

Gluteal Contour Improvement: Different Surgical Alternatives

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Abstract

Background Surgical techniques to achieve improvement in buttocks contour have evolved dramatically. The authors present their experience with the different techniques and indications they use to achieve improvement in this region.

Methods This study reviewed the surgical procedures performed by the senior author over a 15-year period among patients seeking improvement of the gluteal region. Procedures were analyzed according to the characteristics and needs of each patient, and the resulting levels of patient satisfaction were evaluated.

Results From April 1995 to March 2010, 908 patients (862 women and 46 men) ages 18–61 years requested and underwent surgery for gluteal contour improvement. The surgical procedures were liposuction with lipoinjection for 811 patients (89.3%); liposuction with gluteal implants for 62 patients (6.8%); liposuction with gluteal implants and lipoinjection to the hips for 22 patients (2.4%); liposuction, gluteal implants, and a buttock-lift for 7 patients (0.7%);

and liposuction, gluteal implants, lipoinjection, and a buttock-lift for 6 patients (0.6%). The volume of infiltrated fat ranged from 120 to 1,160 ml per buttock, with an average of 380 ml per buttock. The implants used ranged from 250 to 450 ml (average, 325 ml).

Conclusions Surgery performed with the goal of gluteal contour improvement is detailed and demanding with respect to the multiple and diverse techniques. The proper selection of these procedures and their order are paramount to achieving a successful outcome for both the patient and the surgeon.

Keywords Gluteal implants · Gluteal contour · Gluteal lipoinjection · Gluteal fat infiltration · Gluteal improvement · Gluteal augmentation · Buttocks improvement · Buttocks implants

Introduction

Over the years, the concept of feminine beauty and appeal often has been closely associated with two areas: the

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breasts and the buttocks [11, 13]. As part of this trend, gluteoplasty augmentation and buttocks-contouring surgery generally have seen exponential growth over the course of the past two decades, particularly in the United States [2]. Although the initial results of these procedures were not entirely satisfactory [3], there currently are several successful surgical options for improving the gluteal contour. Procedures such as liposuction [1, 7, 8, 18, 23], gluteal lipoinjection [1, 4, 5, 7, 16, 23, 27], gluteal implantation [6, 12, 17, 28], and buttock-lifting [14, 20, 21, 25] all are used with this objective in mind. All these procedures may be implemented together or individually as necessary to achieve the desired results. This report aims primarily to present our experience with the indications and outcomes of these different surgical options and their combinations, which often are used to meet each patient's needs.

Materials and Methods

We performed a retrospective analysis of surgical procedures performed by the principal author for all patients seeking improvement of the gluteal region between April 1995 and March 2010. During this 15-year period, 908 patients were evaluated and treated. The four surgical procedures noted earlier (liposuction, gluteal lipoinjection, gluteal implantation, and buttock-lifting) were combined in five different ways depending on the needs and characteristics of each patient. These five combined procedures were

1. Liposuction with gluteal lipoinjection
2. Liposuction with gluteal implantation
3. Liposuction with lipoinjection and gluteal implantation
4. Liposuction with gluteal implantation and buttock-lifting
5. Liposuction with lipoinjection, gluteal implantation, and a buttock-lifting.

Surgical Indications

Each of the following surgical procedures or combination thereof was used according to the needs and characteristics presented by each individual patient:

1. Liposuction with gluteal lipoinjection. This procedure is indicated for patients with fat excess or lipodystrophy of the flanks, hips, inner thighs, or subgluteal area. The fat excess is removed with liposuction and then infiltrated in the gluteal areas where additional volume and contour improvement are desired.
2. Liposuction with gluteal implants. This surgical combination is indicated when there is minimal lipodystrophy in the regions adjacent to the buttocks.

However, elimination of this fat still improves the contour of these peripheral areas. Because the amount of fat removed by liposuction in these cases is insufficient for the purpose of fat grafting, buttock implants are used.

