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# Suction-Assisted Lipectomy for Correction of 202 Figure Faults in 101 Patients: Indications, Limitations, and Applications

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Since its introduction in the United States, suction-assisted lipectomy has proven to be a safe, effective technique for correction of figure faults. It has been greeted with considerable skepticism by many practitioners, however, owing to the poor results many have obtained in their initial attempts to apply similar techniques. Suction lipectomy using the blunt technique is a safe procedure that can yield consistently good results when appropriately applied. It is suggested that the principal reason others have had difficulty involves problems in patient selection. The technique may not be effective for the correction of generalized obesity and cannot be expected to dramatically alter overall appearance. Patients should be selected for treatment of specific "figure faults" and educated as to what may realistically be expected. The patient's emotional and psychological condition must be taken into consideration. We report a series of 101 patients treated with a total of 202 separate suction lipectomy procedures with good results and only two minor complications. A survey of patients treated by the method reveals a generally high level of satisfaction and some of the ambivalence that might be anticipated from such a technique.

Early reports by European surgeons on the effectiveness of suction curettage for reduction of excessive fat deposits were, understandably, greeted with some skepticism in the United States. For one thing, the techniques reported varied in rather significant ways. Schrudde<sup>1</sup> employed sharp uterine curettes and removed small amounts of localized fat through numerous small incisions, an approach that had the potential for considerable damage to tissues other than the fat deposits targeted for removal. Kesselring<sup>2</sup> developed the sharp suction curette, which first cuts fat cells free of surrounding structures and then vacuums them from the wound. He reported

satisfactory results in nearly 70 of 105 patients, with only minor irregularities in 24 others and only 3 relatively minor complications.<sup>8</sup> Finally, the Illouz technique of suction lipectomy using a blunt cannula appeared to eliminate the hazards inherent in the use of a sharp tool while yielding satisfactory aesthetic results.<sup>4</sup> Fournier and Otteni<sup>5</sup> refined the Illouz technique by eliminating the hypotonic solutions that Illouz had used to infiltrate unnecessary adipose tissue, reporting good results in more than 700 patients using both the earlier "wet" and subsequent "dry" techniques. Like Kesselring, Fournier and Otteni reported only occasional minor complications.<sup>5</sup>

Those American surgeons who have reported on their applications of suction lipectomy have generally reported similarly good results. Teimourian et al.<sup>6</sup> reported on 200 patients treated with a variant of Kesselring's sharp technique with good results and only two minor complications. Courtiss<sup>7</sup> reported similar results in 100 patients and found the sharp technique preferable in some patients and the blunt technique better in others. Dolsky<sup>8</sup> reported on 145 patients and concluded that the blunt technique was the preferred method, and Hetter and Herhahn<sup>9</sup> carefully evaluated 15 patients treated with the blunt technique and found that 13 were satisfied with the results and 12 would have the technique performed again.

Despite the consistently good results reported in the literature and the progress made in terms of technique, numerous surgeons who attempted to use suction lipectomy experienced unsatisfactory results. In general, these difficulties are now

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recognized as having been the result of two fundamental problems in approach: poor patient selection and unrealistic expectations. The common thread that has linked virtually all reports of the successful use of suction lipectomy is agreement that the usefulness of the technique is limited to removal of localized fat deposits for improvement of what we have termed "figure faults." It is not a substitute for weight loss in cases of more general obesity. Once this limitation is recognized and patients are selected accordingly, the application of techniques refined by experience by numerous surgeons can produce consistently good results with minimal complications.

#### PATIENT SELECTION

Suction lipectomy is not a satisfactory treatment for generalized obesity. While it would be technically possible in such cases to remove large amounts of fat in the subcutaneous plane, the difficulties of thus producing an acceptable total body contour are virtually insurmountable. The attempt may actually result in a worsening of an already poor appearance.

