Male Aesthetics for the Gluteal Area: Anatomy and Algorithm for Surgical Approach for Dynamic Definition Body Contouring

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Background: Gluteal prominence is a unique characteristic that is widely acknowledged in female contouring but ignored in the male population. This study focuses on male gluteal aesthetics based on a muscular anatomical approach.

Methods: A retrospective review of gluteal contouring in men from January of 2012 to September of 2019 was conducted. Male body sculpting surgery in the gluteal area was performed in most cases. Patients were included according to preoperative assessment and the American Heart Association risk analysis. The gluteal area was divided into four main anatomical contouring zones and classified according to the procedure type. The follow-up period of 3 months to 6 years was included with photographs and medical assessment data. A nonstandardized satisfaction survey was performed postoperatively.

Results: The analysis included data from 374 consecutive gluteal dynamic definition liposculptures performed in men (mean age, 38.2 years; range, 20 to 66 years). Patients were treated according to the authors' new classification of deformities. Fat extraction, liposhifting, and fat grafting were performed on a regular basis to enhance and define the gluteal area. A satisfaction index of 92.5 percent was reported. Minor complications were reported: seroma, 0.2 percent; prolonged bruising, 1.3 percent; and swelling, 1.8 percent. No necrosis, burns, or infections were reported.

Conclusions: Men have been increasingly requesting improvement and definition of the buttocks, and our novel algorithm allows for a reliable method in this regard. The high satisfaction index supports the natural and athletic results accomplished with our new approach. (*Plast. Reconstr. Surg.* 146: 00, 2020.)

Gluteal prominence is a unique human characteristic that results from standing and bipedal locomotion. Many cultures recognize this feature as a female characteristic associated with fertility and sexuality[1] with the aesthetic standards of the glutei in women. Operative classifications and surgical techniques for women have been well established.[2–5] To date, however, aesthetic procedures for the gluteal region in men have been based on criteria for the female shape and volume enhancement, without differentiating the unique aesthetic features and anatomical standards for men.

The gluteal shape in men is clearly different, having a square shape in the standing (resting) position and a butterfly shape during active contraction from the posterior view, rather than the rounded female shape. Therefore, achieving the male gluteal contour requires dividing the perigluteal region into clear anatomical areas to effectively plan the contouring procedure.

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A "Hot Topic Video" by Editor-in-Chief Rod J. Rohrich, M.D., accompanies this article. Go to PRSJournal.com and click on "Plastic Surgery Hot Topics" in the "Digital Media" tab to watch.

Increasingly, men pursue aesthetic body contour surgery, which has challenged plastic surgeons to develop male-specific approaches. We propose a new approach to gluteal contour reshaping and enhancement in men that focuses on the desired shape at rest and during contraction, associated with dynamic definition body contouring principles, providing a natural appearance aligned with the patient's underlying anatomy.

PATIENTS AND METHODS

We performed a retrospective analysis of men who underwent body contour reshaping and/or enhancement of the gluteal region at our center between January of 2012 and September of 2019. Inclusion criteria were as follows: body mass index less than 32 kg/m^2; nonsmoker or previous smoker of more than five packs per year (with these patients asked to stop smoking and attend supportive group therapy as needed); good general health with no risk factor for surgery (American Society of Anesthesiologists class less than III) according to the guidelines of the American Heart Association; and absence of hematologic abnormalities and/or scarring illnesses. Patients with lung disease, diabetes mellitus, or any systemic disease were assessed by their physician to be cleared for surgery.

The study group included 374 men, with a mean age of 38.2 years (range, 20 to 66 years) and a mean body mass index of 26.5 kg/m^2 (range, 22 to 32 kg/m^2). All procedures were performed by AQ3 the first author (A.E.H.) at his private practice in Bogota, Colombia. All patients provided informed consent for the procedure, including authorization for the use of photographs for research purposes. The study adhered to the principles of the Declaration of Helsinki, local guidelines, and protocols for human subjects.

Anatomical Description

Our anatomical description of the male gluteal region, including landmarking and references, is based on cadaveric dissection studies. The first author performed four gluteal cadaveric dissections during a plastic surgery meeting (in collaboration with the l'Université de Paris) and wrote down the findings to finally ponder the following anatomical regions.

Zone 1, or the flank, extends from the margins of the posterior lower rib cage margin, to the superior iliac crest and lateral border of the erector spinae. This area consists of the thoracolumbar fascia, the latissimus dorsi, and the lateral portion of the external oblique muscle.

