



# Gluteal Region Reshaping of Massive Weight Loss Patients—A Decision-Making Strategy

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## Abstract

**Background** Massive weight loss (MWL) is a very common presentation that you may face as a plastic surgeon. Each patient has his own individual criteria, so, you should work according to a well-organized plan, especially when such cases have concerns about their gluteal area contour that were neglected before by many surgeons. A decision-making strategy was used to give a personalized treatment for targeting gluteal region reshaping of MWL patients.

**Methods** This study considered all patients with MWL subjected to buttock reshaping. There was no randomization in treatment; there was a case-by-case assessment. We analyzed the features of the buttocks, the type of surgery performed, the outcomes, and the complications.

**Results** Fifty two patients were included (41 females and 11 males), ages ranged between 21 and 66 years. Demographic data, preoperative body mass index (BMI), duration of surgery, type of surgery, and postoperative complications were collected. Statistically significant improvements were observed in gluteal ptosis and patient satisfaction grades.

**Conclusion** Aesthetic improvement of the buttocks involves either augmentation or contouring that may be obtained by liposculpture, surgical lifting, or combination. Patients with MWL have high expectations and are often treated with multiple procedures. Thus, an easy strategic approach personalized on each patient to treat multiple adjacent areas in one operation is necessary. Adipose tissue distribution, gluteal skin status, and BMI were the main factors that can forcefully affect our plan to guarantee reduction of unpleasant results and complications and improve patient satisfaction.

## Keywords

- massive weight loss
- postbariatric surgery
- belt lipectomy
- liposuction

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The rising obesity rate with weight loss surgery success has created a roaring need for body contouring surgeries for both men and women.<sup>1</sup> Redundant skin after massive weight loss (MWL) has resulted in extensive circumferential trunk deformity and exponential increase of body contouring procedures. Despite the popularity of these procedures, gluteal region deformities were neglected, because a lower body lift alone failed to create well-projected buttocks.<sup>2,3</sup>

Many surgeons were reluctant to operate in such regions for many reasons, one among them being the high incidence of complications as wound healing problems of surgical lifting. Therefore, the availability of well-established approaches to fix gluteal contour was something not addressed thoroughly in the literature.<sup>4</sup>

In the present study, the authors provided a common concept for gluteal reshaping in patients after MWL. The study considered the skin and adipose tissue status and the body mass index (BMI) as the main leading factors in decision making to address the gluteal deformity encountered in such patients.

## Methods

This study was conducted between January 2019 and May 2021 and included 52 patients (41 females and 11 males; age range: 21–66 years). All cases had been diagnosed

as post-MWL seeking gluteal reshaping. Consequently, 15 and 37 patients were treated with liposculpture and surgical gluteal lifting with or without autologous gluteal flap augmentation, respectively. BMI, weight constancy periods, previous bariatric and aesthetic procedures, cardiopulmonary history, and smoking history were recorded. All cases had a stable weight for at least 6 months preoperatively.

Exclusion criteria included active smoking, hemoglobin level <9 g/dL, albumin level <3 g/dL, unstable weight, uncooperative patients, patients refusing surgery, and patients unfit for surgery due to medical illness (e.g., recent stroke, myocardial infarction, deep venous thrombosis, chemotherapy, or radiotherapy).

