

Regional Distribution and Behavior of the Subcutaneous Tissue Concerning Selection and Indication for Liposuction

Juarez Avelar, M.D.

São Paulo, Brasil

Abstract. The distribution of the fat tissue in the subcutaneous layer is described. Since it has specific characteristics in each region of the human body, careful evaluation of the distribution before selecting patients for surgery is necessary. The subcutaneous tissue after an operation frequently demonstrates a thick and hard fibrosis which is evidence that liposuction should be performed in the lamellar layers. This type of fibrotic tissue in the subcutaneous areola layer often brings on irregularities and ungraceful waves on the skin surface.

Key words: Suction-assisted lipectomy — Fat tissue distribution — Subcutaneous layers — Lamellar layers — Postoperative fibrosis

Since liposuction became popularized among plastic surgeons, we started to think about the anatomy of subcutaneous tissue which has not been well described. Its distribution presents particular characteristics in each region of the human body and needs to be studied in order to employ the liposuction technique.

In order to improve our knowledge in this matter we have devoted some effort to anatomical dissections on corpses and have also performed liposuction in several regions. In a previous publication [4] on this subject we described measurements of the subcutaneous layers in all regions with respect to liposuction. We also emphasized [5] a comparison

between fat and thin people concerning thickness of the subcutaneous tissue. The scheme (Fig. 1) published in that paper [4] shows the variations of the layer's thickness of the subcutaneous adipose tissue. This segment, in children, was also described.

Adipose tissue, whether in the subcutaneous layers or in the internal viscera, stores energy in the form of fat particles within the adipose cells [8]. Obviously, the tissue's behavior varies according to the degree of nutrition and to the excess of adiposity in the organism [12]. Studying the same region in fat and thin people, we found great differences which are of concern to fat suction.

Another important role of the subcutaneous cellular tissue is to protect the body's surface, creating a smooth contour. On the other hand, this structure has a peculiar behavior in different areas where it can produce more protection in regions of attrition, as in the plantar, palmar, and digital areas. As these segments are not of interest to liposuction, they will not be studied in this article.

According to Testut [17] and Gray [8], the subcutaneous tissue is formed by two layers: one more superficial, external, and situated below the skin, the other directly beneath the first and separated from it by the fascia superficialis, including the lymphatic and blood vessels. Testut [17] classified the first layer as areolar and the second as lamellar. We have found that the areolar layer is formed by large, round, and turgid cells, piled together where small vessels pass to irrigate the skin. However, the lamellar layer presents fat cells much smaller, empty, and horizontally elongated. Thicker vessels coming from the aponeurotic plane perforate in the direction of the fascia superficialis. The connective tissue that forms the fascia behaves in a distinct manner in each region of the human body.

Address reprint requests to Juarez Avelar, M.D., Brazilian Scientific Institute of Plastic and Reconstructive Surgery, Al Gabriel M. Silva #783, CEP-01441, São Paulo, Brasil

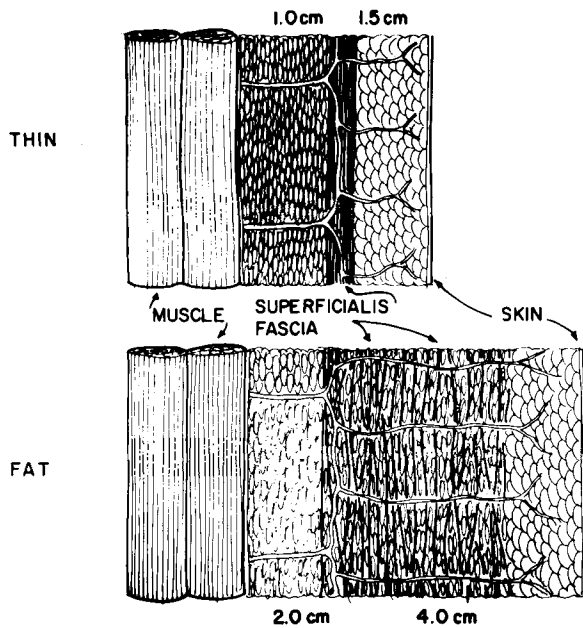
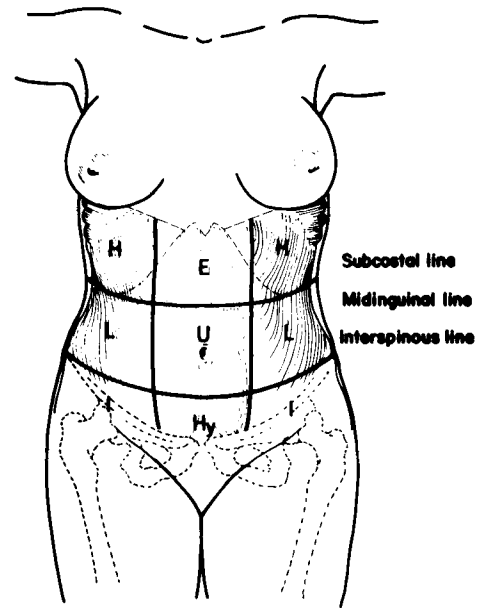


Fig. 1. Comparison of the subcutaneous panniculus between a thin person and a fat person. The fascia superficialis and lamellar layer in fat patients increases the thickness much more than the areolar layer

Abdomen

The abdominal panniculus shows a wide variety of anatomical changes which are described in detail in our previous publication [5]. The lateral regions on the right and the left (Fig. 2) do not exhibit modification on the fascia superficialis, which is isolated and very seldom presents localized adiposity (Fig. 3). However, the medial regions (supraumbilical, umbilical, and infraumbilical) are those that show deep and important alterations. The fascia superficialis in those regions presents several layers separated by adipose tissue in patients with adiposity (Figs. 1, 4). The measurement and variation of thickness of the areolar and lamellar layers are described in detail elsewhere [1, 3]. The thicker zone of the abdomen corresponds to the projection of the rectus abdominalis muscle, where the large perforating vessels are situated (Figs. 5, 6). The thickness of the lamellar layer progressively decreases on the lateral regions of the abdomen (Fig. 7). When the lamellar layer is thick, the panniculus firmly adheres to the muscular level underneath, which can also be observed through the Illouz pinch test (Fig. 8). However, in regions with a thin lamellar layer, the panniculus slides easily over the abdominal musculature (Fig. 9).