Zone 2, or the central zone, is subdivided into two areas: the rhomboid of the sacrum (the rhomboid of Michaelis) and the erector spinae muscles. The area is limited inferiorly by the medial and superior insertion of the gluteus maximus, creating a V shape (Fig. 1). The upper border is F1 delimited by the lateral border of the erector spinae muscles (i.e., iliocostalis, longissimus, and spinalis). An adipose pad over the sacral prominence is possible, particularly in overweight and obese patients.

Zone 3, or the gluteal zone, is subdivided into the following three areas: gluteus maximus, gluteus medius, and trochanteric depression. The gluteus maximus dominantly contributes to the convexity of the area, particularly in slim individuals. Its origin rises from the posterior gluteal line of the ilium, the posterolateral surface of the sacrum, the coccyx, and the sacrotuberous and sacroiliac ligaments. Most fibers course in an inferolateral direction to insert into the iliotibial tract (Fig. 2). The deep fibers insert into the gluteal F2 tuberosity of the femur. A depression over the posterior superior iliac spines is created by the lack of muscle coverage of this bony structure. A triangle is formed between the two depressions on either side of the midline and the gluteal cleft, which is crucial to give the buttocks a natural and youthful appearance (Fig. 1). The inferior medial border of the gluteus maximus is covered by gluteal fat, creating the medial part of the infragluteal fold. Laterally, the gluteus maximus tapers between the long head of the biceps femoris and the vastus lateralis. The muscle bulk of the gluteus maximus (posteriorly) and the gluteus medius (superiorly) create a C-shaped concavity, with the greater trochanter lying as an inverted vertex between the greater trochanter and the muscle fibers of the gluteus maximus. This depression is important to keep the masculine appearance, as it is more pronounced in men than in women. Thus, misshaping in this area is critical to aesthetic outcomes.

The gluteus medius is lateral to the gluteus maximus, a fan-shaped muscle that originates AQ4 from the lateral iliac crest and runs from the anterior part of the lateral aspect of the ilium to the lateral surface of the greater trochanter, and continuous with the lower flank. It is bounded by the tensor fasciae latae muscle, which crosses from the iliac crest just posterior to the anterior superior iliac spine and inserts into the iliotibial tract at approximately the level of the infragluteal crease. Deeper and below the gluteus medius lies the iliac bone, without any adjacent noble structure. Consequently, a specific plane can be dissected

