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Circumferential Thigh Lift: Merits and Pitfalls

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ABSTRACT

Thigh lift is a procedure which contours the thighs. For many decades, thigh lift was limited to the medial thigh skin excision. Circumferential thigh lift is a technique which addresses the skin redundancy at the anteromedial, lateral, and posterior thigh. This study was conducted for twenty patients. Thirteen patients had severe skin redundancy of the thighs after massive weight loss following a successful bariatric surgery. Seven patients had obese thighs with overlying excess skin. Circumferential thigh lift was done for all patients with liposuction when needed. Seventeen patients were satisfied with the results. Three patients developed seroma, two patients developed scar widening and migration, and one patient developed infected hematoma at one side. The study presented the merits and pitfalls of the circumferential thigh lift and the precautions to be taken to achieve a good and safe result.

INTRODUCTION

Obesity and dysmorphia of the thighs has tested the skills of plastic surgeons for decades. Patients with localized fat accumulations often desire removal for aesthetic reasons, whereas patients with large, especially circumferential, accumulations desire removal for functional as well as aesthetic reasons. The loss of excess fat from the thighs either after massive weight loss or after liposuction usually leads to a severe redundancy and sagging of the skin. Hoffman and Simon described these thighs as heavy fatty thighs, trochanteric lipodystrophy, medial skin redundancy and cellulite **[1]**. For aesthetic and functional reasons, thigh lift was invented which addresses these problems.

The anatomy of the skin and subcutaneous tissue of the thigh varies greatly. The skin overlaying the greater trochanter is thick but with less subcutaneous fat. It is densely adherent to the deep tissues and is recognized as an area that may need to be released during thigh lifts **[2]**. The posterior thigh, inferior to the buttocks, is composed of the hamstring muscles and a more diffuse layer of overlying fat. When enlarged, it is usually part of a pattern of diffuse obesity of the thigh. The anterior thigh contour consists of the quadriceps muscle group and a diffuse, rather than defined and delimited, layer of fat. In all of these areas there are both a subcutaneous layer and deeper subfascial layer of fat **[3]**. The medial or inner thigh takes its shape from the abductor muscles and a layer of subcutaneous fat with no real subfascial component. The skin here is also quite thin and subjected to more redundancy compared to the rest of the thigh **[4]**.

Thigh lift remained virtually unchanged until Lockwood described the superficial fascial system (SFS) of the abdomen and thigh. He studied the anatomy of the SFS in 12 cadavers and in 20 patients. He found that the SFS consists of horizontal fascial sheaths separated by fat that are interconnected by vertical fibrous septa **[5]**. According to Lockwood, its function is to encase, support, and shape the fat of the trunk and extremities and to hold the skin onto the underlying tissues. The surgical manipulation of this system allows more aggressive lifting by increasing the pulling power of the deep soft tissues and decreasing the tension on the skin. Lockwood also describes the "zones of adherence" that must be released to achieve a more normal appearance **[6]**.

Over the years, thigh lift has evolved from variations on this theme. Lewis first described the circumferential excision of thigh skin and fat with a vertical closure **[7]**. Farina performed direct lateral excision that, while improving the contour of the lateral thigh, produced huge, highly visible scars **[8]**. Pitanguy was the first to describe a thigh lift incision that was hidden within the bathing suit line **[9]**. This resection also was the first to address inner and outer thigh skin and fat excess and to correct buttock ptosis.

Major variations dealt with the location of the posterior scar. Baroudi kept his posterior incisions low **[10]**. Regnault et al., brought the incision higher, onto the buttock **[11]**. Grazer and Klingbeil raised

the incisions to the level of the mid buttock to conceal the scar beneath normal clothing [12].

Circumferential thigh lift has the merits of good contouring of the thigh with the excision of as much redundant tissue as possible. Furthermore, the scar of the circumferential thigh lift runs in the natural creases either anterior in the groin or posterior in the inferior gluteal crease. However, the pitfalls of this technique include wound dehiscence, scar widening and scar migration due to the effect of downward tension, hematoma, seroma, and sensory nerve damage [13,14]. Groin lymphoceles and lymphorrhea are rare complications of thigh lift and the incidence increases with the circumferential technique [15,16].