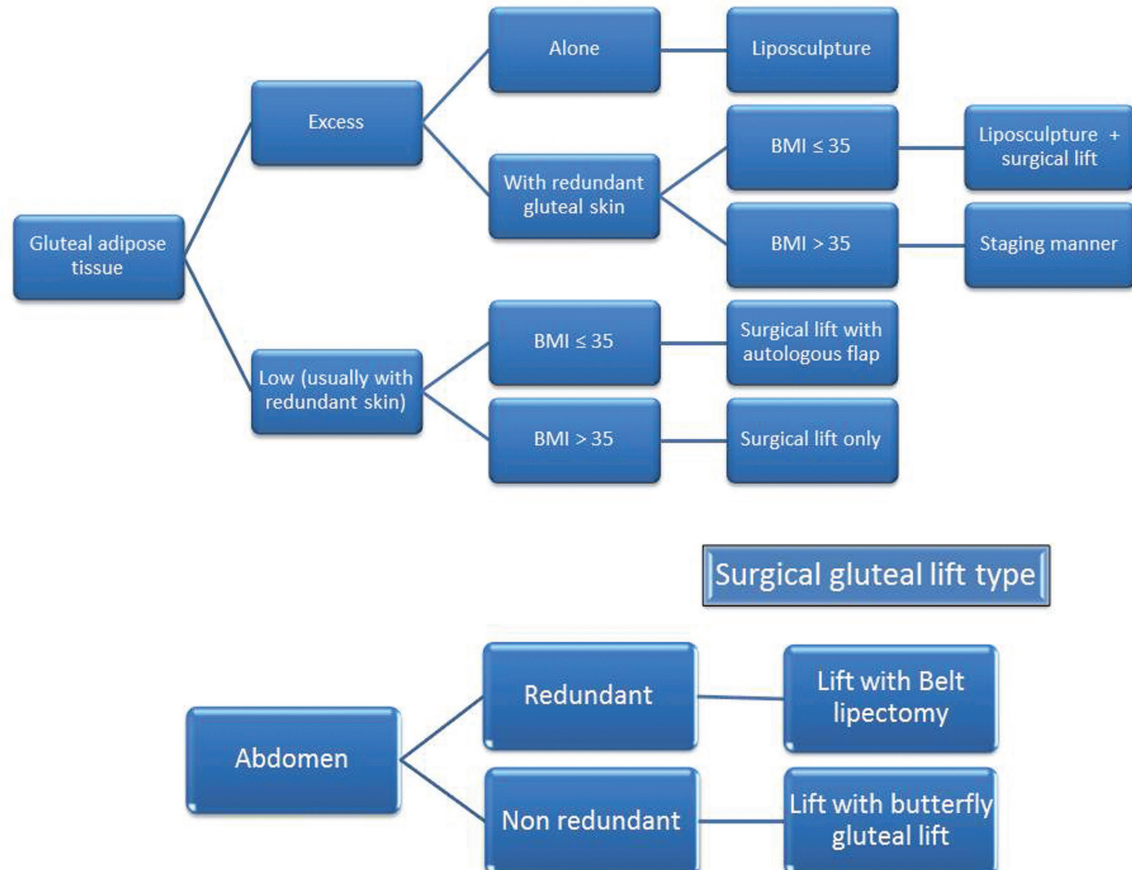
Any pre-existing scars in the abdominal and gluteal areas were documented, because they can impair the blood supply of the tissue flap. Ptosis grade according to Mendieta classification<sup>5,6</sup> was assessed (no ptosis, grade 1, grade 2, or grade 3), with postoperative grade reduction assessment.

The treatment procedure was personalized following skin assessment and adipose tissue status taking into consideration the current BMI (►Fig. 1).

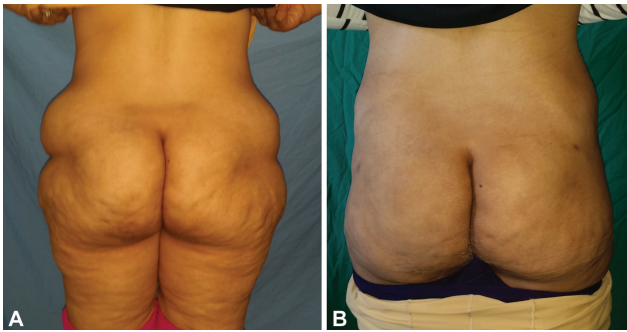
### A. Assessment of gluteal adipose tissue:

#### 1. Excess adipose tissue:

- Only adipose tissue excess: liposculpture alone (►Fig. 2A, B).