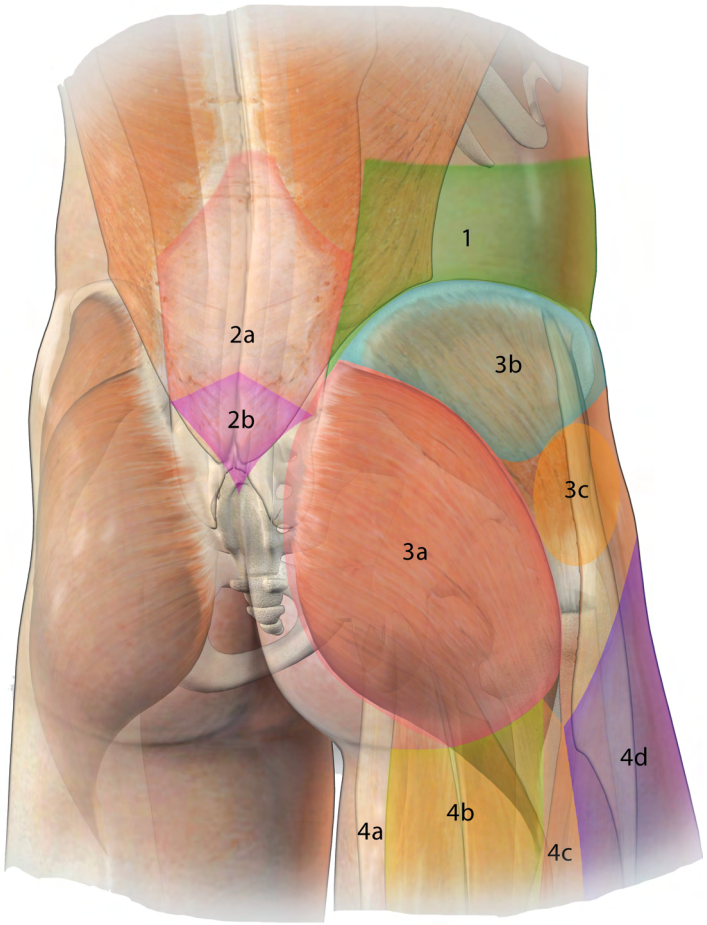

Fig. 1. Hoyos male gluteal anatomical landmark classification. Zone 1, flank zone; zone 2, central zone, consisting of the erector spinae muscles (*2a*) and the rhomboid of the sacrum (*2b*); zone 3, gluteal zone, consisting of the gluteus maximus (*3a*), gluteus medius (*3b*), and trochanteric depression (*3c*); and zone 4, infragluteal zone, consisting of adductors (*4a*), biceps femoris (*4b*), iliotibial tract (*4c*), and vastus lateralis (*4c*).

beneath the isolated gluteus medius, allowing a safe fat graft inoculation with a low risk for migration (Fig. 3).

The trochanteric depression is located below and lateral to the gluteus medius, a critical zone for the masculine, final appearance. It is an adhesion zone where no fat is accumulated and must be defined, as it will outline the lateral border of the male square buttocks. The gluteus medius, trochanteric depression, and lower flank create a specific concavity, which is described later (Fig. 4) (see Intraoperative Procedures).

Zone 4, or the infragluteal zone, is subdivided into four areas: the adductors, biceps femoris, iliotibial tract, and vastus lateralis. Muscles of the infragluteal zone form the posterior compartment of the thigh. Only the distal tendon of the long and short heads of the biceps femoris (laterally) and the semimembranosus and semitendinosus (medially) are observable on the popliteal fossa. Hip and knee flexion produce a groove or ridge between the long and short heads of the biceps femoris and vastus lateralis, which courses upward over the trochanteric depression, dividing the thigh into anterior and posterior compartments. The tensor fasciae latae muscle continues superiorly with the upper portion of the gluteus medius and, eventually, the flank.

Preoperative Markings

The male gluteal shape is mainly determined by the underlying gluteus maximus with little adipose tissue, with the sharp edges producing a distinctive slim and muscular appearance. Because of hormonal receptors and estrogen-related fat deposits, compared to women, men do not accumulate significant amounts of adipose tissue in

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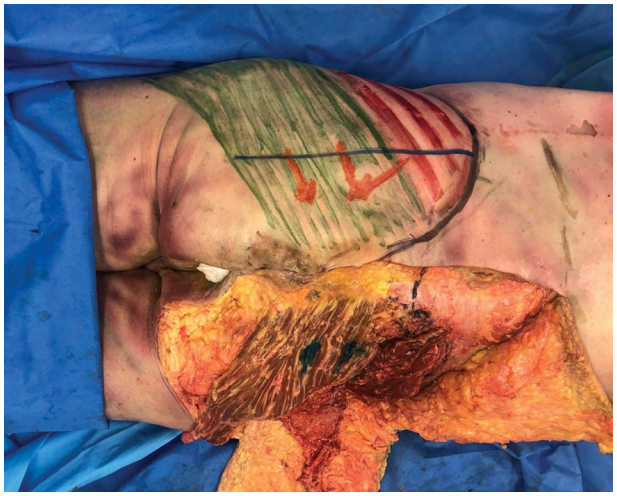

Fig. 2. Cadaveric dissection of a 54-year-old man, showing right gluteus maximus isolation. Notice the muscular fiber arrangement. Anatomical landmarks are drawn over the skin in the left gluteus. The *blue marks* over the right gluteus muscle represent the *red lines* on the left skin markings, which illustrate the superior and inferior neurovascular gluteal bundles. The *blue line* describes the gluteal midline.

the gluteal area, but rather in the central abdomen and torso. If present, these fat deposits are marked for resection.

The superior gluteal edge is identified with the patient in the upright position, following the shape of the iliac bone to the anterior iliac crest. Subsequently, the posterior lower rib edge and the lateral border of the erector spinae are marked, delimitating the flank zone where the fat can be freely removed. Next, the trochanteric depression is marked on the lateral side and a line is traced from its upper limit to the top of the intergluteal crease, creating a triangular area (red zone) for complete (deep and superficial) fat removal (Fig. 1).

