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Experience is rapidly accumulating with a technique of lipodystrophy treatment that combines two of the m recently described procedures in aesthetic surgery: liposuction (extraction of fat tissue with a cannula and a vacuum pump) and ultrasound liposculpturing (ultrasound stimulation of fat tissue previously infiltrated wi large quantity of fluid to selectively destroy fat tissue and subsequent removal of the liquid component). The physical principles of both techniques complement each other very well. Therefore when using them together in the combined technique, the range of indications increases, and the results are better. The combi technique is based on three steps:

1. Tumescent infiltration of Dr. Zocchi's solution into superficial layers
2. Ultrasound liposculpturing of superficial layers with emphasis on treating the inner surface of the dermis
3. Liposuction of superficial layers to deep layers according to Dr. Gasperoni's principles and to Dr. Gasparotti's method

Up to now we had only one choice for treating lipodystrophy: liposuction. This method allows us to attain g results in indicated cases.
While still preserving the original principle of physics in the extraction of fat tissue by suctioning with a rou ended cannula, new technical variations have appeared. The latest one, Gasparotti's superficial liposuction, allowed the indications for its use to be increased and improved results.' ' ' Recently a new technique basec a totally different principle of physics has been described for treating similar deformities. Zocchi's ultrasou liposculpturing uses ultrasound stimulation of fat tissue previously infiltrated with a large amount of fluid. cavitation phenomenon produced by the ultrasound waves liquefies the adipocytes. The liquid portion of th is eliminated through the incisions made to in- sert the probe, but a residue consisting of cellular membrane intercellular substance, and connective filaments extremely rich in autologous collagen remains inside. Stimulation of the inner surface of the dermis with ultrasound energy by scraping backward with the probe increase skin retraction and produce a better adaptation to its new contour.

TECHNIQUE

Once the preoperative tests have been completed (blood analysis, radiographs, electrocardiograph, and photographs), the type of anesthesia to use (general or regional) depends on the size of the area to be treatec The areas to be treated are marked with the patient standing up, and any asymmetries are noted. In the operating room after the patient has been anesthetized, the operative field is prepared and the patient positic accordingly (lateral position for trochanteric lipodystrophies and supine for the abdomen and the inner aspe of the thighs). Antibiotic prophylaxis may be started at this point. We then proceed to infiltrate the area to b treated with Zocchi's solution:

- Epinephrine, 1 mg (1 mL of a 1: 1,000 solution of epinephrine)
- Normal saline, 500 mL of a 9% NaC1 solution
- Distilled water, 500 mL
- Chondroitinsulfatase, 1,000 turbility-reducing units (TRU) in ZO mL

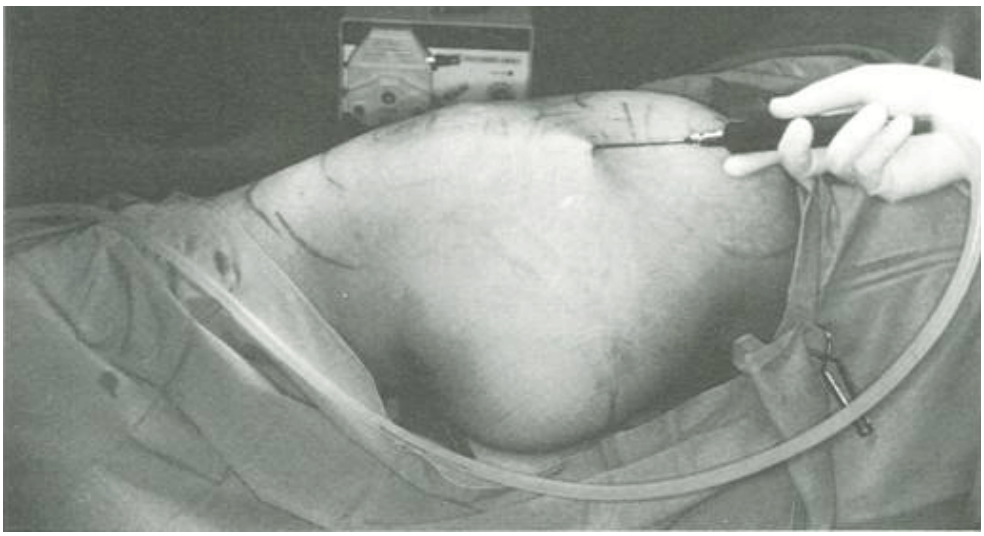


FIGURE 1. *Tumescent infiltration of Dr. Zocchi's solution with an automatic Klein injection pump.*

