

Superficial Liposculpture

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ABSTRACT

Liposculpture has provided a safe and effective method of removing fatty deposits without scarring. When a large amount of fat has been aspirated skin irregularities can occur due to the presence of a thick subdermal adipose layer, which decreases the possibility of skin retraction. Superficial liposculpture involves liposuction of this areolar fat layer to enhance skin retraction. Over a two-year period, 64 female patients with adiposities in various body parts were treated with associated deep and superficial liposculpture. Of these, 28 patients had lost some weight through inconsistent dieting before presentation. Fan shaped pretunneling and criss-crossing lipoextraction, producing true tunnels on superposed layers, starts deep to superficial using finer cannulas as we approach the surface. The concept is to perform meticulous uniform liposculpture of the areolar fat layer to reduce the thickness and consistency of the fat under the skin to enhance cutaneous retraction. It is always necessary to do a peripheral discontinuous mesh undermining to redistribute the excess skin, remodel the tissues and immobilize. In general, patients showed reduction of unsightly bulges and a smoother, better proportioned and more attractive overall contour. Measurements were also reduced. There were no hematomas or seromas, no hemorrhages or infection. Before dieting, skin tone is good. Liposculpture in these (n=36) patients was easy, bloodless with more volume of pure fat removed and good cutaneous retraction and tight skin envelope. Significant weight loss before liposculpture affects skin elasticity. Liposculpture in these (n=28) cases was difficult with bloody component and less volume of fat aspirate. Skin retraction, however, in view of the preoperative flaccid skin tone, was good due to superficial liposculpture. Discussion of the basis behind the technique, the results and new observations will be made. Superficial liposculpture provides uniform fat extraction, thin less heavy skin and good harmonious skin retraction, which is even better in patients undergoing liposculpture early before dieting. In flaccid skin patients, it is the main noninvasive option for a better contour. It affords a rapid procedure with no complications, decreased recovery time and cost and high satisfaction for patient and surgeon alike. This excellent method of body contouring makes use of the shrinking properties of the skin, which enables the indication of the procedure in more patients and provides it with great potentials.

INTRODUCTION

Overweight and exaggerated fat deposits can appear in early adolescence. Patients, however, are usually reluctant to remove the fatty deposits early

for fear of skin redundancy. Liposuction has provided a safe and effective method of removing fatty deposits without scarring and refinements are continuously made to improve skin retraction after the procedure [1]. The term liposuction implies a passive process, but since the process involves active to and fro movements of the cannula, hence the term lipoextraction. Liposculpture is artistically practiced lipoextraction as the precise forming of body areas (body contouring) is possible. In daily practice, however, the term liposuction is more common.

When a large amount of fat has been aspirated residual deformities can occur due to the presence of a thick subdermal fat layer, which decreases the possibility of skin retraction. Previously only deep liposuction was used, which acted in the lamellar layer, located between the superficial fascia and the muscular fascia. Liposuction was not performed in the more superficial areolar fat layer, situated between the dermis and the superficial fascia, for fear of the appearance of skin surface irregularities [2]. With the use of fine cannulas, regular work and the demonstration of the existence of such scar retraction that occurs after liposuction of the areolar layer, liposculpture is rapidly evolving into a highly refined and detailed surgery with great potentials [3,4]. Superficial liposculpture comprises liposuction of the areolar fat layer to reduce the thickness and consistency of the fat under the skin and enhance the possibility of skin retraction. Thanks to the phenomenon of cutaneous retraction that follows superficial liposculpture; we can therefore increase our range of indications of liposculpture without skin resection [5,6]. Superficial liposculpture is now integrated in almost every body contouring procedure. In this series, we report our experience with superficial liposculpture in various body parts. The fundamental basis behind the technique and new observations are highlighted and results shown.