This clinical study was designed to evaluate the merits and pitfalls of the circumferential thigh lift and to improve the outcome of the technique.

PATIENTS AND METHODS

This study included twenty patients who had severe skin sagging and redundancy after massive weight loss following bariatric surgery (n. 13) or moderate redundancy of the skin with excess fat (n. 7). The age of the patients ranged from 21 to 33 years with an average age of 26.5 years. The study was conducted in Alsalam International Hospital, state of Kuwait, from May 2008 till December 2009. The average of follow-up period was six months. Post-bariatric patients were operated after 18 months of the bariatric surgery. The obese thighs were operated after a procedure of massive liposuction of the thighs three months before the thigh lift procedure. The total body weight of the patients ranged from 63 to 94 Kilograms. Thigh lift was a part of combined body contouring surgeries in 11 patients, and a single procedure in 9 patients.

The patients were subjected to physical examination which included the examination of the patient in the standing position to evaluate the degree of skin redundancy and assess the amount of the skin which can be excised. Examination of the skin elasticity and tone was performed.

Before surgery, full laboratory blood examination was done specifically for complete blood picture, blood sugar, bleeding profile. The night before the surgery, all patients were receiving a routine intravenous one gram third generation cephalosporin.

Marking of the patient was carried out while the patient in the standing position (Fig. 1A,B). A line was drawn within the groin crease starting from posterior superior iliac spine and runs downward within the groin crease and extends medially within the natural crease simulating the line of bikini. Pulling up of the skin of the thigh was performed and a preliminary level of excision line was marked. Areas of excess fat accumulation were marked for liposuction.

Posterior, the marking was carried out by extending the line within the inferior gluteal crease and it ends laterally at the end-point of the crease. Again, the inferior line of excision was extending posteriorly while lifting up the skin of the posterior thigh by the surgeon's left hand. The areas of excess fat in posterior thigh and trochantric areas were marked for liposuction.

All patients were operated upon under general anesthesia. After induction of anesthesia, co-band pressure bandage was wrapped both legs. Both thighs were scrubbed with 5% betedine solution and wrapped with sterile towels to facilitate their manipulation during surgery. The procedure was beginning in the supine position to perform the anteromedial thigh lift followed by the posterior thigh lift in the prone position.

Surgical technique:

Liposuction was started in the areas of excess fat. Superwet technique was used which constituted 1:500 000 saline adrenaline. Liposuction cannula (size 3 and 4) were used to perform a deep and superficial liposuction.

The surgical procedure was started by flexing the hip and pulling the skin of the anterior and medial thigh up and the amount of excess skin was estimated and a more precise marking of the inferior incision line was marked. Incision was carried out though the groin line starting from the posterior superior iliac spine and extended medially beyond the labia to reach the upper medial thigh. The cutting and dissection was continued by the electrocautary using the fine Colorado needle. Dissection was carried out in the subcutaneous plane and undermining was continued 10 centimeters below the predetermined line of excision. A final marking for the line of excision was done that insure moderate tension on the skin. At this stage, an excision of the excess skin was carried out from lateral to medial meanwhile, a stay tension sutures were taken at equal distances.

Two stitches of proline 2/0 were taken to lift, and suspend the lower flap and fix it to the upper medial flap. These stitches were taken into the

deep fascia of the lower skin flap and tucked to the periosteum of the pubic bone. The wound was then closed in layers. Vicryle 2/0 was used to suture the deep layer, vicryle 3/0 for the subcutaneous layer, and monocryle 3/0 for the intradermal skin closure. At the end of this stage, the excised skin became attached medially on both sides. These skin flaps were wrapped in sterile towel. The wound was temporarily covered with occlusive opsite sheet. The patient was then turned to the prone position.