3. Liposuction with lipoinjection and gluteal implants. This technique is indicated for patients with minimal lipodystrophy in the areas adjacent to the gluteal region but with significant hypoplasia of the buttocks and the tronchanteric region. This procedure makes use of the liposuctioned fat to increase the volume of the tronchanteric region and uses the implants to improve the buttocks.
4. Liposuction with gluteal implants and a buttock-lift. This combination is beneficial for patients who have lost weight and present with minimal lipodystrophy but have hypoplasia and ptosis of the gluteal region. In these cases, liposuction is performed in the necessary areas, and buttock volume is increased with the use of implants. In addition, ptotic tissues are surgically lifted.
5. Liposuction with lipoinjection, gluteal implants, and a buttock-lift. This mix of procedures is appropriate for patients who have lost weight and present with ptosis but whose lipodystrophy persists. For these patients, additional projection is needed in the gluteal and tronchanteric areas. Liposuction is performed in the required areas, and fat is transferred to the tronchanteric region. Gluteal implants also are placed, and tissues are surgically lifted.

Surgical Techniques

All patients are evaluated while standing to determine the appropriate surgical procedure or procedures. Markings and procedural details are drawn at this time. Most patients are anesthetized with regional anesthesia using an epidural block induced by lidocaine except where it is contraindicated or the patient is undergoing multiple procedures. For these patients, inhaled general anesthesia is used. During the intraoperative period, all patients receive antibiotic therapy using cephalexin, which subsequently is continued for a postoperative period of 5 days.

Option 1: Liposuction with Gluteal Lipoinjection

For treatment of the gluteal contour, the patient is situated in the supine position, and the tumescent liposuction technique is used. This procedure involves infiltrating 1 l of isotonic saline solution 0.9% with an ampule of adrenaline. The ratio of infiltrated solution to suctioned matter is about 1.2–1.5 to 1. In other words, 1.2–1.5 l of solution is

infiltrated for every liter liposuctioned from the patient. Because epidural anesthesia was used, we do not need to make routine use of lidocaine in the tumescent solution. We do not use internal or external ultrasound because we have not seen any demonstrated benefit from its use compared with the classic tumescent technique [9, 10]. In addition, we need to make use of the fatty tissue for the fat-grafting procedure.

The incisions for infiltration are the same as those used for the fat injections and determined according to the areas requiring treatment. If liposuction is required in the lumbar region, an incision is placed in the intergluteal area, with another positioned in the supragluteal area. If work is required in the trochanteric region, the supragluteal incision is used as well as an additional incision in the subgluteal crease area, which also is used for working on the subgluteal region.

Liposuction is simultaneously performed by two plastic surgeons under the coordination of the chief surgeon. Cannulas (3 and 4 mm) are used in conjunction with a Cosmetech machine (Model SSB-IV; Alpine, CA, USA). Regularity of the liposuction is determined using the pinch test and observing the flap thickness when the cannula is lifted.

After completion of the liposuction procedure, the suctioned fat is prepared for injection elsewhere by transferring it to a second container, in which a manual cleaning is performed that eliminates the connective tissue. Clindamycin (300 mg) then is added to the prepared fat before infiltration. Fat is injected into the buttocks, hips, or both with an atraumatic cannula connected to a 60-ml syringe.

The infiltration process is performed via multiple paths and different planes. In fact, various directions and access paths are used to obtain better fat distribution. Special precaution is always taken during infiltration of fat into deeper areas. We actually inject fat with movements similar to those used in performing the liposuction technique. This improves the distribution and integration of the infiltrated fat, resulting in more injected volume and better projection of the buttocks.

After liposuction, a soft, open silicone drain is always positioned in the sacral region, where it remains for approximately 5 days. The remaining incisions are sutured to avoid the probable escape of infiltrated fat. Compression bandages and postsurgical compression garments are used by patients for about 4–6 weeks. Postsurgical therapeutic ultrasound treatments of the liposuctioned areas are started 5 days postoperatively and continued every 3 days over the course of 1 month [26]. If necessary, 15 to 20 endermologie sessions may follow at this point [19]. A patient treated with this technique is presented in Fig. 1.

