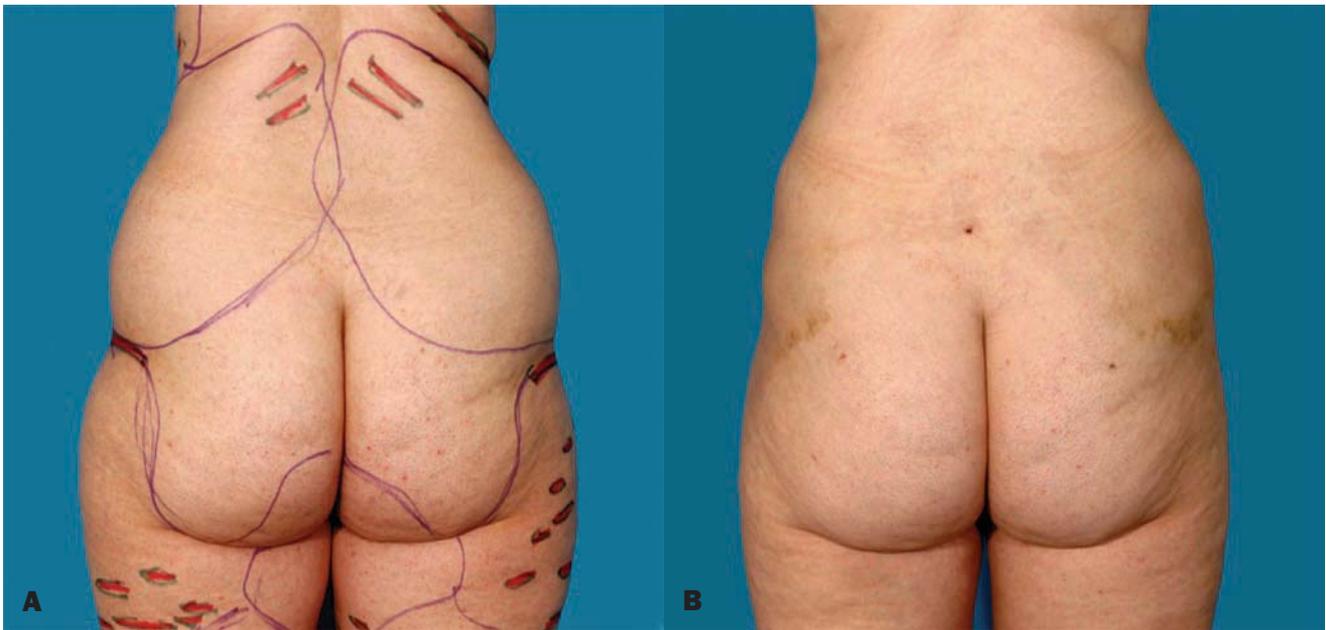


Figure 2. **A,** Preoperative view of a 52-year-old woman. **B,** Postoperative view 1 week after undergoing WAL.



Figure 3. **A,** Preoperative view of a 60-year-old man. **B,** Postoperative view 2 days after undergoing WAL.

4. Considerably less intraoperative swelling allows the surgeon to realize the target result with greater precision.
5. Fine shaping of small deposits with precision is also possible. This enables surgeons to accommodate the increasing patient demands for contouring.

It is notable that patient safety has increased considerably, even in extensive procedures. The limitations and drawbacks of other infiltration methods are reduced or eliminated. This new method of simultaneous fluid in and out allows the surgeon and patient new consistent levels of comfort and security. ■

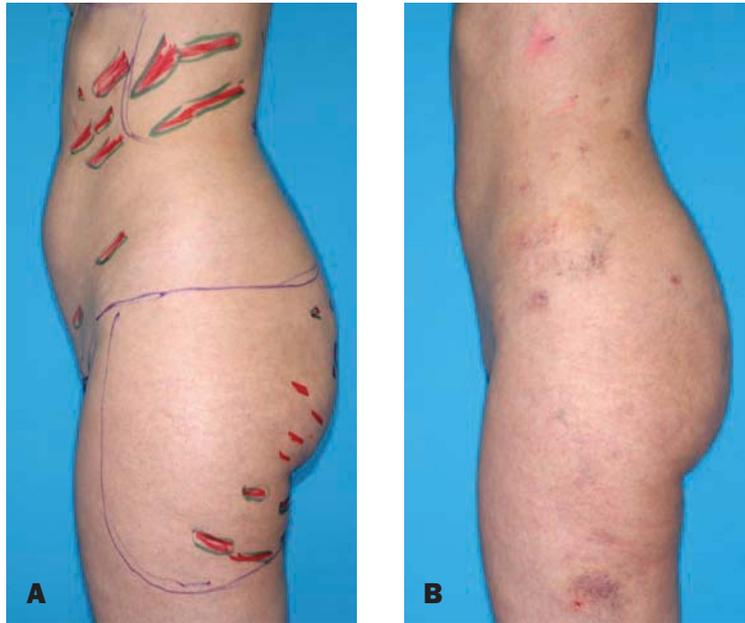


Figure 4. A, Preoperative view of a 51-year-old woman. **B,** Postoperative view 1 week after undergoing WAL.



Figure 5. A, Preoperative view of a 51-year-old woman. **B,** Postoperative view 1 day after undergoing WAL.

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