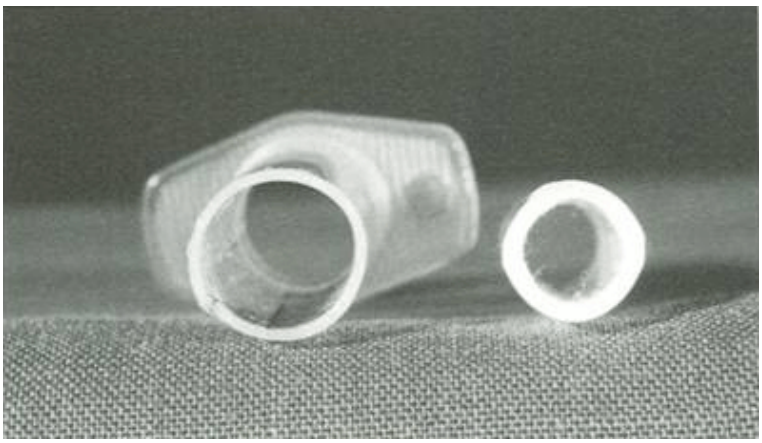


FIGURE 2.

Skin protector employed by the author: comparison between the special Teflon skin protector and the 2-mL angular-cut syringe protector used until now. The smaller diameter of the Teflon protector a11ows the use o smaller incision.

When only sedation is used, 50 mL of 1% lidocaine and 12.5 mEq of sodium bicarbonate must be added.

The solution is infiltrated with an automatic Klein Injection Pump through the incisions that will be used la for introduction of the probe and the cannula (Fig 1). Sufficient amount of solution must be infiltrated to cr a tumescent field.

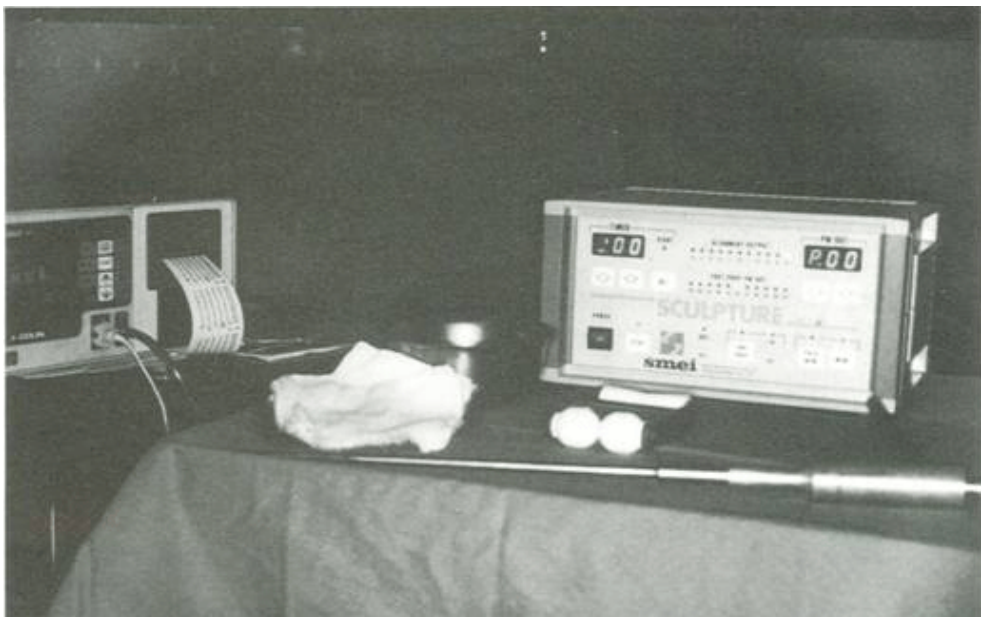


FIGURE 3. *Dr. Zocchi's ultrasound equipment employed in the treatment of the super6cial layers and for stimulation of the inner surface of the dermis.*