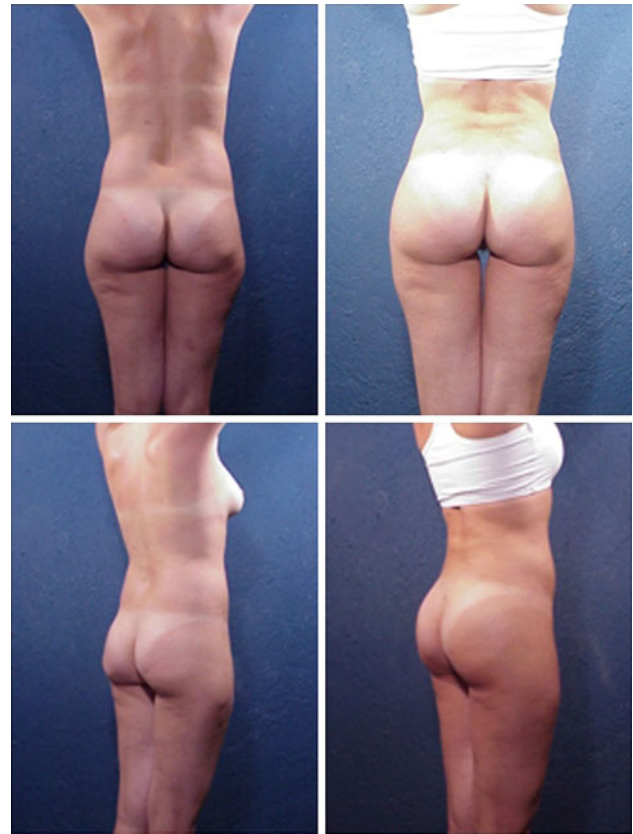


Fig. 1 Patient 1 (photos 1, 2, 3 and 4). A 26-year-old woman 2 years after surgery, with 450 ml injected in the entire gluteal area including the lateral region. Liposuction was performed on the trochanteric and supragluteal areas

Option 2: Liposuction with Gluteal Implants

This combination is indicated for patients who have a low volume of fat in their flanks, hips, inner thighs, or subgluteal fold. These patients, however, also have little gluteal volume that would not improve significantly with the fat that could be obtained with liposuction. For patients in this category, significant ptosis of the buttocks should not be present.

The liposuction markings and techniques used are the same as those noted for option 1. Our preferred method for gluteoplasty is intramuscular with implant placement via the intergluteal crease [6, 28]. Smooth, oval-shaped implants are used.

The patient is marked for surgery while seated and bent forward with the hip projected back. This forms a horizontal line where the buttocks make contact with the seat and represents the lower boundary of gluteal implant placement. With the patient lying in the prone position, the intergluteal crease is marked together with two paramedian lines 4 cm from the medial. The templates then are traced

over these markings according to the approximate volume of the gluteal implants to be used. Iodine-soaked gauze is placed in the perianal area.

Surgical access is gained through a longitudinal incision in the crease, which is at least 2 cm from the anus. Dissection is performed through this incision until the presacral fascia is visualized and, laterally, the gluteus maximus is dissected in the direction of its fibers. This is performed for subsequent creation of an intramuscular pocket with a dissector on the previously marked area. An implant sizer then is introduced to confirm the previously estimated volume and the uniformity of the pocket space. Buttock implants are introduced together with drains that are closed with negative pressure. Muscle and connective tissues are sutured to reduce skin closure tension, and a micropore bandage is put in place to exert compression. The drain is removed in about 5–7 days postoperatively when the amount of fluid discharge is less than 30 ml in 24 h. The patient is instructed to make use of an appropriate compression garment and to sleep in the prone position. Seating should be on the ischial tuberosities (leaning forward with the hips projecting back) for a

period of 10 days. A patient who underwent this technique is presented in Fig. 2.

Option 3: Liposuction with Lipoinjection and Gluteal Implants

This combination is indicated for patients that have little fat volume in their flanks, inner thighs, or subgluteal folds. In addition, these patients have hypoplasia of the gluteal region and hip depressions but do not experience significant gluteal ptosis.

The appropriate surgical option for these cases is tumescent liposuction of the flanks, inner thighs, and subgluteal folds as previously described in this report. After this, intramuscular gluteal implants should be placed using the method already described. Finally, fat injections are completed using the fat harvested from the liposuction process. This last step is done to correct the depressions or hypoplasia of the tronchanteric area. The goal is to give the patient a result that is aesthetically adequate and uniform to the entire gluteal contour. The patient in Fig. 3 exemplifies this surgical combination.