**Fig. 1** MWL patient gluteal reshaping decision-making strategy. MWL, massive weight loss.



**Fig. 2** A case of adipose tissue excess only. A 40-year-old female with BMI 27.7 kg/m<sup>2</sup> was managed with liposculpture only. (A) A preoperative gluteal view. (B) One-year postoperative gluteal view. BMI, body mass index.

- Associated with redundant gluteal skin:
  - BMI  $\leq$  35 kg/m<sup>2</sup>: liposculpture was combined with surgical lift (➤ Fig. 3A–D).
  - BMI > 35 kg/m<sup>2</sup>: the two procedures were performed but separately in a staging manner.

2. Low adipose tissue (usually associated with redundant skin):

- BMI  $\leq$  35 kg/m<sup>2</sup>: surgical lift was performed and autologous gluteal flap augmentation could be added, if patient had a complaint of gluteal projection (➤ Fig. 4A–D).
- BMI > 35 kg/m<sup>2</sup>: surgical lift was performed only without autologous gluteal flap augmentation (➤ Fig. 5A–D).

B. Assessment of abdominal skin status to decide which type of surgical gluteal lift will be done if it was chosen:

- Redundant: surgical lift would be in the form of belt lipectomy (surgical gluteal lift with abdominoplasty).
- Not redundant (with no patient complaint): surgical lift would be in the form of butterfly lift for the buttocks and flanks only (without abdominoplasty).

In liposculpture, the regions of flanks, saddle bags, upper thighs, and sometimes the lateral trochanteric aspect of the gluteal region were addressed. Liposuction was performed with 3- and 4-mm atraumatic cannulas. According to gluteal lift with belt lipectomy, resection was designed to be more aggressive laterally at the posterior axillary line level where the greatest skin redundancy occurs to reverse the deformity with greater elevation of lateral buttock and thighs and lateral contour enhancement of the infragluteal crease. The midline inferior extent of excision is marked (3–5 cm) above the intergluteal crease. In male cases, we designed it higher to make the line more straight avoiding feminine look of contour resulting from lower curved scar. Using the pinch technique helped to mark the superior line after asking the patient to bend the waist anteriorly (semi-kneeling) to prevent posterior dehiscence. A few quantities of areolar adipose tissue were left on the posterior side especially

flanks to avoid seroma. Moreover, the skin flap was removed as one unit from the prone to the supine positions to reduce excision time.

In butterfly gluteal lift, we had not performed a complete abdominoplasty, so we did only marking for surgical lift with fusiform incision lines starting from the posterior midline point just above the intergluteal cleft to some point on the inguinal ligament anteriorly. The two lines were marked with a pinch test of the skin making the inguinal ligament as the axis of them.

If gluteal island flap was planned, then with the patient in a prone position, we drew the inferior marking centrally, predicting a postoperative gluteal height of 16 cm. Medial border of the dermal fat flap was marked 2 to 3 cm laterally from the midline and with a width between 15 and 18 cm according to the body type and intended contour. An adipo-dermal flap was de-epithelialized as an island flap using the lower back sacral and supragluteal skin. Then a pocket for the flap was dissected above the muscle fascia with a caudal limit at 5 cm above infragluteal crease to avoid numbness of the buttock postoperative. Then, the flap was advanced into the pocket without any undermining to its deep surface.

### Outcomes and Complications

Operative time, hospital stay, and the need for blood unit transfusion were reported. Surgery should not be longer than 6 hours to avoid the thromboembolic events, and has to be associated with the use of anticoagulation prophylaxis with low-molecular-weight heparin and pressure garments as well as early mobilization and hydration of the patient from the first day. Drains were left until they produced <40 mL/day. They were simultaneously removed avoiding a break of their connected drainage cycles. Flexed position (only 15°) of the trunk was advisable for the first week after surgery with slow straightening exercises. Limited activity was advised for the first 1.5 months, whereas strenuous exercise was discouraged for 3 months.