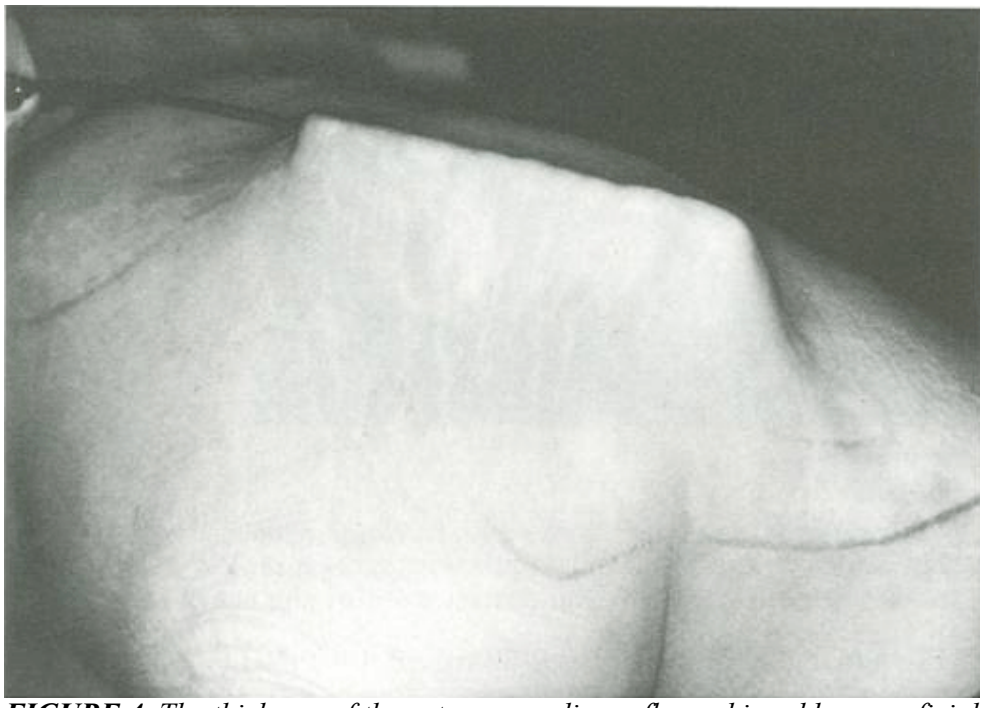


FIGURE 4. *The thickness of the cutaneous-adipose flap achieved by superficial liposuction according to Dr. Gasparotti's method can be appreciated.*

A special Teflon skin protector is introduced inside the incisions and fixed at the dermis with two 2-0 silk stitches. This protector prevents any possible damage to the skin from the ultrasound probe (Fig 2).
A titanium probe connected to an ultrasonic generator designed by Dr. Zocchi is used to treat the superficia layers, with special attention paid to treating the inner surface of the dermis by direct contact with the probe obtain strong skin retraction (Fig 3). The power employed should not exceed 45 W. The next step involves introduction of a 3-mm, two-hold cannula to suction the oil produced by ultrasound stimulation and the fat tissue of the subsequent layers, with the depth of liposuction increased until a homogeneous thickness and a ideal proportion with the rest of the body's contour is achieved (according to the superficial liposuction of I Gasparotti's method).
Finally, the incisions are sutured with 7-0 silk stitches, and hypoallergic tape is methodically placed over th treated area to help in reshaping and readaptation of the skin, For reinforcement, the patient wears a double elastic garment. In cases where the inner aspect of the thighs, knees, and abdomen are treated, the hypoaller tape is replaced by Reston sheets.
The patient remains hospitalized overnight, and antibiotic prophylaxis is dispensed for the following 5 days After 1 week, the stitches, hypoallergic tape, and Reston sheets are removed. The patient continues to wear elastic garment for another month, Ferroprotein therapy is prescribed for the next month.

CONCLUSIONS

The combined technique (superficial liposuction with ultrasound liposculpturing) incorporates the advantag of both techniques, enlarges the indications for cosmetic surgery, and allows the treatment of particularly difficult cases that would not have been attempted before. Better skin retraction is ensured by using the ultrasound effect to biologically stimulate the inner surface of the dermis and cause a multiple microscarrin retractile effect and by the ease in contour reshaping al- lowed by the thin cutaneous-adipose flap provided the superficial liposuction (Fig 4).