PATIENTS AND METHODS

Sixty-four female patients were treated with associated deep and superficial liposculpture between January 2003 and December 2005. The average age was 26 years, with a range between 17 and 52 years. Twenty-two patients presented lipodystrophy of the thighs, 20 of the abdomen, 12 of the dorsal region, and 10 of the arms. The associated lipodystrophies were mostly treated in the same or subsequent interventions. Of these, 36 (14 thigh, 11 abdomen, 6 dorsal region and 5 arm lipodystrophy) patients presented for liposculpture without any serious attempts at dieting or significant weight loss. The adiposities were well-defined, firm and skin tone generally good. The remaining 28 (8 thigh, 9 abdomen, 6 dorsal region and 5 arm lipodystrophy) patients lost some weight through inconsistent dieting before presentation. These patients went through multiple weight fluctuations and demonstrated a little bit loose heavy skin with reduced elasticity-short of the need for an excisional procedure. This was especially evident with significant weight loss-with the difference between the maximal and the current weight, 10 or more kilograms. The patients were measured, weighed and photographed pre- and periodically postoperatively. The results of treatment and follow up of all patients were evaluated regarding the volume and nature of the aspirate and skin retraction as they relate to the type of patient, and whether pretreatment weight loss affects the procedure and the results.

Preoperative Evaluation:

In front of the mirror, together with the patient in the standing position, we evaluate the areas selected for liposuction and fat injection. The adiposities are evaluated with and without contraction of the related muscle groups. We do routine preoperative testing for hemogram, coagulation, and other tests as relevant. A standard pre-anesthetic evaluation is also done.

Presurgical Technique:

Preoperative Markings: The outline of the surgical plan is drawn on the patient in the standing position with different colors being used for areas which must be aspirated and those in which fat is to be injected. We mark:

- The adiposity, which is circled.
- A second circle, 1 to 2cm around the previous one, is also marked. The tip of the cannula will be pushed until the second marking so there will be no stair step defects.

- An outer circle beyond the adiposity, 2 to 8cm from the second marking, corresponds to the peripheral mesh undermining (Fig. 1).

Asepsis, Antisepsis and Draping: Asepsis and antisepsis is performed in the operating room with povidone iodine while the patient is standing. The patient then lies down on the operating table on a sterilized sheet and we wrap the patient's legs with sterilized elastic bandage to prevent thromboembolism.

Anesthesia: The majority of the procedures are done under general anesthesia. Local-regional anesthesia is employed for minor and isolated liposculpture [7,8]. Prophylactic antibiotics are given to all patients.

Operative Technique:

Infiltration: Tumescence technique is employed [8,9]. The area is infiltrated with Ringer lactate adrenaline-lidocaine solution. Infiltration should be done from deep to superficial. The quantity of the solution infiltrated varied according to the extension of the area of fat excess and the volume to be extracted. To a large extent, we attribute our results to a well-performed infiltration.

Lesional Lipectomy: 5- and 6-mm blunt cannulas were used for liposculpture of the lamellar layer and cannulas of 3 and 4mm were used for superficial liposculpture. A fan-shaped pretunneling is carried out, which will facilitate the following work. Through one opening, half of the estimated amount to be resected is removed. In order to make real tunnels, not sinuses or blind tunnels, the other half of the quantity to be resected is removed through another opening opposed to the first one. True tunnels, perpendicular on the first ones, are thus obtained with two orifices and cross work. The surgeon works regularly on superposed horizontal planes-each plane consists of a fan-shaped extraction. Most important of all is uniform superficial liposculpture of the areolar fat layer with fine cannulas to ensure good harmonious cutaneous retraction. Always we preserve 2-3 syringes of aspirated fat for fat injection. In each area, the amount of fat suctioned or injected is recorded on a map for symmetry.

Peripheral Mesh Undermining or Perilesional Lipoplasty: These fan-shaped to and fro movements of the cannula in the entire marked area are somewhat larger than in the lesional lipectomy and do not extract any fat. By severing a certain amount of retinaculæ cuti, which connect the skin to the deep fascia, the discontinuous undermining will

allow redistribution of the excess skin in the lipectomy area.

Dressing: Elastic adhesive tape and a compressive girdle are used. The adhesive dressing-cut lengths of elastic adhesive bandage-is applied in vertical overlapping strips to fix the repositioned skin in the treatment area to normal areas above during healing. This controls edema and bruising and secures the skin in place to retract to its normal position.