Our anatomical study of corpses has shown that after liposuction the areolar layer retains the same thickness but the lamellar layer is reduced by aspi-



- H - Hypochondriac region
- E - Epigastric
- L - Lumbar
- U - Umbilical
- I - Inguinal
- Hy - Hypogastric

Fig. 2. The nine regions of the abdomen: 3 odd—epigastric, umbilical, and hypogastric; 3 even—hypochondriac, flank, and inguinal

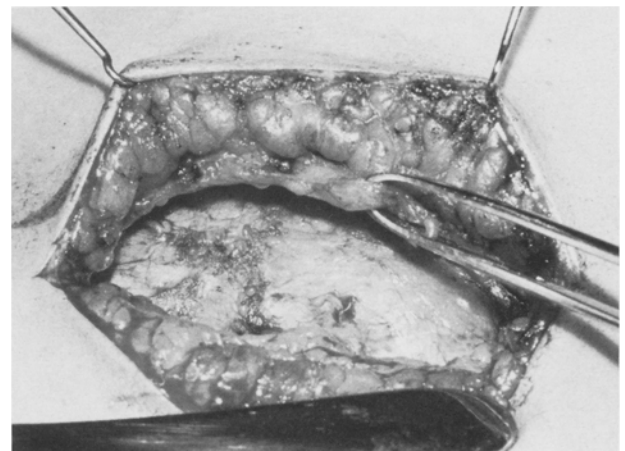


Fig. 3. Photo during operation showing the panniculus on the right hypochondriac region in a 12-year-old boy. The forceps hold the fascia superficialis and the lamellar layer which is very thin. The areolar layer above is much thicker

ration of the adipose tissue (Fig. 10). The fascia superficialis shows several layers that make a network with the vessels included (Fig. 11). Therefore,

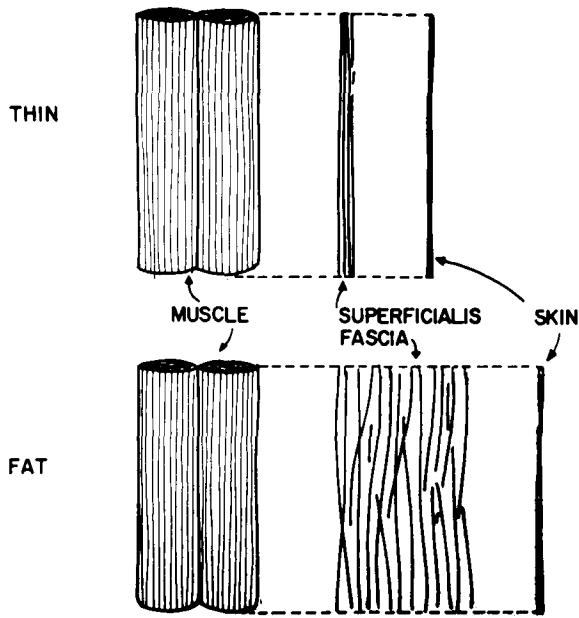


Fig. 4. Diagram of the subcutaneous panniculus showing the difference between the fascia superficialis in a thin person and a fat person

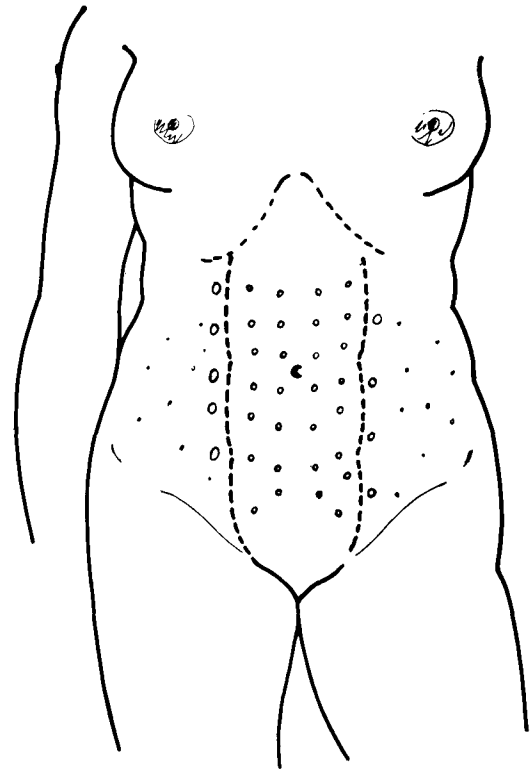


Fig. 6. Drawing showing the perforating vessels from the aponeurotic plane to the panniculus. They are mostly below the projection of the rectus abdominalis

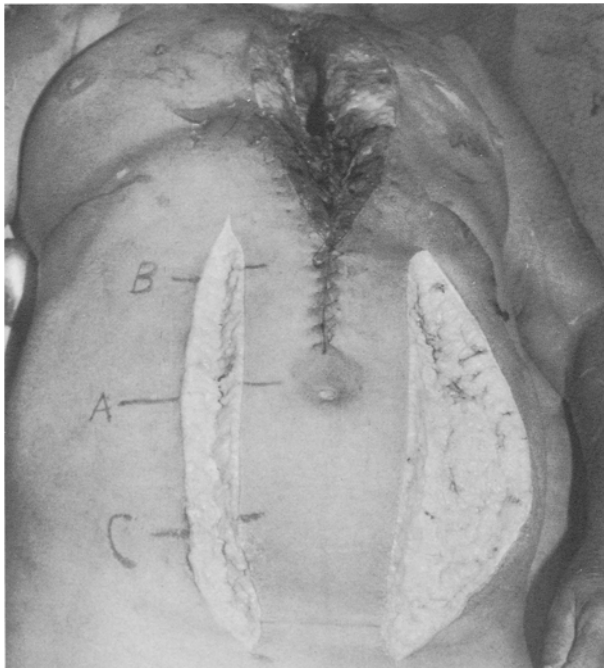


Fig. 5. Photo of a corpse showing the abdominal wall. Fat suction was performed on only the right side of the abdomen. The difference in thickness between both sides is seen