Fig. 2 Patient 2 (photos 5, 6, 7, and 8). A 36-year-old woman 1 year after surgery. Liposuction was performed on the lumbar area, and 350-ml gluteal implants were placed



Fig. 3 Patient 3 (photos 9, 10, 11, and 12). A 36-year-old male patient who underwent liposuction on the supragluteal area, with placement of 400-ml gluteal implants. In each hip area, 350 ml of lipoinjection was administered 6 months after surgery

Option 4: Liposuction with Gluteal Implants and Buttock Lifting

This option is indicated for patients who exhibit a small amount of fat poorly distributed that as a result causes problem areas primarily in the flanks, inner thighs, or hips. The amount of fat present in these cases is not sufficient to contribute to a useful fat-grafting procedure for those patients who have substantial gluteal ptosis. This condition should not be confused with large buttocks. This procedural combination generally applies to patients who have lost weight or who have poor-quality tissue. Besides the markings described for the previous techniques, we also mark an additional area for patients in this category. The superior gluteal pexia is marked on the superior gluteal region over the iliac crest [20].

Liposuction is performed for these patients using the tumescent method already described followed by the superior gluteal pexia designed to lift the buttocks [20]. In accordance with the preoperative lines marked on the patient, a dermal cutaneous excision is made up to the fascial plane. Sutures are placed in three planes to complete the superior gluteal pexia. Finally, gluteal implants are placed using the previously noted intramuscular technique. Figure 4 shows a surgical patient who underwent these procedures.

A second subgroup of patients present some special cases or characteristics in that they have large buttocks, asymmetry involving the folds, or double gluteal folds. For these patients, an inferior gluteal pexia is the appropriate procedure. Tumescent liposuction is used followed by the intramuscular placement of gluteal implants. The last step is the implementation of a lower buttock-lift eliminating the redundant inferior skin and creating a new gluteal crease. [14].

Option 5: Liposuction with Lipoinjection, Gluteal Implants, and Buttock-Lifting

Candidates for this combination of surgical procedures are those with all the characteristics previously mentioned. They have lipodystrophy of the flanks and inner thighs, but do not have enough gluteal fat volume to provide sufficient projection of the buttocks. These patients have tronchanteric hypoplasia or hip impingement as well as significant ptosis of the buttocks. They generally have lost weight, have poor skin quality, and quite often are postbariatric or elderly with a history of obesity.

For the proper treatment of patients with all these characteristics, we begin with tumescent liposuction of the flanks, subgluteal fold, and inner thighs. We then move on to a superior gluteal pexia, fixing it to the muscle fascia. The next step involves intramuscular placement of gluteal

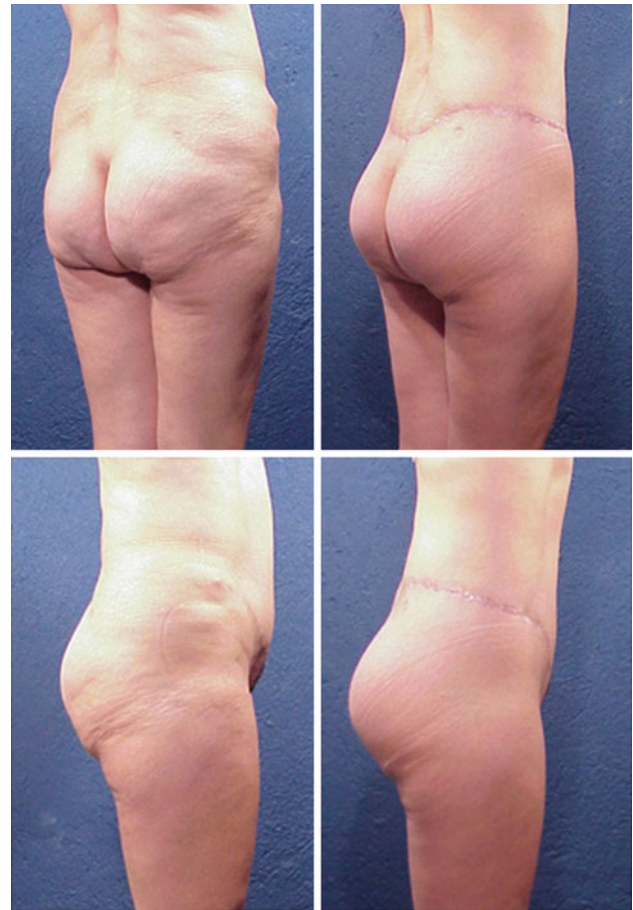


Fig. 4 Patient 4 (photos 13, 14, 15, and 16). Liposuction of the supragluteal and waist areas and gluteal pexia was performed for a 40-year-old woman 6 months after placement of 300-ml gluteal implants