Saddlebags: The lateral thighs deserve special mention as a prototype for superficial liposculpture. Patient is placed in lateral decubitus to improve presentation and facilitate manipulation of the area [2]. At first, the large caliber cannulas used in the deep layer results in a great diminution in the fat tissue volume. The superficial layer is treated with small caliber cannulas. If there is flaccidity and only the deep layer is treated, the area becomes heavy and irregular because the skin cannot retract uniformly. With the use of fine cannulas superficially, the thickness of the flap can be controlled. At the end of surgery, some patients, especially those with flaccid skin, will have a very thin layer of fat attached to the skin. This flap covers the final sculptured shape and should be treated carefully and secured well in its correct place (Fig. 2). Saddlebags are one of the first areas to be treated with this technique. It continues to give the most long-lasting, harmonious, and gratifying results.

Postoperative Care:

The elastic adhesive dressing was removed after 7 to 10 days and the girdle kept on for 6 to 12 weeks to control edema. Patients should be careful to avoid positions that may provoke permanent folds or marks in the treated areas. If the dressing or the girdle starts provoking folds, patient is informed to stop wearing it and do only manual lymphatic massage.

RESULTS

Follow up was between one month and two years. In general, patients showed reduction of unsightly bulges and a smoother, better proportioned and more attractive overall contour. Measurements were also reduced. Most patients experienced reduced appetite for 1-2 weeks after liposculpture and weight loss ranged from 4-8kg with only sensible eating. Fat injection in the middle third of medial thigh was carried out in 6 patients with thigh liposculpture. In patients who had liposculpture first before dieting, fat extraction was easy, bloodless with more volume of fat aspi-

rate. Also contour problems at presentation were evident and can be outlined for treatment (Fig. 1). Cutaneous retraction was excellent with better tone and tight skin envelope. The results were very satisfactory (Figs. 3-5). On the other hand, in patients who underwent severe inconsistent dieting and weight fluctuations before liposculpture, fat extraction was difficult, with bloody component and less volume of fat aspirate. Contour problems, in the form of bumps and bulges, were less evident. Skin retraction, in view of the preoperative skin condition, was good due to superficial liposculpture and the patients were satisfied (Figs. 6-8). Overall, the volume of fat removed from one area in patients who had liposculpture before dieting was approximately twice the volume of fat removed from the same area in patients who lost some weight before the procedure. In patients who presented for liposculpture first, the total volume of fat removed from the thigh was on average 5200ml, with a minimum of 2300ml and a maximum of 10500ml. In patients who lost some weight before liposculpture, the total volume of fat removed from the same area was on average 2100ml with a minimum of 1500ml and a maximum of 4800ml.

Recovery was rapid with minimal morbidity and no complications. One patient needed blood transfusion, previously programmed to correct preoperative anemia. There were no hemorrhages or infection, no hematomas or seromas. Transient edema of the legs and feet was noted in some patients in whom fat excess medial to the knee was treated. Bruising or yellow discoloration of the skin was variable, but generally infrequent. It appeared mainly in areas not covered by the adhesive elastic tape and resorbed gradually over 10 to 15 days. Also there were no significant skin redundancies, no waves or irregularities. Most patients complained of itching from the adhesive dressing after 5-6 days. This was completely relieved upon removal of the dressing. Firmness was felt in lower abdominal skin of some (n=8) cases, which resolved with massage over 2-3 weeks. A few patients noted decreased sensation of the skin in the area of liposuction, which improved gradually over weeks. One patient had symmetric hypertrophic scar at puncture holes in the back, which required intralesional steroid injection. Caution was taken thereafter to avoid symmetrical puncture holes, which may denote a cosmetic procedure. Only one patient (age 28) underwent a second liposculpture to remove additional fat from the trochanteric area. Skin retraction was particularly good and to the satisfaction of the patient and surgeon alike. However, this was even better in patients who had liposculpture before dieting.

Fig. (1-A): Huge trochanteric fat deposits; patient wanted treatment of this area only. The inner circle represents the lipectomy area; the second circle to avoid stair step defects and the outer dotted circle shows the extent of peripheral mesh undermining.