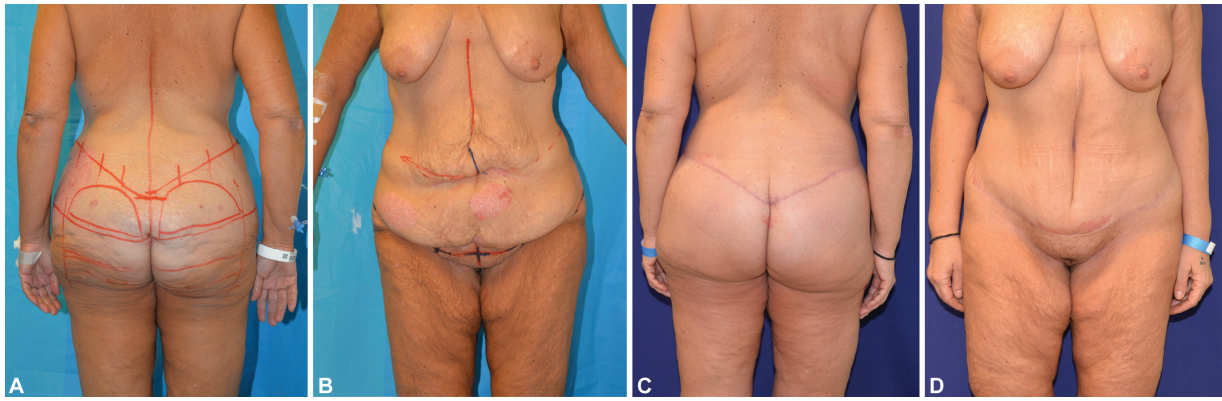
Complications (e.g., wound dehiscence, hematoma, seroma, dressing hypersensitivity, skin hyperesthesia, infection, thromboembolic events, and skin necrosis) were considered.

Patients were followed up weekly for dressing, draining, removing of sutures, and checking any complaints or early complications monthly, then once every 3 months. The existence or persistence of any complications and gluteal ptosis grade reduction were assessed after 1 year. Also, the self-satisfaction of the patient regarding the shape of gluteal region compared with before the procedure was assessed on a 5-point Likert scale; (1, strongly unsatisfied with low self-esteem; 2, unsatisfied; 3, neutral; 4, satisfied; and 5, strongly satisfied with a better lifestyle).

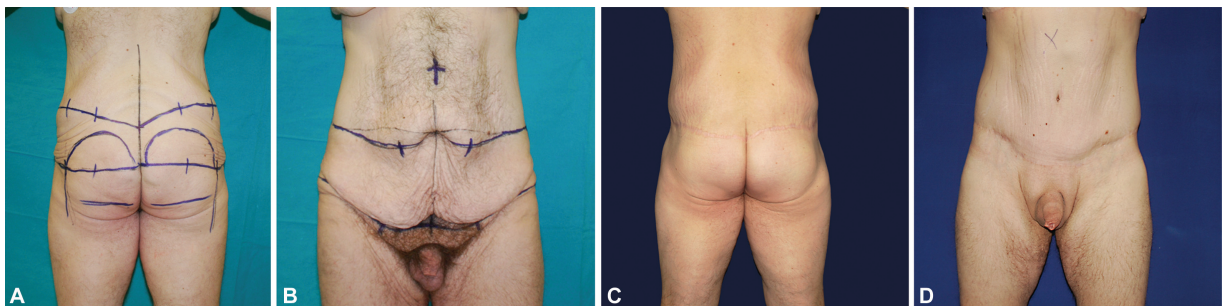
### Statistical Analysis

The collected data were analyzed using SPSS, version 15 (IBM, Armonk, NY). Normally distributed variables were expressed in mean  $\pm$  standard deviation (SD). Nonnormally distributed variables were expressed in median and range. Paired *t*-test or paired Wilcoxon tests were used when





**Fig. 3** A case of redundant skin/excess-adipose tissue. A 46-year-old female with BMI of 25.6 kg/m<sup>2</sup> was managed by combining liposculpture with surgical gluteal lift with autologous flap augmentation. (A) Preoperative gluteal view. (B) Preoperative abdominal view. (C) Six-month postoperative gluteal view. (D) Six-month postoperative abdominal view.