implants. Finally, after obtaining the partial contour shape of the buttocks, lipoinjection is applied as necessary to correct the tronchanteric hypoplasia and to provide the desired silhouette. All these procedures are implemented according to the techniques previously described in this document. Figure 5 features a patient treated with all the procedures under option 5.

This group also has a variant equal to the alternative described in the previous option. These patients have elongated gluteals, asymmetry of the gluteal folds, and the presence of a double gluteal fold. The treatment plan is the same as that noted in the previous section.

When gluteal implants were needed, Silimed Quartzo low-profile oval gluteal implants were used (Silimed, Rio de Janeiro, Brasil). Capacities of 250, 300, and 350 ml were used depending on the characteristics and requirements of each patient. In all the groups, patients received ultrasound therapy every third day for approximately 1 month, starting after drain removal on approximately day 5. Ultrasound was performed on the area of liposuction and



Fig. 5 Patient 5 (photos 17, 18, 19, and 20). A 29-year-old woman who underwent a combination of four procedures: liposuction of the supragluteal area, a 200-ml lipoinjection in the lateral gluteal areas, 350-ml gluteal implants, and gluteal pexia. The patient is seen 1 year after surgery

on the gluteal implant area. The ultrasound was used to improve swelling and prevent capsular contracture [26]. Also on the area of liposuction, subdermal therapy (endermologie) was performed. To improve smoothness and

results in that area, subdermal therapy began 3–4 weeks after surgery and was applied twice a week for 2 months [19].

Results

During the 15-year period from April 1995 to March 2010, 908 patients (46 men and 862 women) had surgical intervention to improve the contour of their buttocks. Their ages ranged from 18 to 61 years (mean, 28.2 years).

The surgical procedures completed were liposuction with lipoinjection for 811 patients (89.3%), liposuction with buttocks implants for 62 patients (6.8%), liposuction with lipoinjection and gluteal implants for 22 patients (2.4%), liposuction with gluteal implants and a buttock-lift for 7 patients (0.7%), liposuction with lipoinjection, gluteal implants, and a buttock-lift for 6 patients (0.6%). The indications for each procedure and the patients operated on in each group are outlined in Table 1.

The gender distribution by surgical procedure was as follows: liposuction with lipoinjection completed for 774 women (95.4%) and 37 men (4.6%), liposuction with buttocks implants for 61 women (98.4%) and 1 man (1.6%), liposuction with lipoinjection and gluteal implants for 14 women (63.6%) and 8 men (36.4%), liposuction with gluteal implants and a buttock-lift for 7 women (100%) and no men (0%), and finally, liposuction with lipoinjection, gluteal implants, and a buttock-lift for 6 women (100%) and no men (0%). The summary of the distribution by sex is shown in Table 2.

The volume of infiltrated fat ranged from 120 to 1,160 ml per buttock, with an average of 380 ml per buttock. The implants used ranged from 250 to 450 ml (average, 325 ml).

Satisfaction regarding the results was evaluated subjectively with the patients. The score represents the degree

Table 1 Surgical procedures and general characteristics for 908 patients

Group	Patient characteristics	Surgical procedures completed	Patients <i>n</i> (%)
1	Patients with lipodystrophy; sufficient fat volume for grafting	Liposuction + fat grafting	811 (89.3)
2	Patients with lipodystrophy; insufficient fat volume for gluteal grafting	Liposuction + Gluteal implants	62 (6.8)
3	Patients with lipodystrophy; hip hypoplasia; insufficient fat volume for gluteal grafting	Liposuction + gluteal implants + fat grafting to the hips	22 (2.4)
4	Patients with lipodystrophy; insufficient fat volume for gluteal grafting; ptosis	Liposuction + Gluteal implants + buttock-lift	7 (0.7)
5	Patients with lipodystrophy; insufficient fat volume for gluteal grafting; hip hypoplasia Ptosis	Liposuction + gluteal implants + buttock-lift + fat grafting to the hips	6 (0.6)
Total			908/100%