Suction lipectomy is most successful when used to correct figure faults: outcroppings of fat in the hips, medial thighs, abdomen, or other locations that are distinctively out of proportion to the rest of the body. The Ad Hoc Committee on New Procedures of the American Society of Plastic and Reconstructive Surgeons clearly recognized as early as 1983 that such localized problems represented the most appropriate application of the Illouz blunt technique: "It would appear that we now have a relatively satisfactory surgical method if utilized in the hands of appropriately trained and experienced surgeons for the treatment of disharmonious obesities or congenital steatorrheas (segmented genetic fat)." The committee concluded that the technique is safe and effective not only for removal of "saddle bags" (i.e., "riding britches"), but also for "removal of fat from the abdomen, hips (love handles), medial thighs, larger saddle bag deformities, and can be extended to fat deposits of the knees, ankles, arms or lipomas."<sup>10</sup>

In fact, there are few locations on the human body that might not display figure faults potentially treatable with suction lipectomy. We have found the technique effective in altering facial as well as body contours.

If identification of localized fatty deposits, as distinct from more generalized obesity, is critical

to successful patient selection, recognition of psychological characteristics is also important. In every case, it is extremely important that the patient be educated regarding precisely what results to expect from the procedure. When patient dissatisfaction is with overall appearance, correction of figure faults, while producing clinically satisfactory results, may have little or no impact on the patient's own body image. Such patients will often enter into the procedure with unrealistic expectations and be disappointed in even the best possible result. Patients who are specifically concerned with identifiable figure faults, however, will frequently perceive even relatively small changes as resulting in a dramatically improved appearance. Patient selection, therefore, required not only identification of the physical defect itself, but also of the appropriate psychological state. Education may be effective in lowering unrealistic expectations in some patients. Others will never be satisfied with their appearance, no matter how dramatically altered.

#### MATERIALS AND METHODS

We use an instrument which has both a blunt hole and a blunt tip, as originally developed by Illouz. The diameter of this cannula varies from 3 to 7 mm, depending on the size of the area being treated. The cannula is inserted under the skin through a small incision of approximately 1 cm. The suction opening is kept facing away from the overlying skin and toward the underlying muscle fascia. The instrument is moved by a back-and-forth motion only, never from side to side in the manner of a windshield wiper. By this method, nerves and vessels are pushed gently aside and only fragile, amorphous fat cells are ruptured and sucked in small concentrations into the cannula's blunt hole. The back-and-forth motion allows a diffuse network of tissue to remain intact connecting the overlying skin to the underlying fascia. Perforating vessels are neither injured nor distributed.

The maintenance of a high level of suction is important to the technique. Removal of fat through the cannula and into the suction reservoir requires negative pressures approaching 20 torr (750 mmHg negative pressure at sea level). Our experience has shown that small variations in pressure do not observably affect results, as long as a consistently high pressure is maintained.

During the initial stages of suction lipectomy, the fat removed will be a bright, clear yellow that

is semifluid and flows evenly up the tubing. When the area has been cleared of amorphous fat cells, the fluid becomes first pinkish and then red, indicating that suction should cease. Once all areas to be treated have been cleared, the cannula is removed and the wounds are closed using absorbable subcuticular stitches reinforced with suture strips. A normal incision requires only one or two stitches.

The total amount of fat removed by suction lipectomy can vary over an extremely wide range (Fig. 1). The most we have removed from a single patient at one time has been 8000 ml. In this case, involving a slightly obese female, we suggested that treatment be completed in several separate procedures. The patient, however, wished to complete treatment promptly in anticipation of accepting a scholarship overseas. The patient was hospitalized and the procedure was performed under general anesthesia. Cases involving removal of such large amounts of fat are relatively unusual. In most cases, the amount removed is 2000 ml or less. In such cases, the procedure is routinely performed on an outpatient basis under general anesthesia. When the amount to be removed is expected to exceed 3000 ml, general anesthesia and hospitalization are indicated. Blood loss is usually minimal when the amount of fat removed is 2000 ml or less.

However, we do ask that all patients donate 1 unit of blood to themselves 1 week prior to surgery. At 4000 ml, we expect to replace 2 units of blood. This increases to 3 units at 6000 ml and 6 units at 8000 ml.