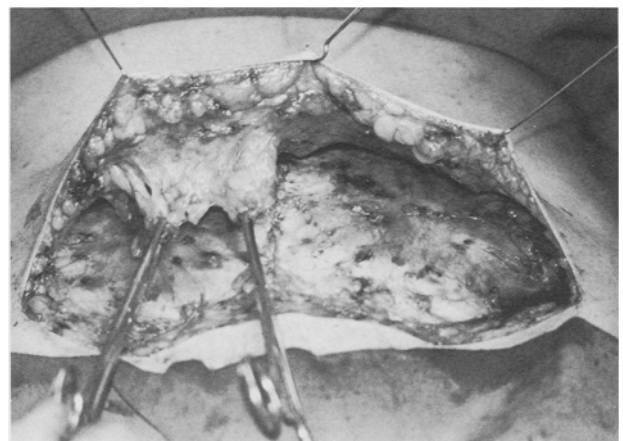


Fig. 7. Photo during operation showing the panniculus of the abdomen. The forceps are holding the lamellar layer on the right side of the patient. The left one was already resected. The fascia superficialis can be seen on left side

the final result in patients is a lamellar layer devoid of adipose tissue. The cicatricial tissue was studied by Baturia et al. [6] who performed liposuction six months before conventional abdominoplasty. The

behavior of the subcutaneous tissue is evidenced by the thick layer of cicatricial tissue (Figs. 12, 13). Also, the perforating vessels are not damaged by the cannula during liposuction (Fig. 14). The areolar layer is preserved in all its thickness. If it is damaged during fat suction, the scar tissue will cause

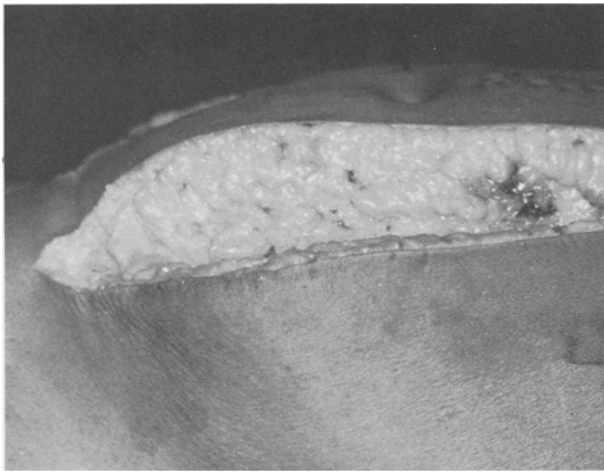


Fig. 8. Photo showing the left side of the abdominal panniculus of a cadaver without fat suction. One can see that the thickness is increased by the lamellar layer

irregularity below the skin producing waves on the surface.

On the other hand, to perform a second fat suction on the same region is a very difficult procedure and should be done carefully. The hard thickness of the cicatricial tissue does not allow the cannula to cross through it (Fig. 12). It is also dangerous because the second stage may damage the areolar layer resulting in irregularities on the skin surface.

In conclusion, we emphasize that fat suction should be done on the deep layer (lamellar) keeping the thickness of the areolar layer intact. The final result shows the relief of the abdominal musculature through the cutaneous panniculus, which means a natural and harmonious contour.

Torso

The posterior wall of the trunk benefitted greatly with the advent of liposuction for the treatment of localized adiposity. Conventional procedures leave unbecoming and unesthetic scars, which has not encouraged plastic surgeons to treat those deformities.

The classic anatomy described by Sobotta [15] and Spalteholz [16] classified the regions of the torso according to the musculature. From the surgical point of view we suggest dividing the torso into nine regions (Fig. 15): three even on two sides (scapular, lumbar, and suprailiac) and three odd (sacral, vertebral, and interscapular). The even regions of the torso present a close relationship to the lateral areas of the abdomen. In fact, they are a continuation from the front backward. For this reason plastic surgeons must examine the torso every time a patient complains about any problem on the ab-

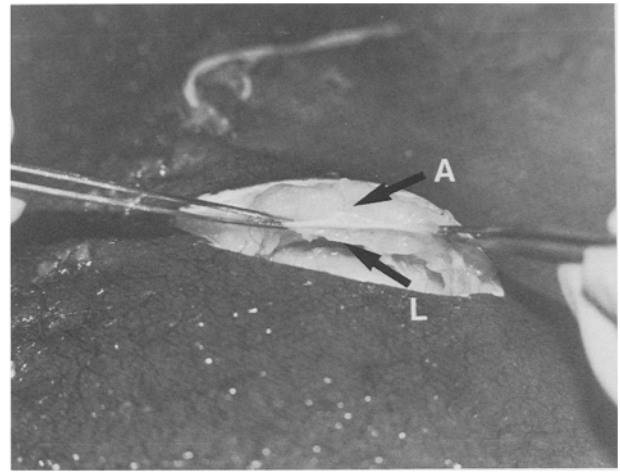


Fig. 9. Anatomical dissection showing the thickness of a thin cadaver. This is a horizontal incision on the projection of the rectus abdominis left of the umbilicus. The forceps are holding the fascia superficialis. Arrow **A** shows the areolar layer; arrow **L** shows the lamellar layer

dominal wall. On the other hand, the abdomen must be evaluated when the problem is on the torso (Figs. 2, 15).