The inferior gluteal area is marked and divided into its four zones by placing a vertical line through the center of the gluteus maximus and a horizontal line through the inferior gluteal crease. A total of three negative areas (targeted for smooth definition and carving out the fat for body sculpting[6]) are marked: the proximal portion of the inner thigh, the red zone, and the trochanteric depression. In the thigh, there is a negative space over the posterior portion of the lateral intermuscular sulcus, between the quadriceps and the biceps femoris, which should be avoided during liposuction to prevent contour defects.

The adhesion zone of the middle third of the inner thigh is marked to avoid deep liposuction over this area. If absolutely necessary, very

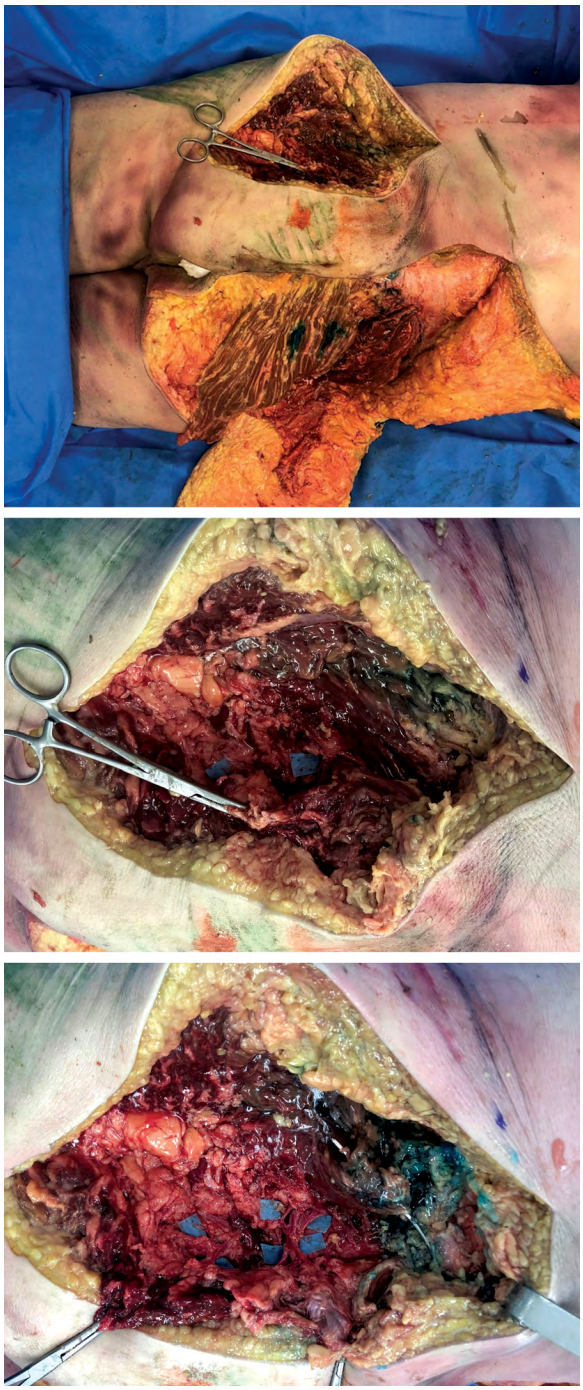

Fig. 3. Cadaveric dissection of a 54-year-old man. (*Above*) Left gluteus maximus transection with left gluteal nerve and artery isolation under the muscular plane. Comparison with the right gluteus maximus dissection. (*Center*) Detail of the left gluteal superior and inferior neurovascular bundles (*blue papers*) and the transected gluteus maximus muscle (Kelly forceps). (*Below*) Notice the blue dye on the gluteus medius, reached by the curved cannula within a safety plane in relation to the neurovascular bundle.

smooth superficial liposuction can be performed in this area. A line is drawn from the superior border of this zone of adherence to the infragluteal