The principal postoperative problem encountered with this technique is a certain amount of waviness or wrinkling of the skin resulting from unequal distribution of fat over the area of the lipectomy. This phenomenon is a direct and unavoidable result of the in-and-out motion of the cannula that is essential to preserve a portion of the supporting structure between overlying skin and underlying fascia. Older patients and those with noticeably loose skin in the area under consideration may experience particular difficulties of this sort and may thus not be good candidates. Other postoperative problems may include discoloration, numbness, or increased sensitivity of the skin over the area of the lipectomy. These problems are most often encountered immediately following the procedure and usually disappear within 4 to 8 weeks.

Suction lipectomy can be useful for a number of other purposes besides simple correction of Figure faults. It is useful in removing fat from the edges and corners of larger wounds involved in other surgical reconstructive procedures. It is very effective for removal of lipomas as large as

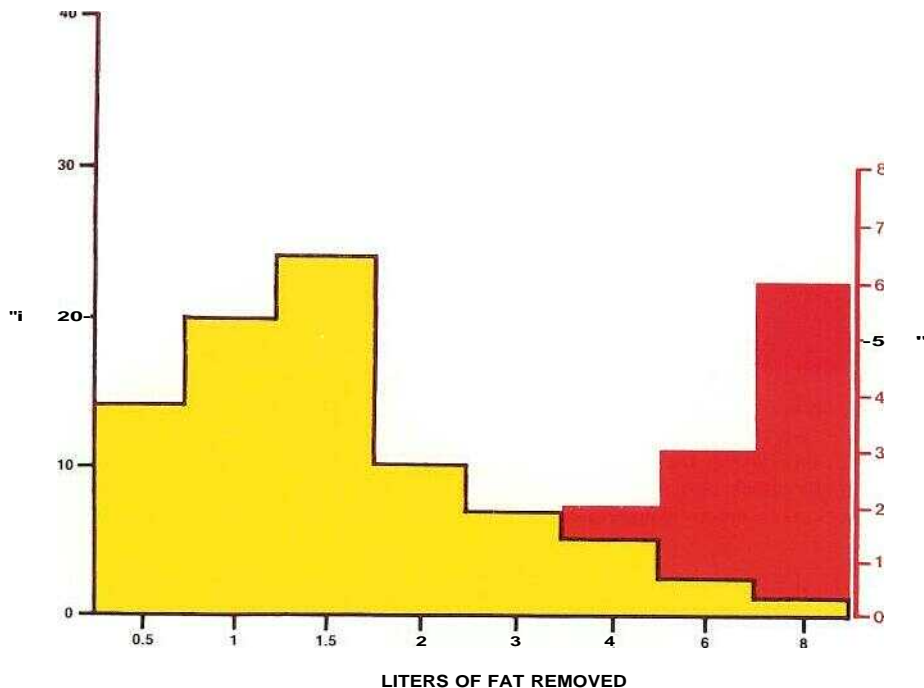


FIG. 1. Distribution of patients by volume of fat removed and units of blood required.



FIG. 2. Photographs before (*above*) and 3/2 months after (*below*) a 46-year-old woman who had no skin removed had been treated by suction lipectomy alone removing approximately 60 ml of subcutaneous fat through a small submental incision and a small incision through the mucosa of the cheek on each side. (*Below, right*) Notice the slight excess resection in the left lateral cheek, creating an exaggerated dimple subsequent to the procedure.

250 ml in volume, resulting in only a minimal, remote scar.

#### CLINICAL EXPERIENCE

We treated a series of 101 patients using suction lipectomy. Of these, 68 patients were treated

with suction alone, whereas 29 were treated with suction to supplement more general dermatolipectomies and 3 were treated with suction for gynecomastia (Table I). Suction was applied to a total of 202 separate anatomic areas (Table II), with the amount of fat removed ranging from