Usually all regions of the torso present a similar constitution in both cutaneous and subcutaneous tissue. The skin shows a thick and firm areolar layer which is described elsewhere [4], and the lamellar layer is much thinner. However, in those patients presenting localized adiposity, there is a considerable growth of the lamellar layer which is responsible for the deformity of the body's contour.

The first region of the torso is the suprailiac region which the most frequent site of adipose tissue accumulation in both men and women.

As the panniculus is very thick, liposuction gives excellent, smooth results, as long as the indication is correct and the operation is performed properly. The lamellar layer shows increased thickness in cases of localized adiposity.

The second area of the torso is the lumbar, immediately above the first one. It very seldom shows accumulation of adiposity for treatment by liposuction. Often problems on the suprailiac region appear because of the lumbar region. However, the anatomical constitution of the lumbar presents a very thin lamellar layer which does not increase in thickness as much as on the suprailiac region.

The third area of the torso to present accumulation of fat is the scapular. The thickness of the lamellar layer increases greatly and often one can observe asymmetry of the sides. The areolar layer shows some alterations but never as much as the lamellar layer. When the lamellar layer shows localized adiposity, the subcutaneous panniculus is firm and does not slide easily over the muscular plane.

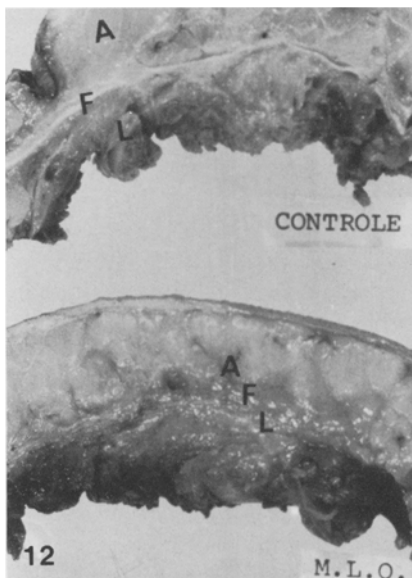
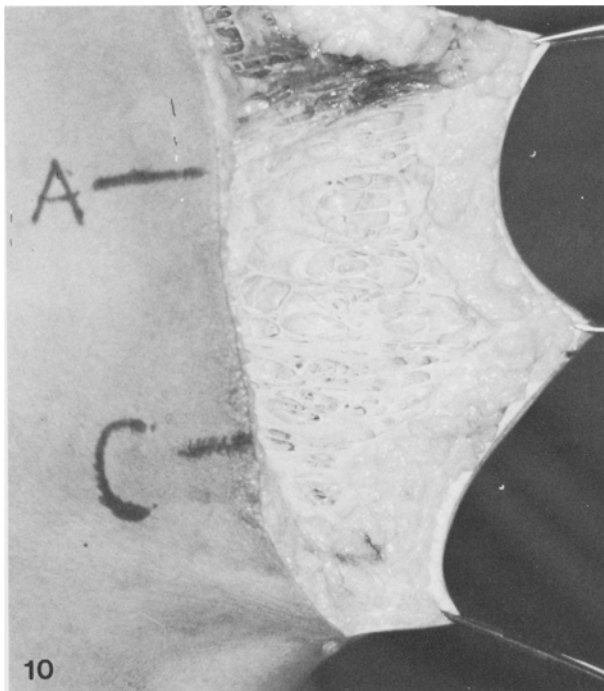


Fig. 10. Photo showing the panniculus on the right side of the same corpse on Fig. 8 after fat suction. One can see the remaining tissue on the fascia superficialis of the lamellar layer

Fig. 11. Closeup of the remaining connective tissue after removal of fat cells through liposuction

Fig. 12. Photos of the panniculus of the abdomen. **(Top)** Subcutaneous tissue in thin abdomen without liposuction. The fascia superficialis (F) is very thin and well defined. The areolar layer (A) is regular without any alteration. The lamellar layer (L) is very thin without any adiposity. **(Bottom)** Panniculus of an abdomen which underwent liposuction six months before. The areolar layer (A) is regular with its normal adipous tissue. However, the fascia superficialis (F) and lamellar layer (L) are mixed up due to the trauma produced by the cannula. The thickness of the scar tissue developed after liposuction (Photo was kindly given by Batuirra and Callia)

The Illouz pinch test shows an increase in the overall thickness of the subcutaneous panniculus layer.

The fourth region is the interscapular, which is even firmer, more resistant, and more adherent than the previous areas. It is also a region where one may encounter an increase in both lamellar and areolar layers to the same extent. Whatever surgical procedure is performed, it must be carried out at a very deep level in an attempt to preserve the areolar layer and the cutaneous surface.

The sacral region, the fifth region to present localized adiposity, is located on the sacre bone between the suprailiac regions on right and left. Liposuction

surgery gives good results. We have seen no localized adiposity on the other dorsal regions, therefore, they show no anatomical singularity on the subcutaneous layers.

Trochanteric Regions

Trochanteric lipodystrophy is one of the most frequent deformities in the subcutaneous cellular compartment and an important anomaly in the body contour [10]. The lipectomy technique described by Pitanguy [14] was useful for removing localized adi-