While the patient was in the prone position, incision was made in the marked inferior gluteal crease. Dissection with electrocuatary was carried out subcutaneously. Undermining was accomplished 7 centimeter beyond the predetermined line of excision. Once again, excision of the flap was carried out while stay tension stitches were taken at equal distances. After complete excision of the flap, the wound was closed in layers as the anterior wound. Care was taken not to humiliate the deep fascia of the thigh. Two suction drains were inserted for each thigh; one drain was lift in the anterior wound and the other drain in the posterior wound. The excised skin was weighed and recorded and was compared with the weight of the skin excised from the other thigh. Brown steristrips adhesive plaster was applied across the wounds to minimize the tension on the wound. All wounds were dressed by opsite sheets. Pressure garment was worn before the recovery from anesthesia.

Postoperative care:

All patients were instructed to lay supine and semi setting in bed for the first 48 hours, with flexion of the hips and knee. A soft pillow was applied under the knee. At the next day, Ambulation was encouraged after removal of the pressure co-band. Urinary catheter was removed. The average hospital stay was two days.

RESULTS

The study was conducted to twenty patients. All the patients were subjected to a follow-up of an average of six months. Seventeen patients were satisfied with the overall results (Figs. 2-5). However, three patients developed seroma which required repeated aspirations for three weeks. One patient developed infected hematoma which necessitates exploration of the wound and drainage under general anesthesia and secondary sutures. Two patients developed scar widening and downward migration (Fig. 4). Most of the complications were noted in the post-bariatric patients (Table 1).

Table (1): Complications and their treatment.

Complication	No. of patients	Treatment
Seroma	3	Repeated aspiration
Hematoma/infection	1	Drainage and secondary sutures
Scar widening/ scar migration	2	Conservative

The skin excised from each thigh was subject to be weighed in operating room to insure the symmetry. The total weight of skin excised ranged from 1600 to 3200 grams (Fig. 6).

DISCUSSION

Thigh contouring surgery is aiming to restore the aesthetics of the thigh. Patients seek for thigh lift either who have excess fatty thighs, excess skin and cellulite or post-bariatric patients who have had massive weight loss with severe redundancy and sagging of the skin. In both cases, excision of the excess skin and design of an aesthetically hidden scar was always the field of evolution.

Numerous designs exist for thigh plasty **[7-12]**. Until 1988, almost all thigh plasties involved partial or total circumferential skin excision and direct closure. Regnault and Daniel call for minimal undermining to prevent seromas and hematomas **[17]**. The major problem with the early techniques was wide, unsightly scars that migrated because of excess tension on the wound.

Lockwood described fascial anchoring in medial thigh lifts and his technique has reproducible results in thigh lift and became a routine **[18]**. He described suturing the colle's fascia in both the superior and inferior thigh flaps. This maneuver greatly minimized the downward scar migration and pulling on the labia majora which were a common pitfalls of the classic technique. He also described the SFS and, equally importantly, certain "zones of adherence" that must be released to obtain a long-lasting result. By releasing the SFS at these "zones of adherence," lifting forces can be transmitted to the distal thigh, the upper abdomen, the trunk, and the buttocks. This can be accomplished through incisions placed entirely within the bathing suit line **[19-21]**. In a second article, Lockwood described his technique. He noted that the SFS lift prevents scar widening, scar migration, and flattening of the buttocks **[22]**.

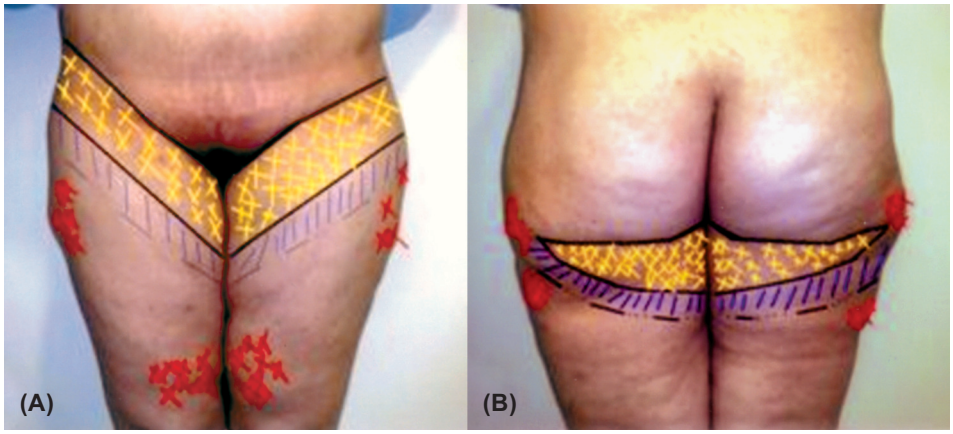

Fig. (1): (A,B) Preoperative anterior and posterior markings. The black lines are the incision lines within the natural crease both anterior and posterior. Yellow area was the excised part, the blue lines area was the undermining part, and the red areas were the addressed parts for liposuction.