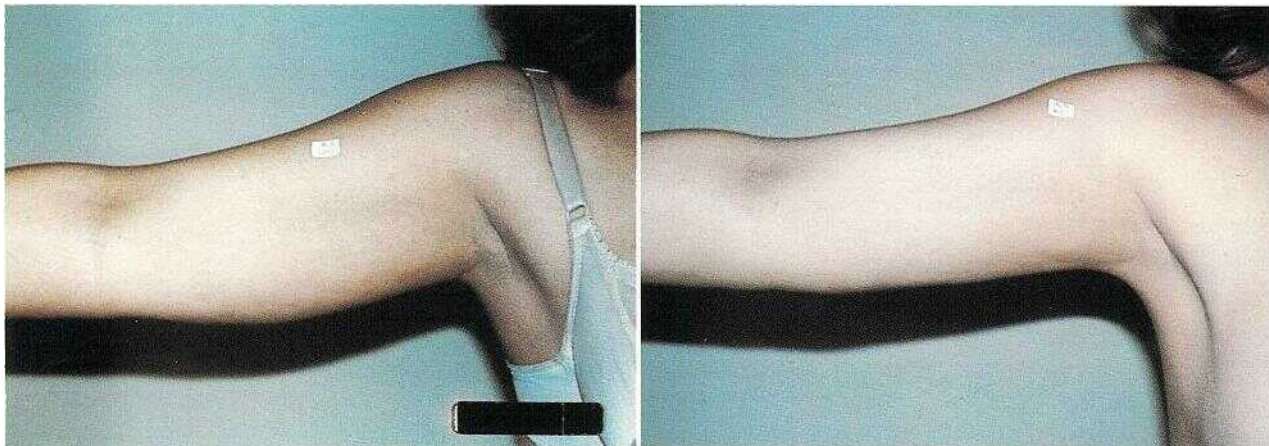


FIG. 3. Before (*left*) and after (*right*) photographs showing the improvement in contour of the triceps area of the arm in a 34-year-old woman 6 weeks after removal of approximately 200 ml of fat from this area through a small stab incision in the posterior elbow.

10 ml in the case of a face to 3200 ml removed from one patient's thighs (Figs. 2 through 7). While certain areas, notably the face and neck, generally require removal of relatively small amounts of fat, there is considerable variation from patient to patient in most areas. As illustrated in Table II, the mean amount of fat removed from abdomen, buttocks, thighs, and knees was nearer to the minimum removed than the maximum, and the median for these areas is considerably lower than the mean. Figure 1 further illustrates the fact that most cases in which suction lipectomy is a viable option have involved removal of relatively small amounts of fat, commonly 1500 ml or less per patient.

In performing suction lipectomy on a total of 101 patients in 202 different anatomic areas, we experienced only two significant postoperative complications. In one patient, an infection occurred which was controlled by systemic antibiotics, with no observable negative impact on the ultimately satisfactory result. In another patient, in whom suction lipectomy was done to the neck, some adhesion of the overlying skin to the underlying fascia occurred postoperatively. This improved with massage, and the adhesion has continued to diminish with time (now 1 year postoperatively).

The vast majority of instances in which we use suction lipectomy involve straightforward correction of failure faults by a one-time procedure. We have, however, initiated what we refer to as "serial suction lipectomy" in cases where patients require removal of large amounts of fat but wish to avoid the recovery period a single procedure would necessitate. This approach allows removal

of maximum amounts of fat in small increments, minimizing both the need for transfusion and the recovery period. One of these serial cases involves a physician who has, to date, had 6 liters of fat removed, 1 liter at a time, from his abdomen, waist, back, and chest. This patient has been able to return to work the next day wearing a rib belt. Another case involves a woman with two young children who has had 5 liters of fat removed, 1 liter at a time, from her thighs, abdomen, and waist. The lipectomy is performed during the day, while her children are in school, and she has never required a baby sitter because of the procedure. In each of these cases, we have allowed a minimum period of 6 weeks between suction procedures. The only difficulty we have experienced with this serial approach to suction lipectomy has been an expected unevenness of contours between procedures. In the two cases described, the patients have felt this temporary asymmetry preferable to even a brief hospitalization.

In one very unusual case, we treated a moderately obese 19-year-old woman with suction lipectomy incidentally in the repair of a degloved hand. A 10 X 25 cm abdominal flap was used to cover the injured hand. When the flap was released, we were able to close the entire donor site primarily by removing a liter of fat from each side of the waist by suction lipectomy, thus obviating the need for skin grafting to repair the donor site. The result was a successfully repaired hand and an improved figure as well.