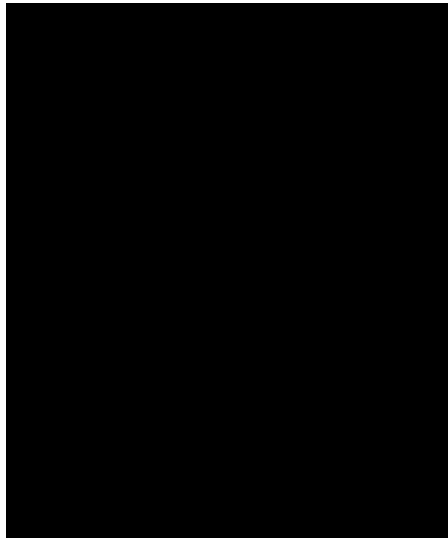


Fig. (1-B): Two years after superficial liposculpture of the lateral thighs with excellent uniform tissue retraction.

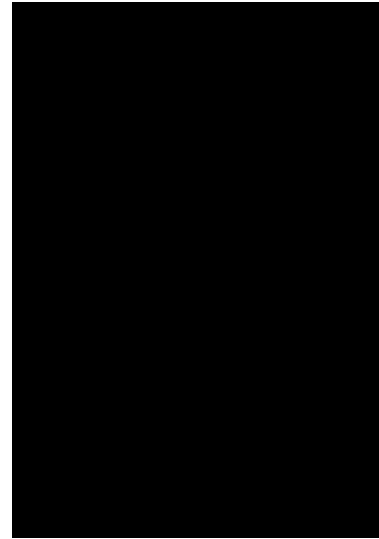


Fig. (2-A): (Above): If there is flaccidity and only the deep layer is treated, the flap gets too heavy. (Below): There will be a tendency to form irregularities because the flap cannot retract uniformly.

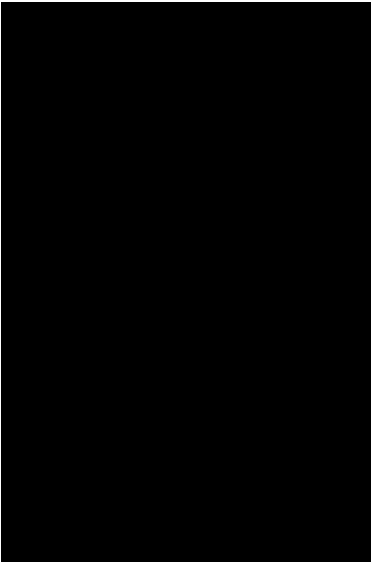


Fig. (2-B): (Above): If the same deformity is treated uniformly with superficial liposculpture, the flap will be lighter. (Below): Better and more uniform retraction of the lighter superficial flap.

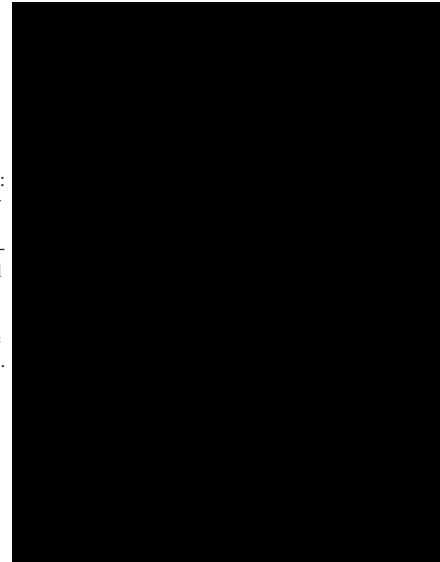


Fig. (3-A): A 24 year-old patient with excess fat lateral, anterior and medial thighs and knees.