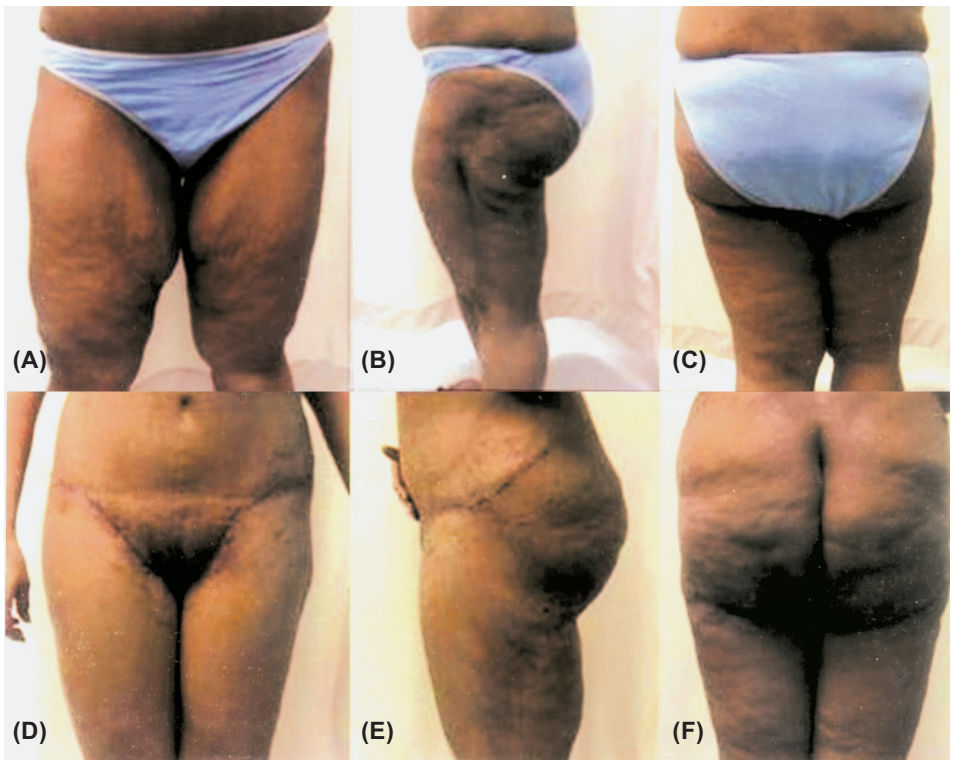

Fig. (2): (A,B,C) Preoperative front, lateral and posterior views of 23-year old female patient with severe redundancy of the skin of the thigh 2 years after a successful bariatric surgery. (D,E,F) Postoperative front, lateral and posterior views after circumferential thigh lift.