A smooth, regular skin surface as well as an irnprovement in the orange skin-like irregularities of cellulite a obtained through careful uriss crossed microtunneling by superficial liposuction and through destruction of fibrous cellulitic septa by the ultrasound energy. Figures 5 and 6 show results of the combined technique. T combined technique allows the scar of the inner thigh incision to be hidden at the inguinal fold because it d not require a continuous postoperative drain as would be needed if the ultrasound technique were used by itself.

itself.

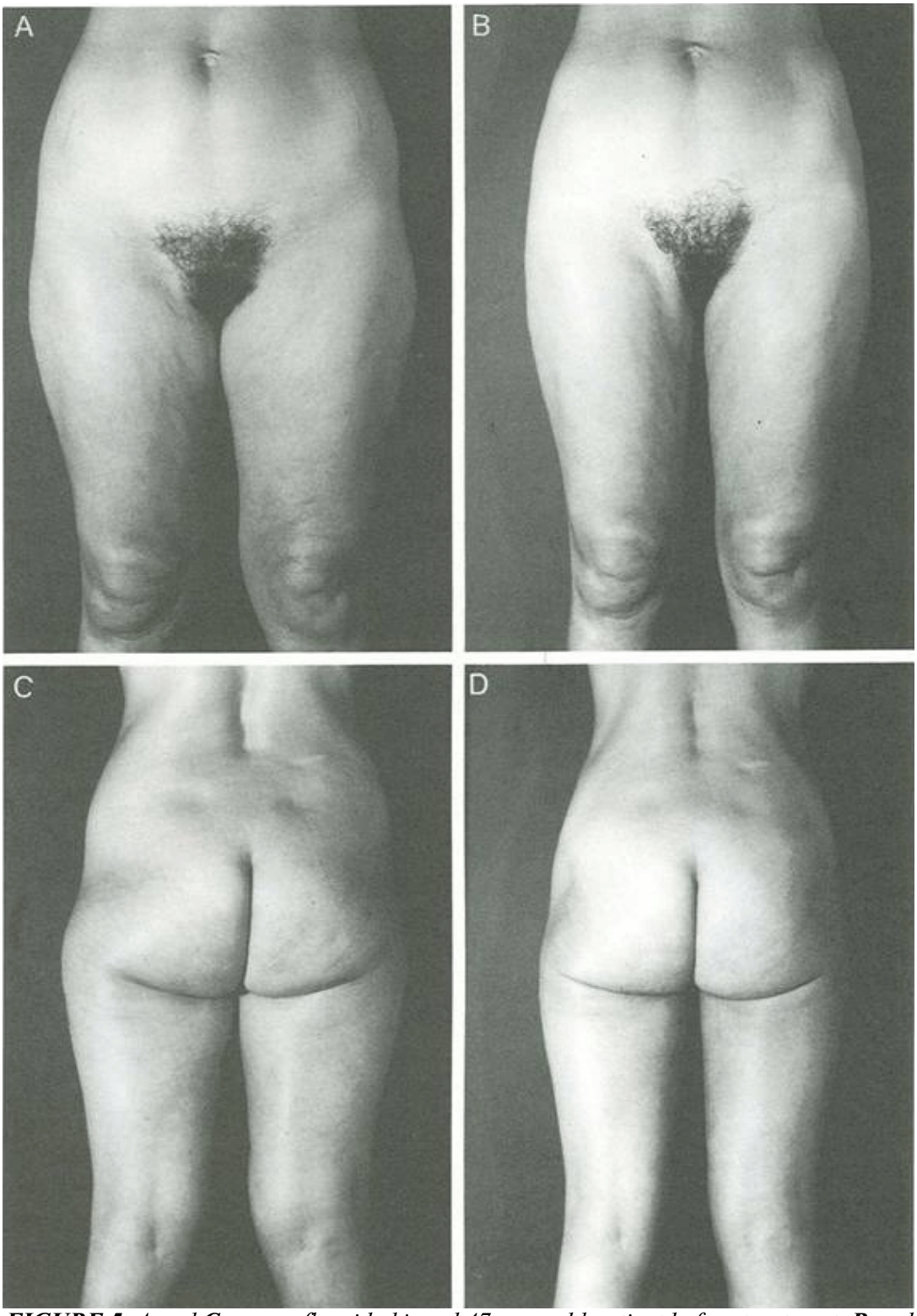
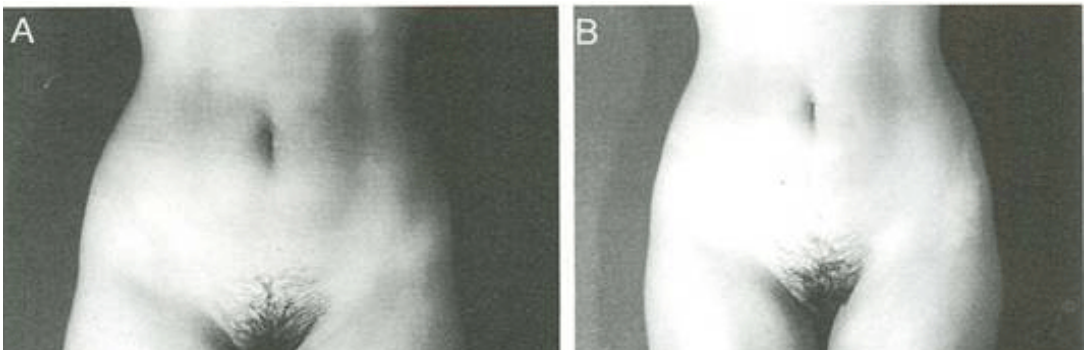