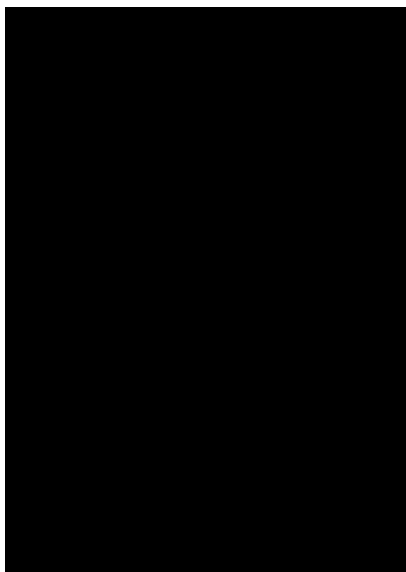
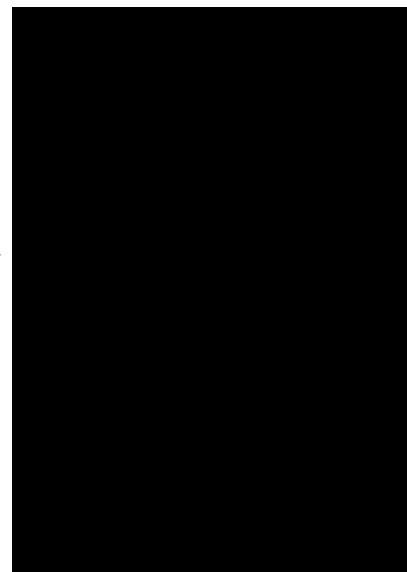


Fig. (3-B): Three-month follow up after superficial liposculpture with good tissue retraction; no irregularities.



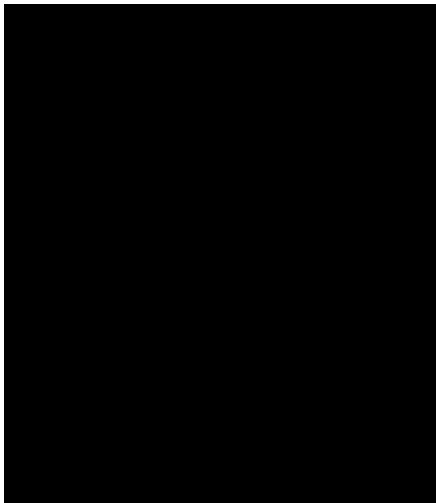


Fig. (4-A): A 23 year-old patient with good skin tone and fat excess lateral, anterior and medial thighs.

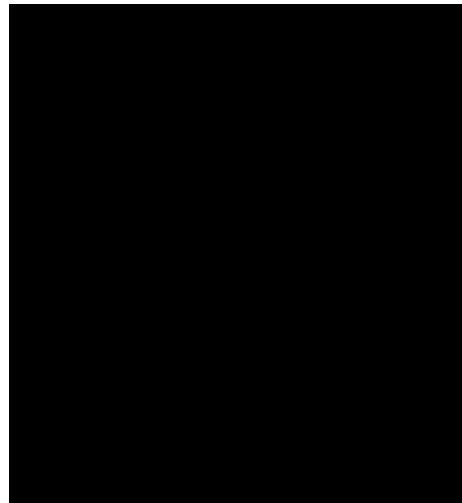


Fig. (4-B): One month after superficial liposculpture with evident improvement of thigh contours and good uniform retraction although there is still some residual edema.

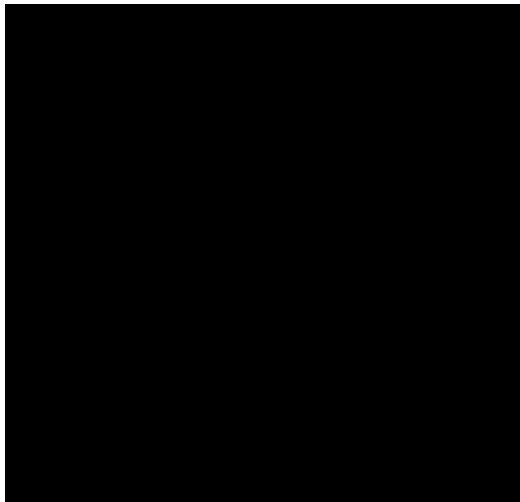


Fig. (5-A): Preoperative photos of a 20-year-old patient with fat deposits in axillary and dorsal regions, waist and flanks.