**Fig. 4** A case of redundant skin/low-adipose tissue. A 33-year-old male with preoperative BMI of 26 kg/m<sup>2</sup> was managed with surgical gluteal lift with autologous flap augmentation. (A) Preoperative gluteal view. (B) Preoperative abdominal view. (C) One-year postoperative gluteal view with reduction of ptosis grade, as well as a masculine projection of the buttocks. (D) One-year postoperative abdominal view.



**Fig. 5** Another case of redundant skin/low-adipose tissue. A 44-year-old female with preoperative BMI of 38.7 kg/m<sup>2</sup> was managed with surgical gluteal lift only without liposculpture or autologous flap augmentation. (A) Preoperative gluteal view. (B) Preoperative abdominal view. (C) One-year postoperative gluteal view. (D) One-year postoperative abdominal view.

appropriate to compare preoperative and postoperative satisfaction scores and ptosis grades.

## Results

Seventy patients with MWL requesting gluteal reshaping were observed in the last 2.5 years. Moreover, 8 patients were not admitted to surgery because of compromised general status (5 and 3 patients showed cardiovascular problems and diabetes, respectively), 10 patients were not included in the study because of nonadherence to any postoperative follow-up, and 52 underwent gluteal reshaping and were enrolled in the study.

The average age was 42.7 years with a SD of 10.4. Females represented 79% of the cases. The follow-up period was 15 months on average. In addition, 85% of the cases did not give a history of smoking, whereas 15% were previous smokers and smoked occasionally but stopped before the procedure with a minimum period of 6 months. No comorbidities were recorded preoperatively except for three patients with a history of controlled hypertension. The cause of MWL was postbariatric surgery in 63% of the cases, whereas it was after diet in the other 19 cases. The average BMI before weight loss was approximately 48 kg/m<sup>2</sup>, whereas it was approximately 33 kg/m<sup>2</sup> after weight loss stabilization.

**Table 1** Case distribution according to gender and procedure done

Category	Liposculpture only	Surgical lift	
		Without autologous flap	Lift with autologous flap
Female number	15	14	12
Male number	0	8	3
Percent % (N = 52)	29	42	29

**Table 2** Gluteal ptosis grade and patient self-satisfaction score when comparing preoperative results with postoperative results

Category	Preoperative (N = 52)	Postoperative (N = 52)	p-Value
Gluteal ptosis grade, median (range)	3 (0–3)	1 (0–3)	<0.05 <sup>a</sup>
Satisfaction score (mean ± SD)	1.85 ± 0.61	4.31 ± 0.61	<0.05 <sup>a</sup>

Abbreviation: SD, standard deviation.

<sup>a</sup>p-Value is statistically significant.

A surgical gluteal lift procedure was performed in 71% of the cases with an average BMI of 33 kg/m<sup>2</sup>. Among them 15 cases were operated with an additional autoaugmentation flap with a BMI average of 25 kg/m<sup>2</sup>. Furthermore, the rest 15 (28.8%) cases were treated with liposculpture without surgical gluteal lift (► **Table 1**). The average BMI was approximately 32.5 kg/m<sup>2</sup>. Liposculpture was a stage of contouring in nine cases either preceded or planned to be followed by surgical lift (average BMI: 37.7 kg/m<sup>2</sup>). Six cases complained of adipose tissue excess in the gluteal region without skin redundancy (average BMI: 27.4 kg/m<sup>2</sup>).