FIGURE 5. *A and* ***C,*** *a very flaccid-skinned 47-year-old patient before treatment.* ***B*** *and* ***D,*** *result after 3 months. Note the improvement in skin quality and body contour.*



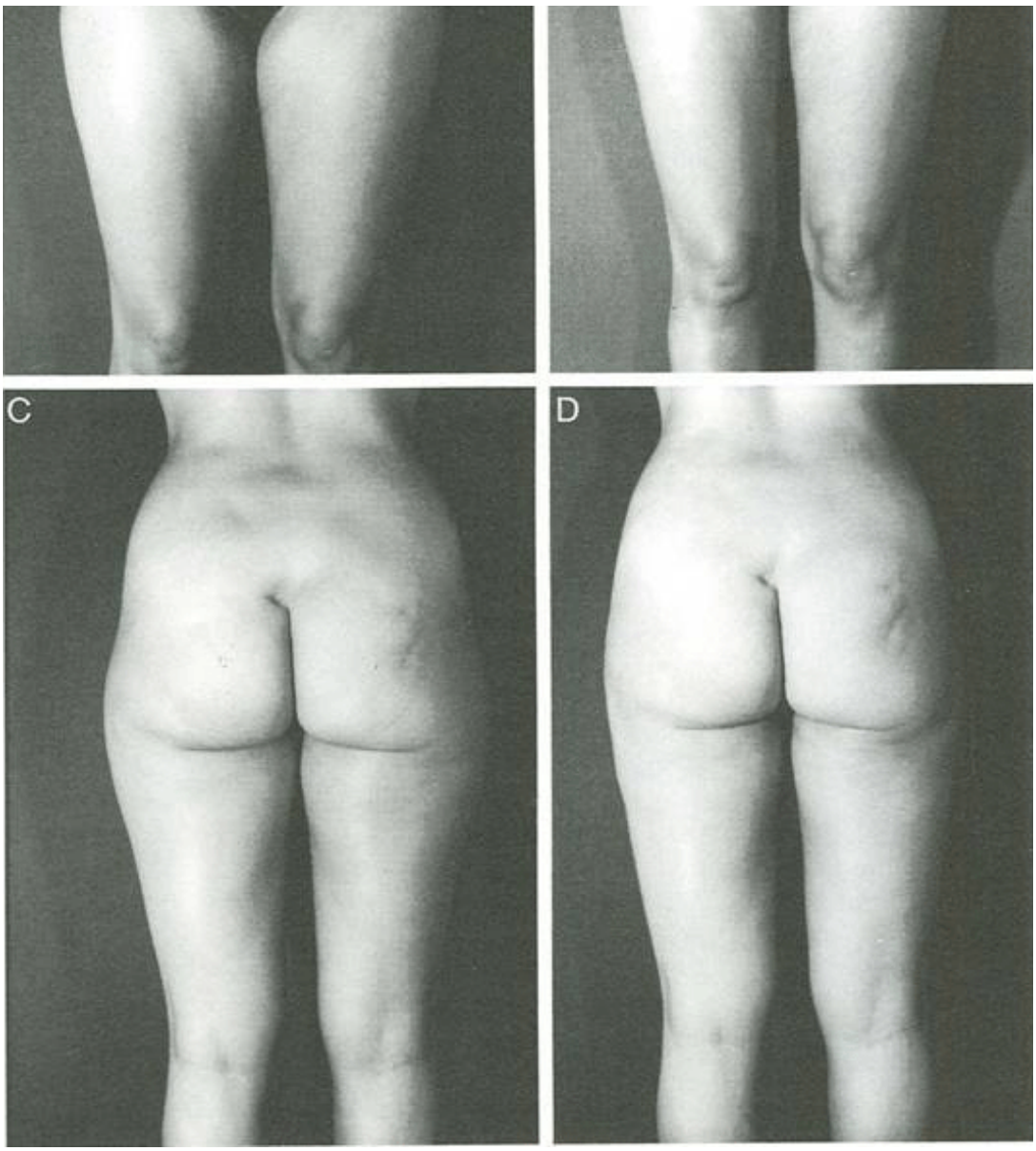


FIGURE 6. *A and* ***C,*** *front and back view of a 31-year-old patient with a noticeable gluteus sag before treatment.* ***B*** *and* ***D,*** *result 2 months after treatment (hips, flanks, inner aspect of the thighs, and knees). .*

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Lipoplasty, during its meteoric rise to the number one position among aesthetic procedures, has seen many modifications and refinements. Now Dr. Zocchi has introduced and popularized a new modality for body cc touring in which liposuction is replaced by ultrasonic destruction of fat cells. The liquid fat is removed by using low negative pressure and external expression with a special remodeling instrument. It is an intriguin concept that has captured the imagination of aesthetic surgeons around the world. His illustrations indicate he has been quite successful in achieving improvement in the patients shown.

Ultrasonic liposculpturing has not yet been introduced into the United States, largely because the instrumentation described is not yet approved by the U.S. Food and Drug Administration. While clinical activity is thus restricted, there are some questions about the technique and its rationale that would be appropriate for investigation to substantiate the theories presented here. For example, it would be desirable show experimentally that the action of the ultrasound is as highly selective for the lipocytes as the author describes. There is no reason to doubt the ob- servation that the oily drainage in the low-negative pressure suction phase of treatment is predominantly from destroyed fat cells, but do we really know that there is no significant physical effect on the cytoplasm of other cells7 The author seems to postulate that the infiltrated hypo- tonic solution not only dissects between the fat cells but is also trans- ferred osmotically to an intracellular location. But in most situations in the living organism, electrolyte concentrations would be expected to equilibrate much more rapidly in the extracellular space than across healthy metabolizing cell membranes, and there is no obvious reason why intracellular equilibration should occur preferentially in the lipocytes.