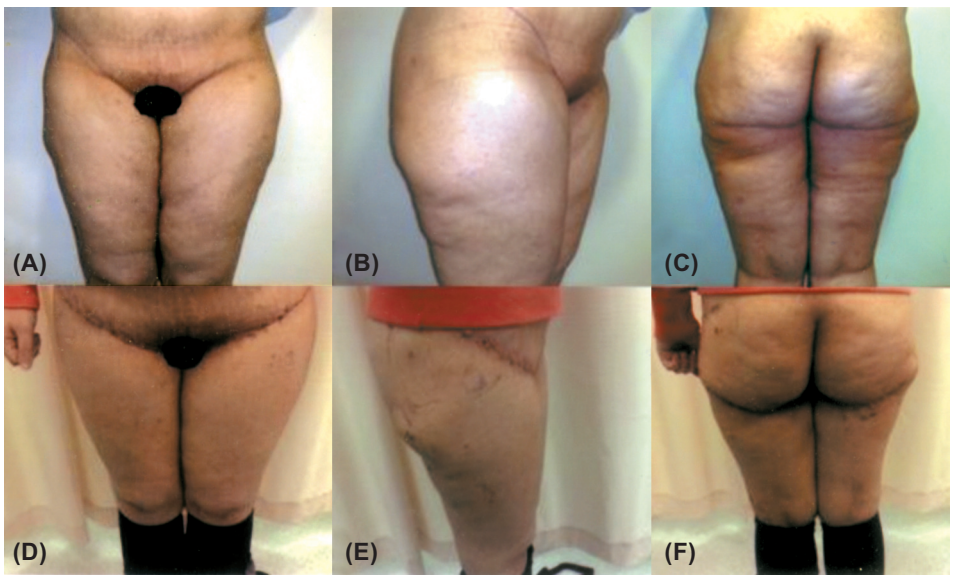

Fig. (3): (A,B,C) Preoperative front, Lateral and posterior views of the thighs of 21-year old female patient. She had marked skin redundancy and localized fat accumulations. (D,E,F) Show the postoperative front, lateral and posterior views after circumferential thigh lift. There is a good contour and lifting. The scar lies in the natural groin crease.

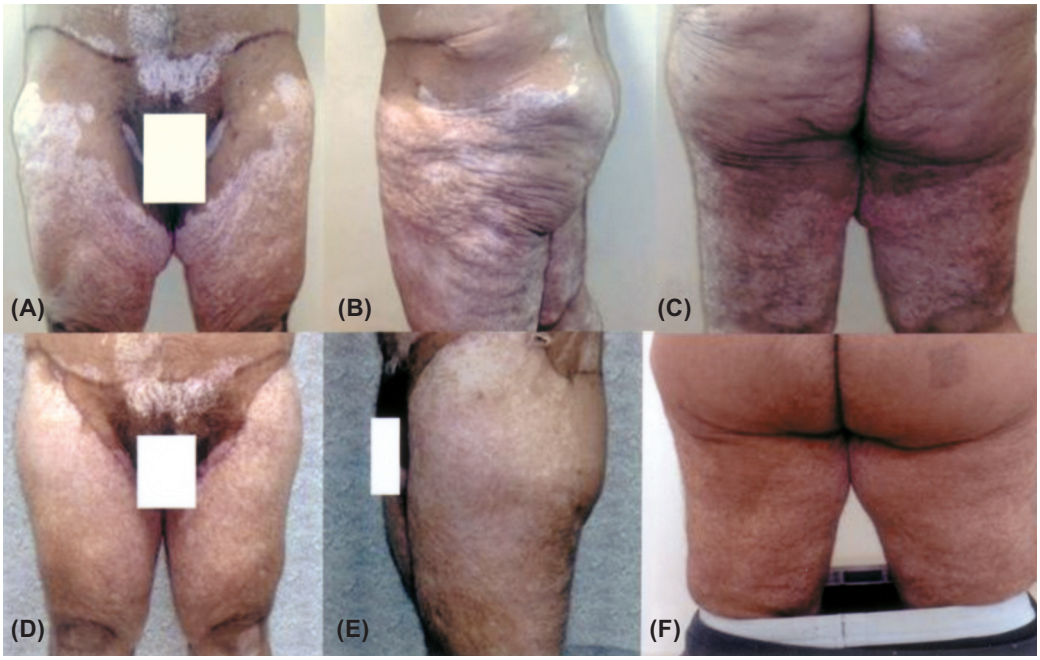

Fig. (4): (A,B) Preoperative front and lateral views of the thighs of 23-year old male patient. He had marked skin redundancy after massive weight loss following bariatric surgery. (C,D) Postoperative front and lateral views of the thighs. There is a good contour and lifting but there is a downward migration of the scar.