In an effort to measure patient satisfaction with suction lipectomy, we mailed a survey to each of our patients, asking them to respond to



FIG. 4. Lateral before (*above*) and 3 1/2 months after (*below*) views of a 46-year-old woman who had no resection of skin, no abdominoplasty, but only removal of 2500 ml of subcutaneous fat by the blunt technique of suction lipectomy from the abdomen and waist.

several questions. In order to ensure forthrightness in patient responses, the survey was anonymous. While this prevented analysis of responses on the basis of patient-specific clinical observations, we felt that an anonymous survey would be more meaningful in terms of the highly subjective question of satisfaction with results. Of 41

patients who returned the survey, 32 indicated that they were satisfied with the results, whereas 5 were not sure and 2 said they were dissatisfied. (One respondent did not answer this question; another answered both "satisfied" and "not sure" and was not counted in the results.) A higher number of respondents, 37 of 41, said that they

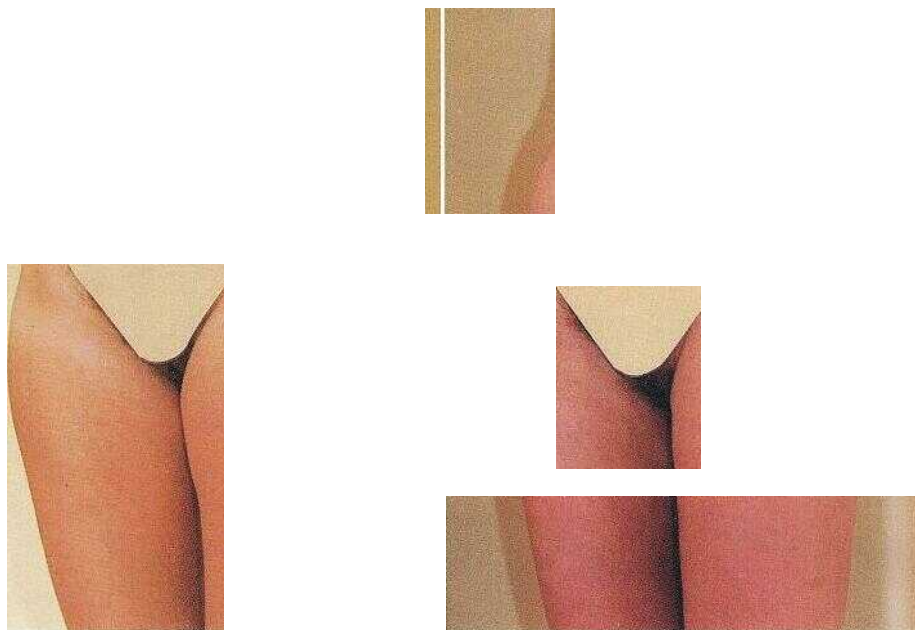


FIG. 5. Front lateral before (*left*) and 6 weeks after (*right*) views illustrating the results of suction lipectomy of the medial knees and medial and lateral thighs in a 26-year-old woman. A total of 2050 ml of fat was removed.