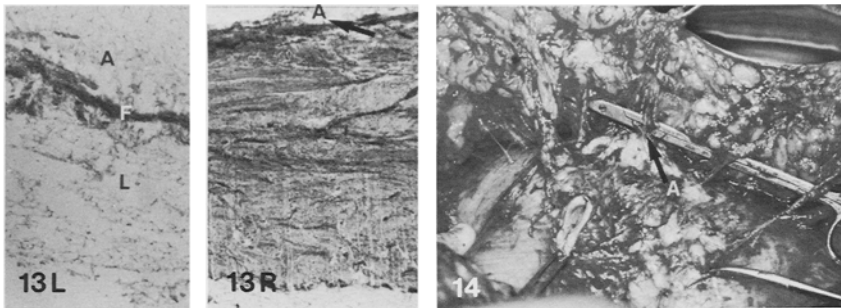
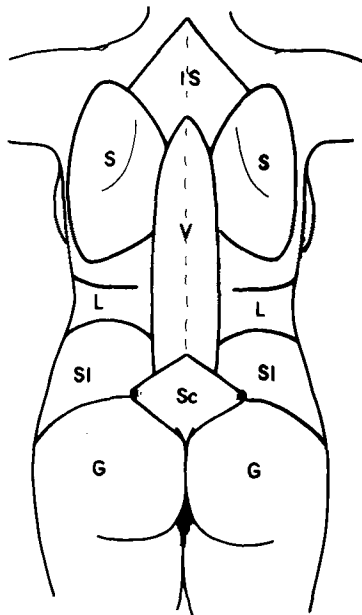


Fig. 13. Two microscopic photos showing the fascia superficialis. **(Left)** Taken from the panniculus shown at the top of the Fig. 12. The fascia (F) is darker with its connective tissue separating the areolar layer (A) above and the lamellar layer (L). **(Right)** One can see the fascia superficialis of the panniculus shown on the bottom of Fig. 12. The fascia is very thick, rich in connective tissue and collagen after removal of the adipous tissue from the lamellar layer. One can see the areolar layer (A) on the upper border of the photo showing that it was not damaged by the liposuction. Both photos were taken at the same magnification ($\times 40$). (photos were kindly given by Batuirea and Callia)

Fig. 14. Photo during adominoplasty in a patient who underwent liposuction six months before. Arrow A shows the perforating vessels preserved by liposuction



IS - Interscapular	region
S - Scapular	"
V - Vertebral	"
L - Lumbar	"
SI - Suprailiac	"
Sc - Sacral	"
G - Gluteal	"

Fig. 15. Nine regions of the torso: 3 even—interscapular, vertebral, and sacral; 3 odd—scapular, lumbar, and suprailiac

posity on the trochanteric regions. However, nowadays liposuction is the first choice for the treatment of such a problem [11].

Our anatomical dissections show that the lamellar

layer undergoes strong alterations, with accumulation of adipous cells making the panniculus very heavy. Normal people without localized adiposity show good proportion between the areolar and the lamellar layers.

Heavier patients without localized adiposity in this region show proportional augmentation on both layers keeping a well-balanced shape in the body contour. However, when there is localized deformity, it may be caused by excessive augmentation of the lamellar layer which can be 8–10 times thicker than in normal people, while the areolar layer only doubles in thickness. Therefore, liposuction treatment must be employed very deeply while respecting the 3-cm-thick panniculus of the areolar layer (compared with the abdominal region—2 cm), which should be preserved all over the region in order to obtain a harmonious and esthetic result. Nevertheless, the trochanteric region is not clearly delimited with the external surface of the thigh. Clinical examination should be done carefully in order to establish deep accumulation of fat tissue, as suggested by Fournier [7].

It is very useful to mark the localized adiposity before operating.

Gluteal Region

According to Illouz [9, 10] and emphasized by Fournier [7], the medial segment of each buttock must be respected during fat suction. Illouz called this area the “Bermuda Triangle” with the superior vertex being the sacral region and the base is formed by the buttocks’ sulcus. He mentioned that it is important to consider the middle segment of the buttocks in

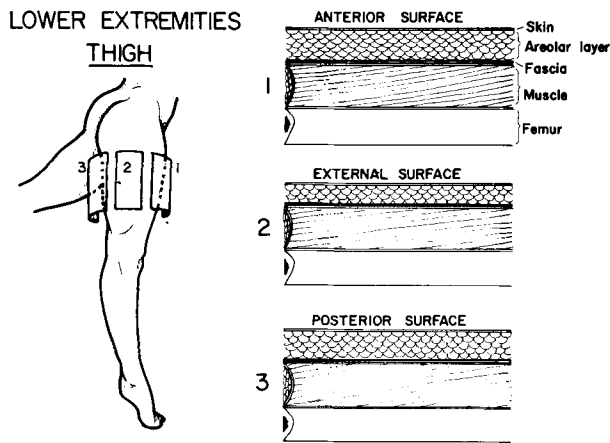


Fig. 16. The three surfaces of the thigh: anterior, external, and posterior. The thickness of the areolar layer is less on the external surface than on the anterior and the posterior. The lamellar layer does not exist

order to obtain good esthetic results. This region has smooth prolongation to the trochanteric region. Very often the gluteal sulcus does not have good definition and should be marked during the operation.

The subcutaneous tissue has peculiar characteristics, including a very thick panniculus. The areolar layer is thicker here than in any other region of the body. The lamellar layer is also thick, even in normal patients without localized adiposity. Liposuction gives good results when it is done correctly on the lamellar layer. Clinical examination is very important in order to certify the difference between localized adiposity and gluteal muscular hypertrophy, as recommended by Fournier [7]. Sometimes hypertrophy is associated with ptosis which helps in identifying hypertrophy.

Lower Extremities

Although liposuction should be a very good technique in the treatment of lipodystrophy in the lower extremities, it should not be used because the lower extremities do not have adequate anatomical and histological characteristics. Testut [15] divides the thigh into two surfaces: anterior and posterior. However, we suggest four surfaces: anterior, posterior, external, and internal (Fig. 16).