Other aesthetic procedures were combined with the main one in eight cases with an average BMI of approximately 28.23 kg/m<sup>2</sup>. Inguino-crural lift, thigh lift, and gynecomastia surgical repair were associated with five, two, and one case, respectively. The mean intraoperative time was 172 minutes.

### Outcomes and Complications

The postoperative hospital stay period was approximately 4 days. Drains were removed after 5.6 days on average. Only three cases needed postoperative blood transfusion (one unit). They were of the liposuction cases, with preoperative Hb around 11 and postoperative 2 to 3 gm/dL drop.<sup>7</sup> Postoperative ptosis grade was reduced by 1.1 grades on average. A postoperative self-satisfaction score of 4.3 after the preoperative score was reported. Changes in value from preoperative to postoperative points are significant with all p-values <0.001 using paired t-test and paired Wilcoxon test (► **Table 2**).

The most represented complications were superficial wound dehiscence and seroma (► **Table 3**). Three cases of postoperative seroma managed by syringe drainage 1 week apart within the first month until it resolved, mostly after the third one, were reported. One case had hyperesthesia at the upper right thigh inguinal region for 2 months that improved with anti-inflammatory prescription. Eight cases had a

little degree of wound dehiscence that healed with secondary intention, and two of them needed local anesthetic revision. No reports of any major complications (e.g., infection, pulmonary embolism, deep vein thrombosis, or mortality) were noted.

### Discussion

Patients with MWL nowadays seek gluteal region contouring of ptotic skin, lipodystrophy, or flattened projection. There are many described articles addressing this with different techniques.<sup>8</sup> Pitanguy and Regnault tried skin excision of the trochanteric area and gluteal fold, whereas Gonzalez-Ulloa and Lockwood decided to conduct total surgical gluteal lifting with very good improvement at the expense of extensivescarring.<sup>9–11</sup>

**Table 3** Complications

Complication	Percentage % (N = 52)
Superficial wound dehiscence	11.54
Wound dehiscence needed revision	3.85
Seroma	5.77
Hematoma	0
Skin flap necrosis	0
Postoperative blood transfusion	5.77
Dressing hypersensitivity	1.9
Thigh hyperesthesia	1.9
Infection	0
Thromboembolic events	0
Mortality	0

Levan and Bassilios Habre described their algorithm to address gluteal deformities according to different analyzed body types based on body morphology, redundancy degree, and pre-existing gluteal projection. Recommending a superiorly placed belt lipectomy for cases with flank lipodystrophy with a minimal deformity in the lower buttocks is also agreeable for the aforementioned authors.<sup>12</sup>

Based on the scientific fact that confirms that there is a significant increase in complication incidence among morbidly obese and severely morbid obese patients undergoing even a single body contouring procedure,<sup>13</sup> this study considered the (post-MWL) BMI at the time of body contouring surgery as a main factor for decision making, being an important predictor for postoperative complications. Considering morbidly obese degree starting from 35 kg/m<sup>2</sup>,<sup>11</sup> so we considered this as the cut-off point that we will decide at which if we can combine more than one procedure or not.

BMI was a landmark for the current study to simultaneously decide in doing more than one procedure. The current study preferred the staging of the gluteal reshaping procedures with BMI  $\geq 35$  kg/m<sup>2</sup> and not combining surgical gluteal lift with autoaugmentation or even with long abdominoplasty procedure as an inverted T technique. The staging was also the policy with cases with BMI  $> 35$  kg/m<sup>2</sup> and required liposculpture with the surgical lift.