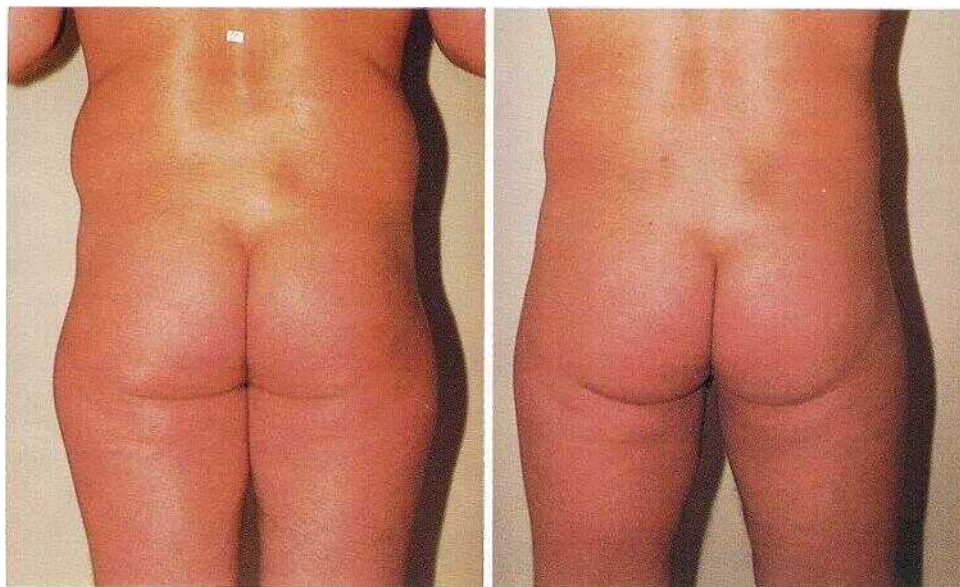


FIG. 6. Posterior before (*left*) and 3 weeks after (*right*) views of a 29-year-old man illustrating removal of 1500 ml of fat from waist, buttocks, and medial and lateral thighs by suction lipectomy.

would recommend suction lipectomy to a friend with a similar figure fault, whereas only 4 said that they would not do so. Both patients who were dissatisfied with the results also said they would not recommend the procedure to a friend,

one who was unsure about satisfaction would not do so, and the one who did not answer about satisfaction also would not do so. The respondent who checked two answers about satisfaction would recommend the procedure. One of those

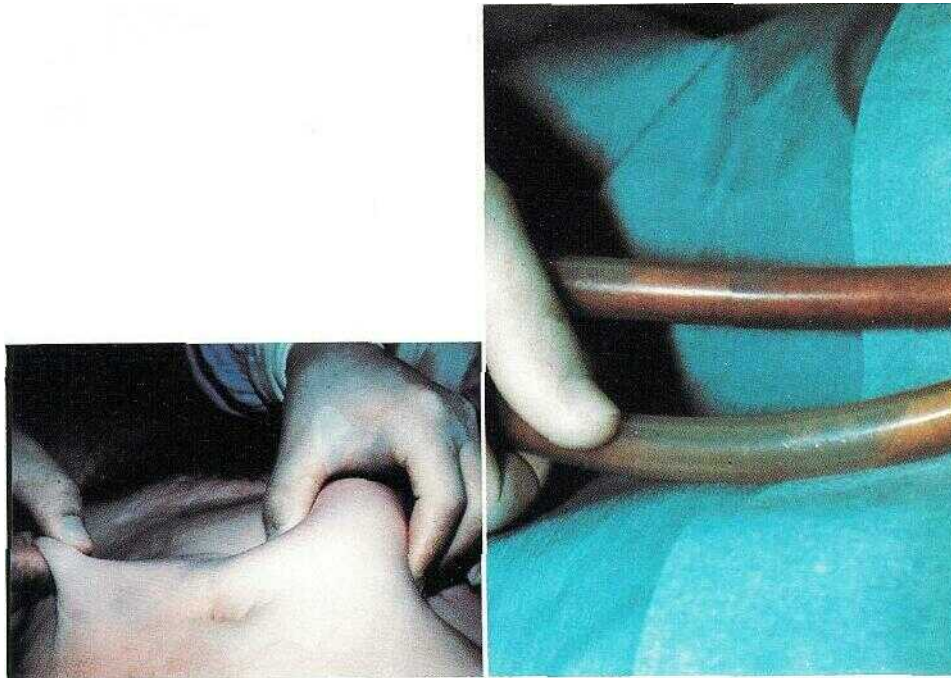


FIG. 7. Before and after pinch tests on the abdomen illustrating the subcutaneous fat thickness immediately prior to (left) and following (right) suction lipectomy. (Right) Note that the fat removed is initially bright yellow (left), becoming pinkish when the suction is complete. Blood loss in most cases is minimal.