Anterior Surface of the Thigh

The anterior surface of the thigh is extensive and a more or less regular region. The skin is thick and adheres firmly to the subcutaneous layer which

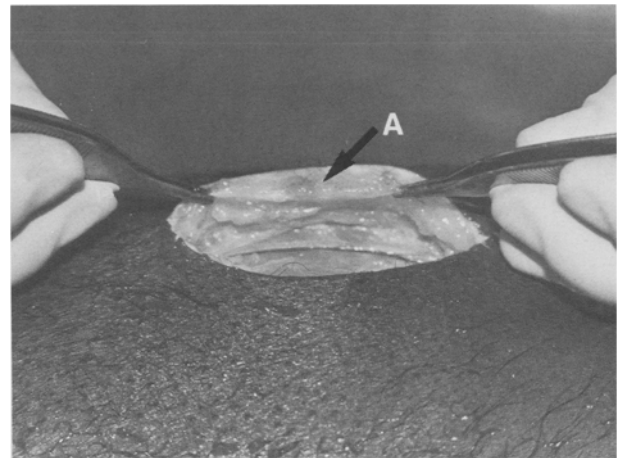


Fig. 17. Anterior surface of the thigh on a cadaver. The forceps are holding the fascia superficialis. The muscular aponeurosis is underneath the fascia. Arrow A shows the areolar layer

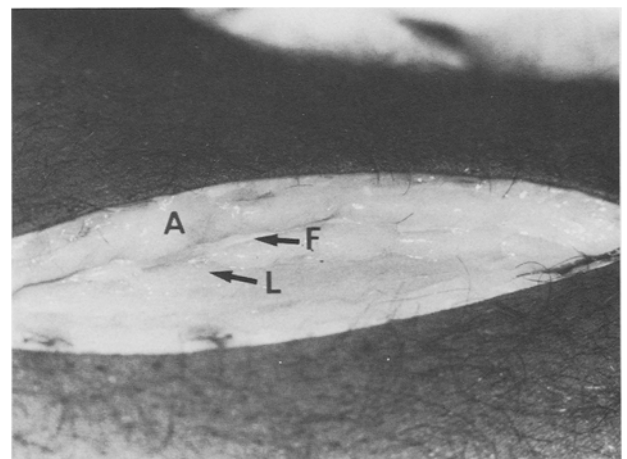


Fig. 18. Anterior surface of the thigh. The areolar (A) and lamellar (L) layers are separated by the fascia superficialis (F)

slides as a block over the muscular aponeurotic plan (Fig. 17).

The subcutaneous panniculus has well-established and peculiar characteristics differing from other regions. The areolar layer occupies almost the entire thickness of the subcutaneous segment, with round and turgid cells that adhere firmly to the cutaneous tegument. Thus, the lamellar layer is practically nonexistent in thin patients. The fascia superficialis is underneath the areolar layer and above the aponeurosis muscle (Fig. 18). There is a small number of perforating vessels.

According to our anatomical findings, we have concluded that this region is formed only by the areolar layer in its total extension, even in those patients with a larger amount of localized adiposity.

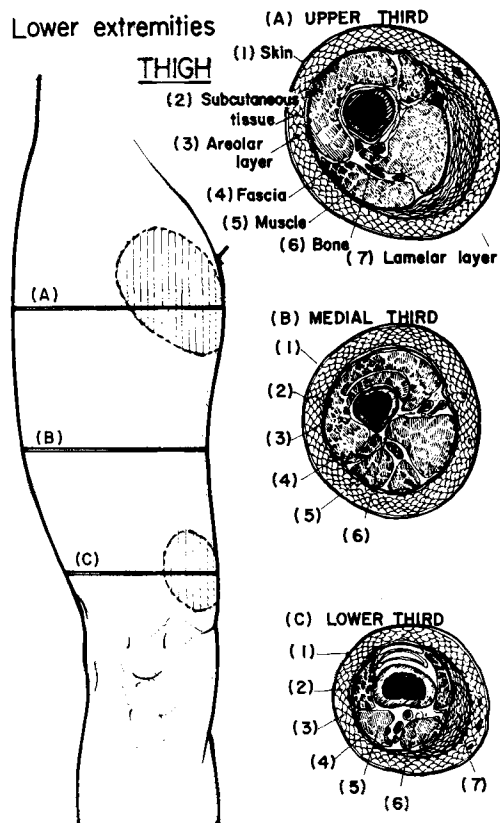


Fig. 19. Internal surface of the thigh. The upper and lower third present thick lamellar layer as shown in sections A and C. Section B shows the middle third which does not have a lamellar layer

The cutaneous and subcutaneous panniculus slides easily over the region and can be estimated by the Illouz pinch test. For this anatomical reason this region is not a good candidate for fat suction. Lesion of the adipous tissue of this layer leads to irregularities reproduced on the cutaneous surface and consequently may cause unsightly waves.

It is very common for patients to complain of "cellulitis" in this region. Actually, this term is used incorrectly by the layperson, since there is no inflammation of the cells. The skin becomes irregular, frequently looking like the skin of an orange and sometimes with more pronounced depressions. The cutaneous retractions are due to the connective tissue which does not expand as much as the volume of adipous cells in the subcutaneous layer. The ideal treatment would be to decrease the number of fat cells, but this is difficult when using fat suction tunnel technique.

External Surface of the Thigh

This area is similar to the anterior one, but the areolar layer is thinner and the lamellar layer does not exist. The fascia superficialis is between the areolar

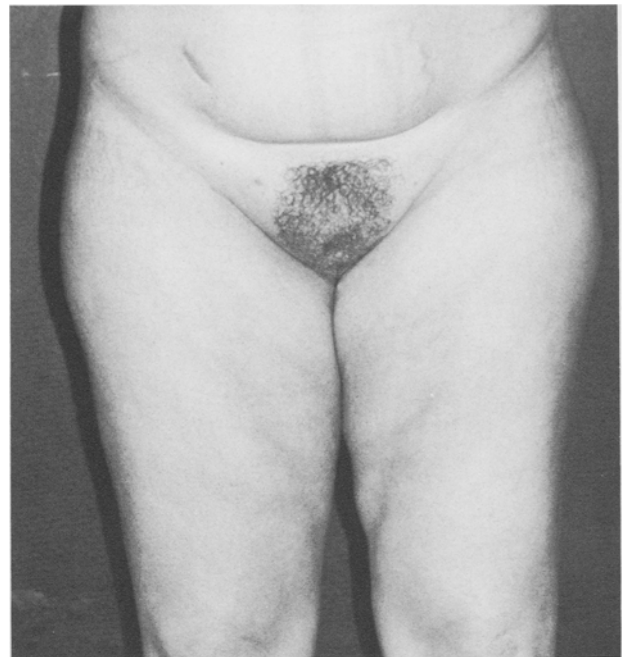


Fig. 20. Front view of a patient presenting local adiposity on upper third of the thigh

and the aponeurosis. For this reason the panniculus slides on the muscular level.