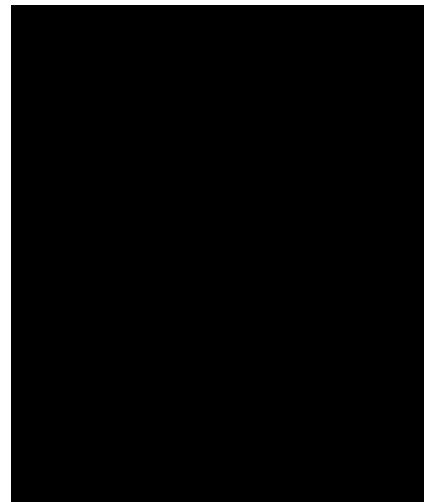


Fig. (5-B): One year after superficial liposculpture with improvement of the back, waist and flanks.

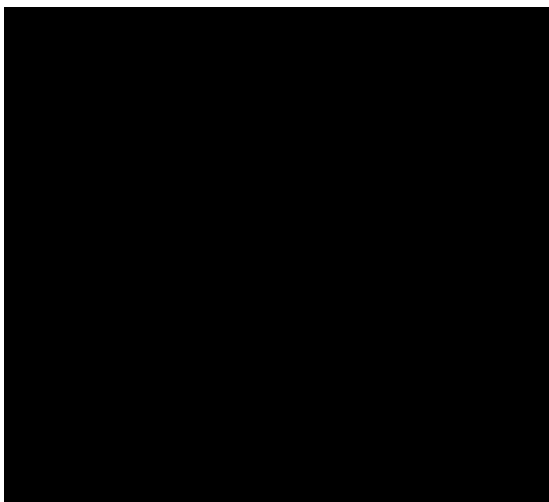


Fig. (6-A): Fifty-year-old post weight loss patient with flaccid skin tone and excess fat in the abdomen and flanks.

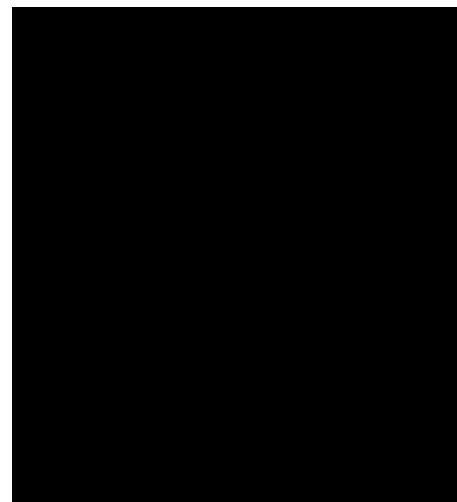


Fig. (6-B): Five-month follow up after superficial liposculpture with good tissue retraction. The excess skin in the abdomen and flanks resolved.



Fig. (7-A): Preoperative photo of a 31-year-old patient with flaccid skin and fat deposits in midthoracic region and flanks. She had inconsistent dieting and weight fluctuation.



Fig. (7-B): Nine-month follow up after superficial liposculpture with improvement of the back, waistline and flanks.

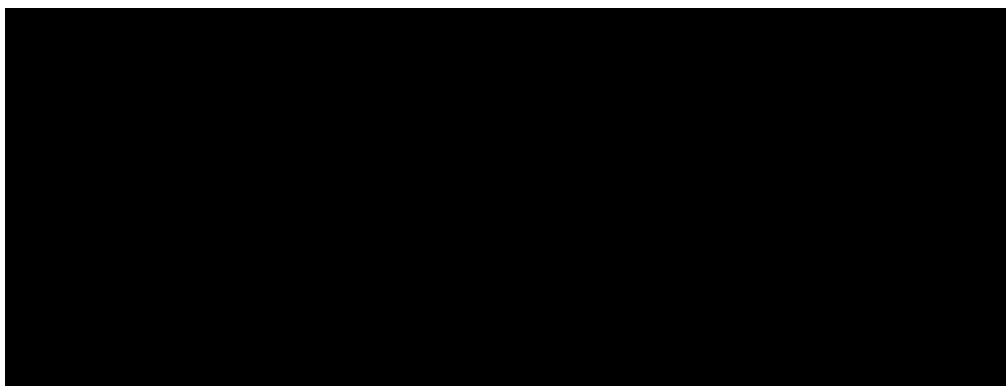


Fig. (8-A): Twenty-year old patient with flaccid skin and sagging adiposity of the arm. She did not want to have brachioplasty.