TABLE I  
Suction Lipectomy Patients

Procedures Performed	Number of Patients
Suction only:	68
Torso and extremities	44
Face and neck	20
Lipomas	4
Dermatolipectomy	29
Gynecomastia	3
Total patients	101

TABLE II  
Areas Treated by Suction Lipectomy

Area	No. of Patients	Fat Removed(mi)		
		Range	Mean	Median
Face	5	10-40	*	*
Neck	15	60-175	*	*
Arms	7	120-720	449	450
Chest	5	100-250	*	*
Abdomen	59	200-2700	941	850
Buttocks	34	150-2400	819	650
Gynecomastia	3	100-300	*	*
Thighs	49	150-3200	871	700
Knees	22	50-800	274	215
Ankles	3	150-300	*	*

\* Total volume of fat removed and/or number of patients too small for meaningful aggregation.

who was dissatisfied with the results of the procedure included a note with the survey form identifying the reason for dissatisfaction as the amount of dimpling in the area treated, the thighs and the knees. The other dissatisfied respondent also included a note. This revealed that the dissatisfaction was in fact with the results of a blepharoplasty performed at the same time as, but separately from the suction. Similarly, one patient who was unsure as to satisfaction but who would not recommend the procedure had been treated with suction as an adjunct to a more general dermatolipectomy and felt that the suction had "not added anything to the results."

Obviously, the results of any such survey of patients regarding satisfaction with what is primarily a cosmetic procedure will be affected by a number of subjective factors, including patient expectations and overall self-image. Patients cannot be expected to have a full awareness of anatomy, nor are they reliable judges when it comes to distinguishing between the results of surgically distinct procedures. As noted earlier, however, patient education regarding the potential of suction lipectomy is of fundamental importance, especially since the actual physical results of the procedure are quite predictable. The

patients were also asked whether they had experienced certain common imperfections in the treated areas. Wrinkling or dimpling was reported by 21 of 41 respondents, whereas 7 reported some discoloration and 8 indicated increased sensitivity in the area treated (8 reported more than one imperfection, so figures cannot be totaled). The fact that so many patients reported these minor imperfections while a much smaller number were less than fully satisfied with the results or would not recommend the procedure to others strongly suggests to us that our efforts to inform patients about expectations were, by and large, effective.

The survey questionnaire also asked patients about weight loss or gain subsequent to the procedure. Only 16 of 41 respondents noted any change in weight, and in most cases, the change was quite small, although the maximum loss reported was 20 pounds and the maximum gain was 15 pounds. We concluded that this information was insufficient to draw any conclusions regarding the effects of suction lipectomy on overall body weight.

#### DISCUSSION

By applying the lessons learned over the course of two decades in Europe and the United States, we have found that blunt suction lipectomy, as first developed by Illouz and refined here by Hetter and others, is a new and useful surgical technique. It is the preferred technique for correction of most localized figure faults caused by isolated fatty deposits that are resistant to diet therapy. In addition, suction lipectomy has proven extremely useful in altering facial contours in plastic surgery, as recently reported by Newman, Dolsky, and Mai.<sup>11</sup>

Although some authors have reported good results in certain patients using the sharp technique,<sup>6,7</sup> we believe the blunt technique is preferable in all patients because of the reduced risk of unnecessary damage to subcutaneous structures and the attendant reduction in blood loss. Any debate over the relative advantages of the "wet" and "dry" techniques has been convincingly resolved in favor of the latter, even for those who have continued to advocate the sharp over the blunt technique.<sup>5</sup>

Dolsky<sup>8</sup> reported that most cases of "liposuction extraction" would normally be performed under general anesthesia, with hospitalization indicated for extraction of greater than about 1

liter. In their first reports on the use of the blunt technique in the United States, Hetter and Herhahn<sup>9</sup> also employed general anesthesia routinely. Our experience has been that general anesthesia is unnecessary in most cases involving removal of less than 2 liters of fat and that hospitalization is not generally required until the amount removed exceeds 3 liters.