Posterior Surface

The posterior surface has the same anatomical and histological distribution as the anterior surface. Therefore, on both the external and the posterior areas, as well as the anterior, liposuction should not be performed.

Internal Surface

This area may be divided in three segments: upper, lower, and middle (Fig. 19). The upper third has very thin skin and a soft aeolar layer, which is also thin. The lamellar layer is present even in thin patients. With the Illouz pinch test one may observe the lamellar layer (Figs. 20–22). In patients with localized adiposity the lamellar layer becomes very thick while the areolar retains its same thickness. This region is a good candidate for liposuction. We observed excellent results in patients with localized adiposity, which usually shows clear demarcations on the thigh.

Localized adiposity is frequently found in the lower segment of the thigh and is a good region for liposuction. Due to its histological and anatomical characteristics, this segment yields good esthetic results with liposuction. The skin accomodates and



Fig. 21. Illouz pinch test showing localized adiposity on the upper third of the thigh of patient in Fig. 20

does not increase the typical flaccidity of the region (Fig. 18).

The medial third of the internal surface is similar to the external and posterior surfaces of the thigh. The lamellar layer is almost absent; therefore, it is not a good area for liposuction.

Knees

From the surgical point of view, only the internal face of the knee can be considered for fat suction. The skin of the region is thin and soft. The areolar as well as the lamellar layer may be thin in patients without localized adiposity, but the lamellar may increase in thickness yielding an unsightly appearance. The determining factor for the thickness of these layers is the accumulation of fat in the lamellar layer. Liposuction may produce good results on this region.

Legs

The legs are perhaps the segment where localized adiposity is less frequent, although it may be responsible for deep psychological scars when it occurs.

Unfortunately, the legs are not a good area for fat suction because of the poor subcutaneous cellular tissue. On the anterointernal surface the skin is attached directly to the bone. The anteroexternal surface has a strong musculature covered by firm and thick skin and a thin layer of subcutaneous tissue formed by the areolar tissue. The superior part of the posterior surface is made of voluminous muscles and is not indicated for surgery according to Illouz' description [10, 11]. The inferior part may have adiposity with serious esthetic defects. For this reason the physical examination must be thorough in searching for semiotic values capable of measuring the respective layers.



Fig. 22. The same patient in Figs. 20 and 21 does not present any adiposity on the middle third of the thigh with the Illouz pinch test

The subcutaneous layers are normally inexpressive, but when there is excessive adipous tissue the lamellar layer is hypertrophic, increasing the thickness. The treatment must be deep but carefully done near the aponeurotic plane.

Upper Extremities

Arms

The upperarm is the only part of the upper extremity that is a candidate for fat suction. The classic anatomy of Testut [17] divides the arm into anterior and posterior sections. However, according to anatomical findings, we suggest dividing it in four regions: anterior, external, internal, and posterior (Fig. 23).

Posterior Surface

With respect to liposuction, the posterior surface of the arm should be discussed. The areolar layer, as well as the lamellar, is very thin in normal people without localized adiposity (Fig. 24). Nevertheless, patients with such an abnormality may present enough accumulation of fat for liposuction. However, it yields poor results and use of the technique should be considered carefully.

Submandibular and Submentonian Regions

Anterior Surface

Although the fat suction technique is a very good procedure for removing fat, we do not recommend

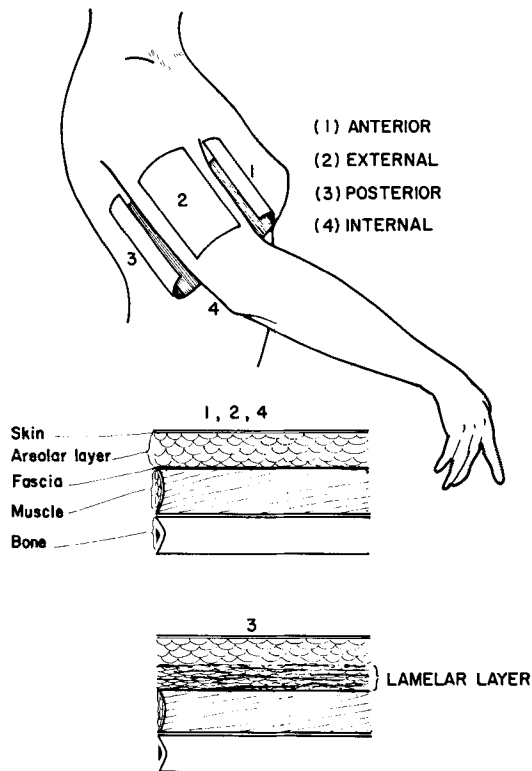


Fig. 23. Scheme of the upper extremity showing the regions of the arm. The posterior surface has a thin lamellar layer which may accumulate adipous tissue

its use on the face [2]. The scar tissue resulting from liposuction may produce waves and other irregularities on the skin surface. Besides being unsightly, it is very difficult to correct them [13]. We have seen some patients who were treated by this technique and had irreparable damage.

On the other hand, the submentonian and submandibular areas are histologically different which holds up well throughout the liposuction procedure.