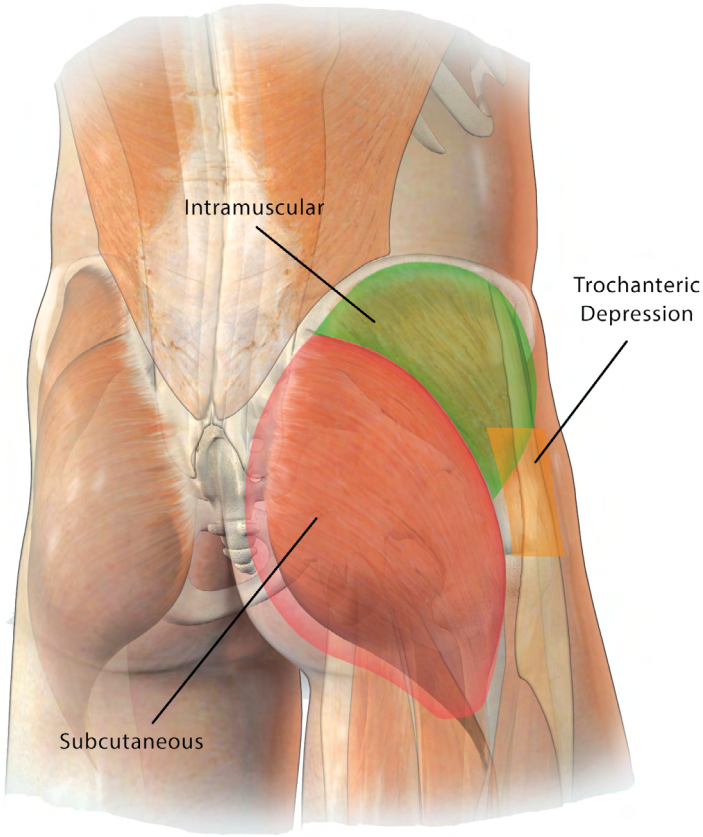

Fig. 4. Fat grafting over the gluteal area. Subcutaneous graft placement is now mandatory. However, before 2014, we performed a multilayer (subcutaneous/intramuscular) approach over the gluteus medius. The trochanteric depression is crucial for a masculine and youthful appearance.

midpoint. Lateral to the infragluteal midpoint, the border of the gluteus is identified by grasping the posterior thigh muscles and rotating them externally to identify extra fat on the lateral buttocks that can be shifted or removed by smooth liposuction.

Finally, the outlined gluteal area is divided into horizontal thirds, with volume and projection emphasized over the medial third, using smooth definition and fat grafting. Over the thigh, we marked the limits between the anterior and posterior muscular compartments, emphasizing the lateral border between the quadriceps and biceps femoris to improve the athletic appearance.

Intraoperative Procedures

The patient was placed in the prone position, with all markings observable. Incisions were performed on each side of the midpoint over the infragluteal crease and in the upper midline over the intergluteal crease. Gluteal contouring was performed using dynamic definition liposculpture, with a third-generation ultrasound device (VASER; 2018 Solta Medical–Bausch Health Companies, Inc., Bridgewater Township, N.J.). We followed the regular three-step process AQ5 for liposuction and performed selective fat grafting. The first step consisted of infiltration of saline (1000 ml) combined with a 1:1000 ratio of 1% lidocaine (10 ml) and epinephrine (1 ml), with a 2:1 infiltration-to-removal volume. Subsequently, fat emulsification was achieved using the VASER Lipo system with a 3.7-mm regular two-ring probe for the flank area and a 2.9-mm regular three-ring probe for the thigh. Once the emulsification (step 2) was complete, we proceeded with liposuction.

In the second step, liposuction was started on the deep layer using the Power-X (2018 Solta Medical–Bausch Health Companies) or MicroAire System (MicroAire Surgical Instruments, LLC, Charlottesville, Va.), with a 4-mm cannula over the lower back and upper gluteal area through the intergluteal crease incision. The extraction of fat from the lower and lateral gluteal area and

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inner thigh was performed from the infragluteal midpoint bilaterally in distal-to-proximal fashion. Then, the upper gluteus maximus line and lower internal area were defined. Once the posterior zones were completed, liposuction of the inner thigh was completed with the patient in the supine position.

Negative spaces previously marked as triangles were smoothly defined to create transitions between concavities and convexities over the upper border of the gluteus maximus, the trochanteric depression, and the medial infragluteal crease. These areas must be defined more sharply in men than in women. Another important transition zone was made over the lateral thigh, between the iliotibial tract and biceps femoris and continuous with the trochanteric depression to create a shadow dividing the anterior and posterior compartments. Thorough liposuction was performed in the lower flank areas to overlap its definition with the upper portion of the gluteus medius (intergluteal crease access). This step is necessary in all male patients, as it specifically defines the muscular and athletic definition. A sharp edge was also created in the anterior zone over the tensor fasciae latae muscle, requiring a transition zone for smooth and careful definition, moving posteriorly toward the gluteus maximus and superiorly reaching the gluteus medius. A curved cannula can be used for this purpose. After completion of the definition, each treatment zone was reviewed, with refinements performed as necessary.