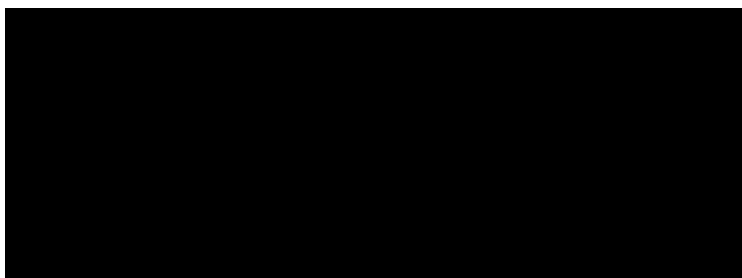


Fig. (8-B): Two years after superficial liposculpture with good tissue retraction and improvement of arm contour.

DISCUSSION

It is today taken for granted, that liposuction, now becoming sculptured enables reshaping of the body contours and volumes to give a new harmony. Many body areas, once considered as untouchable, are now accessible since liposculpture grew superficial and circular [10].

Patients often ask if they should diet first and have liposculpture after weight loss. From this series it seems that, before dieting, contour problems are evident and can be targeted selectively with liposculpture, numerical reduction of fat cells will also facilitate dieting and the reduction in measurements produced by liposculpture often stimulates the need to continue improvement in body contour with sensible dieting. Other authors

[3] also prefer to operate first, and if, after weight reduction, there are still some fat deposits, these can be treated separately under local anesthesia. Another possibility is to perform serial treatments to achieve the desired result, giving the tissues time to retract.

In large adiposities, before dieting, the fat layer is thick and fat cells are full with near maximal size. The subcutaneous adipose tissue blood flow has been found to have an inverse relationship with the thickness of the subcutaneous layer and fat cell volume [11,12]. Therefore, fat extraction in these cases is easy, bloodless with more volume of pure fat removed. Lower concentration of adrenaline will also work well. That problem areas are evident and can be treated selectively with liposculpture spares normal parts, like the face, the sequelae of severe dieting. With early treatment, skin elasticity is good with better cutaneous retraction, which is even better with superficial liposculpture, and tight skin envelope. If the patient is somewhat obese and the skin envelope is firm, liposculpture is usually all that is necessary to improve the contour of these areas [2]. On the other hand, in patients who lost some weight through severe inconsistent dieting before liposculpture, fat lobules shrink, the fat layer is somehow fibrotic, more vascular and the passage of the cannula not as easy. That is why fat extraction is a little bit difficult with bloody component and less volume of fat aspirate. Because skin tone and elasticity suffered through weight fluctuations, judicious superficial liposculpture is important in these patients to enhance cutaneous retraction.

Superficial liposculpture entails use of fine cannulas. The lamellar fat layer consists of large lobules of fat loosely packaged in poorly delimited spaces, bound by oblique fibrous septa, so the fat is easily suctioned with a 5- or 6-mm cannula. On the other hand, areolar-layer fat consists of small, well-defined lobules, firmly contained by more dense vertical fibrous septa, connected to the deepest dermic layer. This is better treated with the thinner 3- and 4-mm cannulas, which permit removal of the fat without damaging the fibrous septa, which are important elements of skin support that lead to even healing and remodeling postoperatively [13,14]. Patients who had liposculpture after some weight loss in this series required the use of fine cannulas and more emphasis on superficial layer.