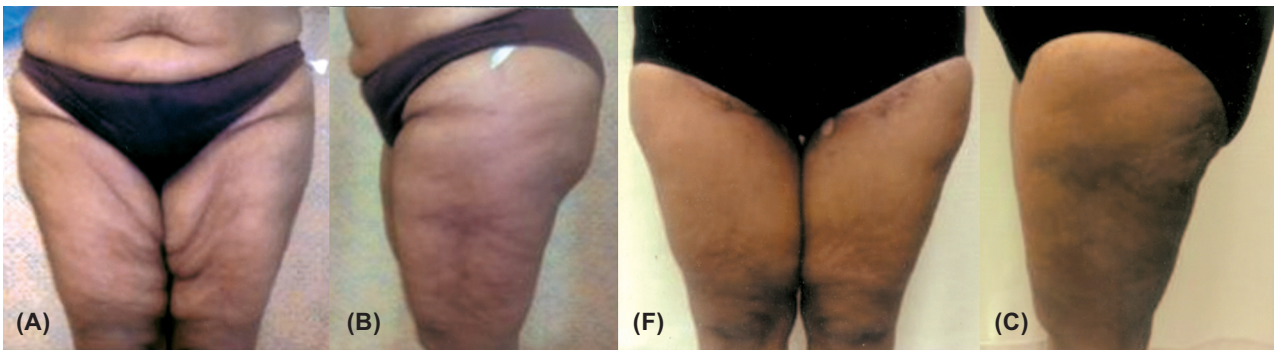

Fig. (5): (A,B) Preoperative front and lateral views of the thighs of 26-year old female patient after marked weight loss. She had marked skin redundancy and localized fat accumulations. (C,D) Postoperative front and lateral views after circumferential thighlift. There is a good contour and lifting. The scar lies in the natural groin crease.

Fig. (6): (A,B,C,D) Preoperative views of the thighs and the amount of excised skin from each patient. Patient © had thigh lift with buttock lift and the black arrows mark the skin excised from the thighs. Note the symmetrical skin excision from both sides in each patient.

In this study, suspension of the thigh flap was a routine, fixing the deep fascia of the thigh onto the colle's fascia. Furthermore, the author intended to suture the deep layer of the thigh flap to the deep groin flap with heavy vicryl sutures. The study did not report a case developed a distortion of the labia majora which was a frequent pitfall of the downward tension. However, two patients developed widening of the scar and downward scar migration.

Regarding the extend of undermining, Regnault and Daniel, have a work which concluded that the fundamental principle of total body contouring is the excision of as much redundant tissue as possible with minimal undermining and moderate tension **[17]**. However, they based their approach on the location of the major redundancy. This frequently necessitates to a multistage approach.

In this study, undermining was performed 10 centimeters medially and 7 centimeters in the posterior thigh. The author excised as much skin as he could with a reasonable tension on the wound. Furthermore, the author depended on the liposuction as a tool of undermining. However, to avoid the postoperative residual redundancy which was more frequent in patients with fatty thighs, massive liposuction was performed three months prior to thigh lift.

Seroma is a common postoperative problem after thigh lift. Numerous maneuvers, including de-epithelialization of the lower flap, were attempted. The problem with these designs is that they called for minimal undermining and skin closure alone. In a recent study which included 222 patients who underwent body contouring surgery after massive weight loss; the risk of seroma formation in thigh lift was 4%. Furthermore, the study concluded that the most important risk factor for seroma formation is the weight of skin excised at the time of surgery **[23]**. In this study, circumferential thigh lift enabled the author to excise much skin ranged from 1600 to 3200 grams. However, three patients (15%) developed seroma which subsided after long time of aspiration. These patients were among the postbariatric group.

Thigh lift is an inevitable procedure for patients having obese thighs as well as after massive weight loss following bariatric surgery. Circumferential thigh lift is an excellent procedure that enables anteromedial, lateral, and posterior lift. The technique is acknowledged for its aesthetic scar which lies in the natural inguinal, groin creases and inferior gluteal fold. Being circumferential, more skin could be excised. The procedure is superior to the classic medial thigh lift because it could address the sagging of the lateral thigh and the cellulite in the posterior thigh. The author recommends the technique with special precautions which include the extend of undermining, proper anchoring the deep fascia to the colle's fascia, massive liposuction in a separate stage prior to thigh lift in patients having obese thighs, and the proper postoperative positioning.