In patients with localized adiposity, the fascia superficialis forms an intrinsic network in the entire area between the skin and the platism muscle. The areolar and lamellar layers almost join to form one element of similar structure. In people without localized adipous accumulation, adiposity may be diffuse along the lateral walls of the neck. In this case the lateral aspect of the neck should also be treated in order to obtain a natural and harmonious contour of the face and neck.

Discussion

The behavior of the subcutaneous tissue in patients with localized adiposity is clearly different from one region to another. The lamellar layer increases in thickness due to the accumulated fat. The areolar

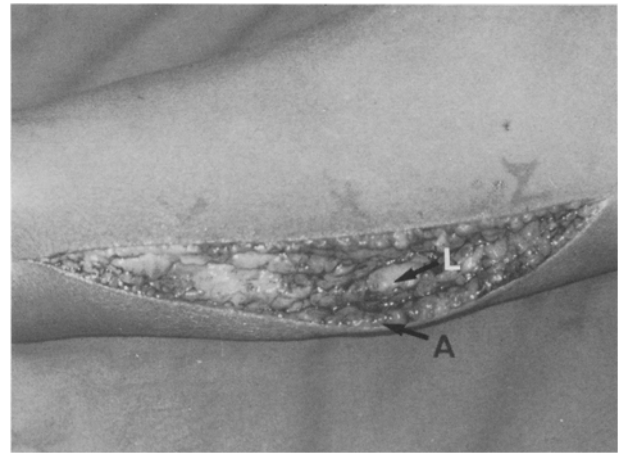


Fig. 24. Photo showing the posterior surface of the arm on a cadaver without localized adiposity. Arrow A indicates the areolar layer, F is the fascia superficialis, and L is the lamellar layer

layer does not change in thickness as much as the lamellar. With the Illouz pinch test it is possible to estimate the thickness of the panniculus as well as the presence of a thick lamellar layer. The panniculus slides over the aponeurotic layer. When this layer is thick the panniculus does not slide because of the numerous perforating vessels.

Classic anatomy does not describe in detail the subcutaneous tissue over the entire human body. Since the liposuction technique works on subcutaneous tissue, we studied the thickness and distribution of the adipose tissue in all regions with respect to the technique. The tissue's characteristics vary widely from region to region. One region may vary from person to person depending on the degree of nutrition.

In our previous publication [5] we came to some conclusions, which are repeated here:

(1) The areolar layer is more resistant and is responsible for terminal vascularization of the skin.

(2) The lamellar layer has a greater number of connective tissue layers forming trabeculas through which larger vessels pass, giving softness to the tissues.

(3) Regular thickness of the areolar layer must be preserved, since traumatism or aspiration of the local tissue causes cutaneous depressions.

(4) The lamellar layer is the region that can be aspirated. The larger vessels do not suffer the local effects caused by traumatism of the cannula.

(5) In regions of thin skin the cannula can be used superficially provided regularity is maintained.

(6) In regions of thick and firm skin, fat suction has to be deeper, leaving more thickness in the dermo-fat flap.

Summary

The distribution and characteristics of fat tissue on the subcutaneous layer have been described.

Careful selection of patients and evaluation of the region of treatment before surgery is recommended. The subcutaneous tissue after operation shows thick and hard fibrosis indicating that liposuction should be performed on the lamellar layer. This sort of fibrotic tissue on the areolar layer will cause irregularities and unsightly waves on the skin surface.

References

1. Avelar JM: Fat-suction versus abdominoplasty. *Aesth Plast Surg* **9**:265-276, 1985
2. Avelar JM: Fat-suction of the submental and submandibular regions. *Aesth Plast Surg* **9**:257-263, 1985
3. Avelar JM: Combined liposuction with traditional surgery in abdomen lipodystrophy. XXIV. Instructional Course of Aesthetic Plastic Surgery of the ISAPS. Madrid, September 19, 1985
4. Avelar JM: Anatomia cirúrgica e distribuição do tecido celular no organismo humano. *Lipoaspiração* **9**:45-57, 1986
5. Avelar JM: Study of the anatomy of the subcutaneous adipous tissue applied for fat-suction technique. In Maneksha RJ (ed): *Trans IX Int Congr Plast Reconstr Surg*. New Delhi, India, March 1-6, 1987, pp 377-379
6. Baturra AT, Callia W, Villano JB, Fauze JS, Zantut Pec, Souza AM: Comportamento do tegumento dermo-adiposo pós lipoaspiração. XXI Congr Brasil Cir Plást, 1984
7. Fournier P, Otteni FM, Avelar JM: Introdução ao Estudo da Semiologia estética do corpo. *Lipoaspiração* **12**:73-79, 1986
8. Gray H: *Anatomy, descriptive and surgical*. Philadelphia: Running Press, 1974
9. Illouz YG: My technique of suction lipectomy. Meeting of the American Society of Aesthetic and Plastic Surgeons and Instructional Course, April 1983
10. Illouz YG: Body contouring by lipolysis: 5 years experience with over 3,000 cases. *Plast Reconstr Surg* **72**(5):591-597, 1983
11. Illouz YG: Princípios básicos da técnica de lipoaspiração. *Lipoaspiração*. São Paulo: Editora Hipócrates **3**:13-18, 1986
12. Illouz YG: Estudo do adipócito nas lipodistrofias. *Lipoaspiração*. São Paulo: Editora Hipócrates **4**:19-23, 1986
13. Illouz YG: Tratamento do envelhecimento da face com recurso da lipoaspiração. *Lipoaspiração*. São Paulo: Editora Hipócrates **33**:226-231, 1986
14. Pitanguy I: Trochanteric lipodystrophy. *Plast Reconstr Surg* **34**:280, 1964
15. Sobotta, Figge: *Atlas of human anatomy*. Baltimore: Urban & Schwarzenber, 1977
16. Spalteholz W: *Atlas de anatomia humana*, 5th ed. Espanha: Editora Labor, 1970
17. Testut L, Jacob O: *Tratado de anatomia topográfica*. Barcelona: Salvat Editores, 1975