The dramatic increase in blood loss we have observed once the amount of fat removed approaches 4 liters is, we believe, significant. It has been noted that suction lipectomy is not indicated for treatment of generalized obesity. Most figure faults caused by diet-resistant fatty deposits will be relatively small, requiring removal of less than 1500 ml of fat. Where it is apparent that significantly larger amounts of fat will need to be removed, careful consideration should be given to the precise nature of the problem. To be sure, we have removed much greater amounts from a single patient, with good results, and suction lipectomy is certainly effective in these cases. However, best results will generally be obtained in cases involving a smaller volume.

The technique for removal of fat using the blunt technique is essentially the same regardless of the area treated or the amount of fat removed. It is a mechanically straightforward and relatively simple procedure that can yield consistently good results when appropriately applied. Most important, the contour changes thus accomplished are permanent, and the procedure itself leaves no dramatic scars of its own. Hetter believes that the removal of these fatty deposits not only eliminates a part of the body storage area for fat cells but also removes cells responsible for the production of fat and fatty acids as well.\* This opinion is shared by others, although the evidence on this point is not yet conclusive.

The technique of suction lipectomy is lucidly and comprehensively described in works by Hetter<sup>12</sup> and Agris and Varon.<sup>13</sup> In the case of this procedure, however, as with so many aesthetic procedures, success is in large measure a function of patient satisfaction, and that, in turn, is largely dependent on the patient. This factor initially comes into play in patient selection and education. Lewis<sup>14</sup> points out that "time tested rules of patient suitability for aesthetic procedures should be applied." Not only is it important to ensure that the physical problem to be addressed is appropriate to the procedure, it is also

\* Personal communication with the authors.

important that the patient clearly understand the results that can be expected and possess the psychological characteristics necessary to respond rationally to those results.

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#### REFERENCES

1. Schrudde, J. Lipexeresis as a means of eliminating local adiposity. *Aesthet. Plast. Surg.* 4: 215, 1980.
2. Kesselring, U. K., and Meyer, R. Suction curette for removal of excessive local deposits of subcutaneous fat. *Plast. Reconstr. Surg.* 62: 305, 1978.
3. Kesselring, U. K. Regional fat aspiration for body contouring. *Plast. Reconstr. Surg.* 72: 610, 1983.
4. Illouz, Y. G. The Origins of Lipolysis. In Hetter, G. P. (Ed.), *Lipolysis: The Theory and Practice of Blunt Suction Lipectomy*. Boston: Little, Brown, 1984. Pp. 25-32.
5. Fournier, P. F., and Otteni, F. M. Lipodissection in body sculpturing: The dry procedure. *Plast. Reconstr. Surg.* 72: 598, 1983.
6. Teiinourian, B., Adham, M. N., Gulin, S., and Shapiro, C. Suction lipectomy: A review of 200 patients over a six-year period and a study of technique in cadavers. *Ann. Plast. Surg.* 11: 93, 1983.
7. Courtiss, E. H. Suction lipectomy: A retrospective analysis of 100 patients. *Plast. Reconstr. Surg.* 73: 780, 1984.
8. Dolsky, R. L. Body sculpturing by iipo-suction extraction. *Aesthet. Plast. Surg.* 8: 75, 1984.
9. Hetter, G. P., and Herhahn, F. Experience with "lipolysis": The Illouz technique of blunt suction lipectomy in North America. *Aesthet. Plast. Surg.* 7: 69, 1983.
10. Ad Hoc Committee on New Procedures. Report of the Commission on Surgical Suction Lipectomy. Chicago: American Society of Plastic and Reconstructive Surgeons, Inc., 1983.
11. Newman, J., Dolsky, R. L., and Mai, S. T. Submental liposuction extraction with hard chin augmentation. *Arch. Otolaryngol.* 110: 454, 1984.
12. Hetter, G. P. (Ed.) *Lipolysis: The Theory and Practice of Suction Lipectomy*. Boston: Little, Brown, 1984.
13. Agris, J., and Varon, J. *Suction Assisted Lipectomy: Clinical Atlas*. Houston: Joseph Agris, 1983.
14. Lewis, C. M. Patient Selection: Psychological Aspects. In Hetter, G. P. (Ed.), *Lipolysis: The Theory and Practice of Suction Lipectomy*. Boston: Little, Brown, 1984. Pp.91-94.