The ultrasonic energy generates heat, which the author has not found to be a problem once he began to prot the skin at the sites where the probe is introduced. However, in the lifting procedure there is danger of a der burn if the ultrasound energy is applied superBcially for too long a time, and the procedure may produce hyperemia. Indeed, one wonders whether the lifting effect is secondary to healing of the dermis after intentional thermal injury. It would be interesting to examine the histologic effects of the treatment on both and the tissues that do not seem to be affected clinically.

Also, it would be interesting to experimentally explore whether physicochemical effects such as the formati of free radicals and the denaturation of cell membranes can be demonstrated in vivo and whether they are limited to the fat cells. The manual remodeling technique is an interesting innovation, but the concept of molding the detritus of the lysed cells is new and would bear investigation. One would hope that a scientist with Dr. Zocchi s background will continue his work to answer some of these questions that others may not equipped to handle.

The combined technique described by Dr. Planas in his comments adds still another dimension to the practi

of body sculpture. Few data are presented regarding this modification, although it sounds rational enough s
long as we can be reassured about the remaining questions in regard to the ultrasound itself. Indications for
approach will need to be worked out in relation to each of the component techniques alone. It is easy to see
how an intriguing technique like this one, whether or not combined with liposuction, can be widely adopte
a wave of enthusiasm. It has caused considerable excitement at international conferences. With the recogni
that Dr. Zocchi has shown us some good results and has pioneered a novel concept, perhaps the reader wou
do well to remember that the indications and pitfalls have not yet been fully delineated.

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