Table 2 Distribution by sex and surgical procedure

Group	Surgical procedures completed	Females <i>n</i> (%)	Males <i>n</i> (%)	Total
1	Liposuction + fat grafting	774 (95.4)	37 (4.6)	811
2	Liposuction + gluteal implants	61 (98.4)	1 (1.6)	62
3	Liposuction + gluteal implants + fat grafting to the hips	14 (63.6)	8 (36.4)	22
4	Liposuction + gluteal implants + buttock-lift	7 (100)	0 (0)	7
5	Liposuction + gluteal implants + buttock-lift + fat grafting to the hips	6 (100)	0 (0)	6

Table 3 Patient satisfaction grade by surgical procedure

Group (no. of patients)	Surgical procedure	Patients with results that did not meet their expectations <i>n</i> (%)	Patients with results that met their expectations <i>n</i> (%)	Patients with results that exceeded their expectations <i>n</i> (%)
1 (811)	Liposuction + fat grafting	35 (4.3)	624 (76.9%)	152 (18.7)
2 (62)	Liposuction + gluteal implants	4 (6.4)	33 (53.2)	25 (40.3)
3 (22)	Liposuction + gluteal implants + fat grafting to the hips	1 (4.5)	14 (63.6)	7 (31.8)
4 (7)	Liposuction + gluteal implants + buttocks- lift	1 (14.2)	3 (42.8)	3 (42.8)
5 (6)	Liposuction + gluteal implants + buttock-lift + fat grafting to the hips	0 (0)	2 (33.3)	4 (66.6)
Total		42 (4.6%)	676 (74.4)	190 (21)

of satisfaction expressed at the last consultation that took 3 and 6 months postoperatively. The patients were asked whether their results were as they expected, better than they expected, or worse than they expected. More than 95% of the patients were satisfied with the outcome of their surgeries. These results are presented in Table 3.

Complications secondary to the lipoinjection procedure were noted as follows. One patient experienced a *Mycobacterium fortuitum* infection and was treated with a triple course of antibiotics. This patient had aesthetic sequels on the affected area. Two patients experienced fat embolism syndrome, which was treated with general support measures in intensive care without additional complications. The syndrome was not related to the amount of fat injected or to the amount of liposuctioned fat because in both cases, the injected amount was less than 240 ml per buttock, and the amount of liposuctioned fat was less than 1,500 ml. Seven patients with fat necrosis were treated by local puncture and draining and experienced no additional complications. Signs of a temporary gluteal erythema exhibited by 29 patients and 37 buttocks were treated with conservative measures.

Complications secondary to the placement of buttock implants consisted of five lumbosacral seromas, which were resolved by direct puncture. A hematoma in the intergluteal incision was successfully treated by conservative treatment. An implant became displaced toward the outer portion of the buttock, and this patient opted to keep

it as it was with no corrective action. One late seroma appeared and produced implant turnover. It ended up requiring surgery to drain through the same surgical access, with the implant reaccommodated 3 months latter.

Of the 13 buttock-liftings performed, 4 patients experienced minimal dehiscence in the areas of greatest tension, which closed completely with conservative treatment. Three patients experienced hypertrophic scars. Segments of the scars were topically treated with acceptable results. Two patients experienced a slight widening of the scar, but neither required treatment.

After the patient has been evaluated and thoroughly examined with his or her objectives in mind and has decided on a surgical procedure, the probable results and potential complications should be discussed. Presurgical markings should always be done while the patient is standing, showing him or her the location of the wounds resulting from surgery.

The type of anesthesia to be used also should be discussed with the patient. We typically use epidural anesthesia in conjunction with intravenous sedation. Adequate hydration before, during, and after surgery; elastic bandage compression of the lower extremities; and antithrombotic prophylaxis must be used to reduce complications. It is imperative that patients get up and move around by the day after the surgery. We discuss with the patient details pertaining to the recovery period and additional treatments or therapies recommended to improve the overall results.