Small et al stated that MWL patients had a statistically significant increase in complication incidence when even performed an abdominoplasty with the surgical gluteal lift.<sup>14</sup> Marchica et al reported higher complication rates in patients with MWL due to dietary, metabolic, or psychosocial issues and combined surgery.<sup>15</sup> However, the statistical results of Levan and Bassilios Habre showed no significant increase in complication rate when more than one procedure is combined.<sup>12</sup>

In their comparative study between the combination and the noncombination of autogluteal flap augmentation with belt lipectomy, Levan and Bassilios Habre reported that postoperative projection of the belt lipectomy-only procedure was less than that of the autoflap augmentation. Moreover, they preferred using implants to increase projection.<sup>10</sup> In the current study, we did not use any implants in such kind of patients to avoid any increase of complication incidence.

This study follows the study of Pajula et al's study<sup>16</sup> where no significant relationship exists between the type of weight-loss procedure and the incidence of the complications. Post-drain removal seroma is a common problem in gluteal reshaping mainly due to the abdominal region association (i.e., just liposuction or belt lipectomy). The current study practiced managing with serial weekly-apart aspiration. This is in agreement with the study of Richer-Stoff highlighting the importance of quick seroma handling to avoid superinfections<sup>17</sup>. Aly and Mueller stated that injecting a sclerosing agent (e.g., doxycycline) through the drains every 2 to 3 days to decrease the pocket size subsequently reduces seroma. In addition, they also supported progressive tension closure.<sup>18</sup> Small and colleagues showed their experience using barbed sutures for rectus plication, progressive

tension closure, and dermal closure. They claimed that these sutures help to reduce seroma incidence and reduce surgery time by 1 hour.<sup>14</sup>

The postoperative evaluation depended on the objective and easily applicable means as standardized photographic comparisons as well as assessment of patient self-satisfaction based on Likert scale enable the patients easily express without confusion. Moreover, Levan and Bassilios Habre complicated the satisfaction assessment by involving three unrelated surgeons' studies to assess their evaluation of the cases using preoperative and postoperative photographs; however, they reported high satisfaction rates in MWL patients whatever technique used.<sup>12</sup>

We can consider that one among the pros of this strategy is that it is a simple and uncomplicated strategy that relies on fixed elements, which makes it easier for surgeons to make a decision, and also makes it easier for them to explain simply to this kind of patients with high ambitions after MWL. Thus, we can create and unify treatment plans, which make the matter smooth and proceed in successive well-organized steps. Additionally, using simple and widely available techniques that needed no special equipment or trained specialized technicians was one of the advantages of this study. It is possible to see some shortcomings in this strategy because it did not take into account some other considerations such as the type and distribution of skin redundancy that may affect the way of thinking about the integration of more than two surgical procedures together, and therefore it is difficult to apply it to all ethnic groups, but it can be considered at least an initial step in developing a preliminary surgical plan.

Despite being limited by its small sample size for causes related to the strict selection of included patients to obtain more significant results, this study is unique in determining objective findings such as the BMI and the adipose tissue status. Moreover, the study was applied on similar ethnic groups with the same style of distribution of the adipose tissue and the skin redundancy, as well as similar concepts of the concerns of that kind of patients about the gluteal region contouring. However, this is an initial study that requires more large-scale patients and further assessment to validate the data in a more evidence-based manner.

To conclude, this study personalized an easy strategic approach on each patient to treat considering adipose tissue distribution, gluteal skin status, and BMI as the main factors that can forcefully affect the plan to guarantee reduction of unpleasant results and complications and improve patient satisfaction.

#### Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study protocol was approved by the Ethics Committee (MFM-IRB), code number: MD/18.12.109.

**Patient Consent**

Written informed consent was obtained from all the patients.

**Author Contributions**

Conceptualization, data curation, formal analysis, methodology, visualization: M.A.M., A.M.Z., A.M.B.E.-D., A.H.E.-S., F.B., and V.V. Project administration: M.A.M., A.H.E.-S., F.B., V.V. Writing-original draft: M.A.M. and A.M.Z. Writing-review and editing: M.A.M., A.M.Z., A.M.B.E.-D., A.H.E.-S., and F.B., V.V.

**Conflict of Interest**

None declared.

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