The weight of the conspicuous fat deposits not only overstretches the overlying skin but also

carries it downward. If there is flaccidity and only the deep layer is treated, the area becomes heavy and irregular because the skin cannot retract uniformly. With the use of fine cannulas superficially, the thickness of the flap can be controlled to a very thin layer of fat attached to the skin. This flap should be treated carefully and secured well in its correct place. The more superficial the suction, the better the retraction, and the more even the suction the more even the retraction of the skin will be. If the suction is irregular, superficial irregularities will be created. These observations were also made in other series [3,15]. Fat injection may level an occasional or existing depression of the contour [16].

Therefore, superficial liposculpture has two goals: Reduction of the big fatty deposits and correction of the expanded skin. The amount of the resected fat is the visible resection. The to and fro movements of the cannula will devitalize a certain amount of fat that will later be resorbed by the body and eventually change the treated area: This is the invisible or biological resection. Both visible and invisible resections contribute to volume reduction. The expanded excess skin at the site of adiposity is redistributed over a wider area by discontinuous undermining outside the lipectomy area. It is important to accommodate this skin in the right place, by fixing it with adhesive dressing against the effect of gravity, till healing is complete in the new position. Peripheral mesh undermining is proportional to the amount of resected tissue and the skin tone. The larger the lipectomy and the poorer the skin tone, the greater the undermining will be; an important observation in patients with weight loss before liposculpture. One must view contiguous areas of any region of the body as a unit rather than to simply suction fat from one particular area [17]. Each area will then act as a peripheral mesh undermining to the other. The need to do peripheral mesh undermining, remodel the tissues and immobilize was also stressed in other reports [3,6]. The adhesive elastic tape, placed in multiple layers, also acts as splint to prevent echymoses, hematoma, seroma and excessive edema. Furthermore, a more regular skin surface is obtained, since the dressing creates a better distribution of the fat cells displaced by liposculpture. The Reston dressings were used in other series with a similar effect [18].

Cutaneous retraction is due to removal of the excess weight and tension within the skin envelope, which allows elastic forces of the skin to contract and also stimulation of myofibroblasts by the dermal trauma [19,20]. After liposculpture, an im-

mediate aesthetic result due to the visible resection can be seen in the adiposity. A later result also having aesthetic effects due to a change in volume is the result of the biological resection. The skin's appearance will also change because of both the contraction of the elastic muscular fibers, which is an immediate and active process and the contraction of the subjacent fibrous tissue, which is a passive and delayed contraction. So both volume reduction and the tissue reaction to superficial liposculpture contribute to contour improvement. That is why tape is kept on for 7 to 10 days and girdles, with remodeling function, for at least 3 months. Skin must be treated as a live structure that might be remodeled. Superficial liposculpture, performed in a systematic organized manner with precise and well-defined criteria, enables the remodeling of the treated area in a delicate, symmetric and harmonious form [2,21,22]. In this series superficial liposculpture has consistently enhanced achievable results, improving skin tone and body contours.

The age of the patient, inconsistent dieting and weight fluctuations, condition of the skin and thickness of the fat layer must be taken into consideration during superficial liposculpture. What matters is the relation between the skin and its content where a firm well-defined body silhouette remains the aim. From this series some observations can be highlighted: 1- Dieting has an adverse effect on skin tone and it seems that body silhouette is better after superficial liposculpture followed by sensible dieting than after drastic dieting followed by liposculpture. 2- Lipodystrophies are better treated early on with associated deep and superficial liposculpture before overlying skin tone decreases. If the patients show a good skin quality, they are more likely to obtain better results because of better cutaneous retraction. 3- By minimizing the total number of adipocytes, the remaining fat cells will be easily controlled with sensible dieting without sequelae.

Merits of superficial liposculpture are many: Better uniform fat extraction; thin less heavy skin and good skin retraction. Superficial liposculpture brings about harmonious skin retraction responsible for firmer, more gracious and lasting contour. This made liposculpture a highly refined and detailed surgery that overcomes one of the dreadful fears of liposculpture, which is skin redundancy and broadens its indications. The procedure is rapid with decreased recovery time and cost and high satisfaction for patient and surgeon alike. Many patients can now benefit from a less invasive procedure and be spared a plasty operation. Super-

ficial liposculpture is applied to every lipoplasty whenever better skin retraction is needed.

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