Discussion

The concept of female beauty has changed over time. There are, however, two physical constants of maximum femininity: the breasts and the buttocks. The standards of what is considered beautiful have varied according to time, culture, and ethnicity [11, 13]. Beginning in 1969, the first gluteal augmentation surgery was reported using mammary implants, and the outcome was poor [2].

Gluteal augmentation and contour surgery have gained universal popularity during the past 20 years. In the last two decades, these procedures have seen exponential growth. In fact, American statistics show that between 2002 and 2003, a 533% increase in gluteoplasty augmentation occurred. There also was an increase of 37.3% between 2008 and 2009 despite the economic crisis. During this same period, the American statistics also show a 442% increase in the number of men undergoing buttock-lift surgery.

Various techniques have been described to improve the gluteal contour. However, in most cases, no single technique is sufficient to achieve an optimum result or to meet the patient's or surgeon's expectations. For this reason, it is important to emphasize the individualization of each case and to have some clear guidelines in place.

Currently, many options exist to improve the gluteal contour [1, 4–7, 12, 14–17, 23, 27, 28]. There also are different types or classifications for diagnosing the gluteal contour including obvious features as well as measurements of planes, shapes, projections, and/or the degree of gluteal ptosis [1, 13, 22, 27]. For each case, different treatment options can be considered with overall gluteal enhancement in mind. These options include liposuction of adjacent fat [1, 7, 8, 18, 23], lipoinjection [1, 4, 5, 7, 16, 23, 24], gluteal implants and the associated techniques [6, 12, 17, 28], and various techniques for buttock-lifting [14, 20, 21, 25].

An adequate gluteal contour must include not only the buttocks but also the trochanteric/hip area, the subgluteal fold, and the inner thighs. The gluteal contour considered "universally beautiful" should be symmetric and rounded, with the greatest projection coming from the upper and middle third [11]. There should be no depressions in the hips or any asymmetric or double subgluteal folds.

Without a doubt, the most important surgical factor is proper selection of the procedures to be performed. The patient's initial assessment is the cornerstone to starting the correct treatment. Patients who have a significant amount of fat are ideal candidates for liposuction and lipoinjection [7]. These patients are, by far, the most common. They typically have enough gluteal support and do not require any lifting of the buttocks. There are, however, very thin

patients with significant gluteal hypoplasia who do not have significant stores of fat for fat-grafting purposes. For these patients, gluteal implants are clearly indicated [6], and the small amount of fat that they have can be used, if indicated, to improve the contour of the hips and to achieve an integral improvement in the treated area. Male patients are characteristic of this group and often require this type of surgery.

On the other hand, patients with weight loss or poor-quality tissues very often require some type of buttock-lift, which usually is performed in conjunction with the placement of gluteal implants. In addition, lipoinjection is incorporated into the treatment plan for some of these patients to optimize the results.

As analysis shows, the combination of different techniques described in this report all involve the incorporation of liposuction, which obviously is the cornerstone of gluteal contour improvement. The extraction of fat from areas adjacent to the buttocks can by itself significantly improve the appearance of this region. In fact, liposuction of the supragluteal region is most important and indicated for practically all patients. This permits the formation of a sacrolumbar angle, which is more acute and obvious than the potential projection of the buttock and forms the tubers or wings of the sacrum considered to be signs of attraction [1, 22, 27].

To obtain the best results using the fat-grafting procedure, proper fat preparation is paramount. The fat intended for injection elsewhere must be decanted, separated, and cleaned to extract segments of connective tissue. The next step in the process involves passing the fat through a 3-mm atraumatic cannula until it does so with ease. When this occurs, the fat is ready for grafting.

The prepared fat should be injected at different levels, with due caution used for the deeper areas. Multiple injection paths should be used in conjunction with different entry orifices. The surgeon should attempt to avoid injecting large quantities of fat into small areas. This results in a greater long-term integration of fat and aesthetically more favorable results [5].

Buttock-contour surgery is a detailed process that needs adequate patient evaluation and calls for adherence to the proper techniques. It is of increasing demand among plastic surgery patients, and several techniques can be used independently or in combination. Only with a proper and thorough evaluation of the patient's anatomic and clinical aspects can clinicians determine which procedures will best achieve the desired results. The proper combination of these procedures and their order will determine the success and consistency of favorable results for the patient and the surgeon.

Conflict of interest None.

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