REFERENCES

1- Hoffman S. and Simon B.E.: Experiences with the Pitanguy method of correction of trochanteric lipodystrophy. Plast. Reconstr. Surg., 55 (5): 551-8, 1975.

2- Pitanguy I.: Trochanteric lipodystrophy. Plast. Reconstr. Surg., 34: 280, 1964.

3- Aston S.E.: Buttock and thighs. In: Rees T., ed. Aesthetic Plastic Surgery. Philadelphia: WB Saunders Co, 1980: 1039.

4- Baroudi R., Smith J., Aston S., eds.: Grab and Smith's Plastic Surgery. Little Brown: Boston, 1991.

5- Lockwood T.E.: Superficial fascial system (SFS) of the trunk and extremities: A new concept. Plast. Reconstr. Surg. Jun., 87 (6): 1009-18, 1991.

6- Lockwood T.E.: Maximizing aesthetics in lateral-tension abdominoplasty and body lifts. Clin. Plast. Surg., 31 (4): 523-37, 2004.

7- Lewis J.R. Jr.: The thigh lift. J. Int. Coll. Surg., 27 (3): 330-4, 1957.

8- Farina R.: Riding trousers-like type of pelvicrural lipodystrophy (trochanteric lipomatosis). Br. J. Plast. Surg., 13: 174, 1971.

9- Pitanguy I.: Surgical reduction of the abdomen, thigh, and buttocks. Surg. Clin. North Am., 51 (2): 479-8, 1971.

10- Baroudi R.: Thigh lift and buttock lift. In: Courtiss E., ed. Aesthetic Surgery Trouble-How to Avoid It and How to Treat It. Mosby: St. Louis, 1978.

11- Regnault P., Baroudi R. and Cavralho C.G.: Correction of lower extremity lipodystrophy, 3: 233, 1979.

12- Grazer F.M. and Klingbeil J.R.: Body image. In: A Surgical Perspective. Mosby: St. Louis, 1980.

13- Baroudi R. and Affonso Ferreira C.A.: Seroma: How to avoid it and how to treat it. Aesth. Surg. J., 18 (6): 439-41, 1999.

14- Shermak M.A., Rotellini-Coltvet L.A. and Chang D.: Seroma development following body contouring surgery for massive weight loss: Patient risk factors and treatment strategies. Plast. Reconstr. Surg., 122 (1): 280-8, 2008.

15- Stadelmann W.K.: Intraoperative lymphatic mapping to treat groin lymphorrhea complicating an elective medial thigh lift. Ann. Plast. Surg., 48 (2): 205-8, 2002.

16- Borud L.J., Cooper J.S. and Slavin S.A.: New management

algorithm for lymphocele following medial thigh lift. Plast. Reconstr. Surg., 121 (4): 1450-5, 2008.

17- Regnault P. and Daniel R.: Aesthetic Plastic Surgery. Little Brown & Co: Boston, 1984.

18- Lockwood T.E.: Fascial anchoring technique in medial thigh lifts. Plast. Reconstr. Surg., 82 (2): 299-304, 1988.

19- Lockwood T.E.: Superficial fascial system (SFS) of the trunk and extremities: A new concept. Plast. Reconstr. Surg., 87 (6): 1009-18, 1991.

20- Lockwood T.E.: Transverse flank-thigh-buttock lift with superficial fascial suspension. Plast. Reconstr. Surg., 87 (6): 1019-27, 1991.

21- Lockwood T.E.: Lower Body Lift with Superficial Fascial System Suspension. Plast. Reconstr. Surg., 92 (6): 1112-1122, 1993.

22- Lockwood T.: The role of excisional lifting in body contour surgery. Clin. Plast. Surg., 23 (4): 695-712, 1996.

23- Shermak M.A., Rotellini-Coltvet L.A. and Chang D.: Seroma development following body contouring surgery for massive weight loss: Patient risk factors and treatment strategies. Plast. Reconstr. Surg., 122 (1): 280-8, 2008.