Fat Grafting

Two different approaches were used for fat grafting consistent with evidence for graft survival and safety.[7–9] From January of 2012 to December of 2014, adipose tissue was harvested and later passed to a 4-mm blunt cannula attached to 60-ml syringe (manual mode). From January of 2015 to September of 2019, fat harvesting was achieved using MicroAire System Liposuction, and later with a 4-mm cannula coupled with an empty sterile bottle trap ready for reinjection. Decantation was used to isolate viable fat cells from saline and blood cell components. The remaining supernatant was processed and prepared for fat grafting.

From January of 2012 to December of 2014, multilayer fat grafting was performed over the gluteus maximus and medius in all patients, using a 4-mm blunt cannula through the sacrum intergluteal access. From January of 2015 to September of 2019, the subcutaneous plane was preferred for adipose graft placement, using a 4-mm basket cannula attached to a MicroAire and peristaltic pump device (expansion vibration lipofilling) to delicately place the graft between the subcutaneous layers.[7] An angled isolated stratum was performed above the gluteus maximus for fat grafting and placed symmetrically (Fig. 4).

Equally important, the gluteus medius was carefully reached through the sacrum intergluteal crease incision bilaterally to achieve a selective intramuscular fat graft using a blunt-tip, 4-mm, Mercedes, 30-degree curved cannula. Notably, the surgeon always has to be aware that the trochanteric depression must not be grafted. Lastly, symmetry was evaluated with photographs and visualization from all angles. Once the posterior zone was finished, some additional definitions can be performed in the anterior zone (thigh and flank). Finally, the ports were removed and a drain (Blake drain; Johnson & Johnson, New Brunswick, N.J.) was placed in the intergluteal crease incision to allow free residual fluid drainage. High-absorbent pads were placed over the incisions, followed by application of a garment and foam vest to facilitate skin adhesion along the incisions.

Postoperative Procedures

Patients requiring more than 5000 ml of fat extraction, and those requiring additional procedures or having comorbidities, such as hypertension or diabetes, were admitted for overnight observation. The garment and foam vests were used during the immediate postoperative period, for 8 to 12 weeks. Patients were enrolled in the postoperative care program, in which daily lymphatic drainage, massages, and ultrasound therapy were provided. The drain output was assessed at each therapy appointment, with drain removal on postoperative days 3 to 7 once drainage was resolved. Although the supine position was recommended during resting, there was no strict contraindication on positioning, provided that there was no pain. Early mobilization was promoted. Postoperative photographs were taken in the standing position, in lateral, oblique, and posterior views, at postoperative week 1 and at 1, 3, 6, and 12 months.

Patients completed a nonstandardized survey of satisfaction at 3 or 6 months after surgery, either at the follow-up appointment or through a secure online access. Satisfaction was also evaluated by having patients compare their before-and-after photographs. We also performed magnetic resonance imaging in five of the 374 patients (randomly selected), before surgery and at 2 (three patients) and 4 (two patients) years after surgery, to evaluate the integration and survival of the fat graft.

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Fig. 5. Gluteal high-definition liposculpture in a 36-year-old male patient. Notice the new projection and definition of the gluteal region in the postoperative (*below*) photographs compared with the preoperative (*above*) ones. The trochanteric depression is preserved and volume is added to fit the patient's wish. Gluteus maximus graft, 250 cc each; gluteus medius graft, 100 cc each.

AQ8

RESULTS

High–dynamic definition liposculpture, including enhancement of the gluteal area with selective fat grafting, was achieved in all cases (Figs. 5 through 7 and Table 1). The mean volume of fat extraction was 5400 ml (range, 1200 to 12,800 ml), with a median gluteal fat graft volume of 350 ml (range, 200 to 800 ml). Final fat graft volume was determined depending on the projection needed and was achieved intraoperatively by comparison while performing the grafting, independent of the layer location (intramuscular versus subcutaneous). Generally, a 4:1 ratio of gluteus maximum–to–gluteus medius fat graft volume was used.

F5-F7

T1

Minor complications included seroma with fever [one of 374 patients (0.27 percent)], treated using a 1-week period of drainage and 5-day antibiotic treatment (with no microorganisms isolated from cultures); fluid accumulation caused by unintentional early (postoperative day 2) drain removal [two of 374 patients (0.5 percent)]; minor

Fig. 6. Gluteal high-definition liposculpture in a 41-year-old male patient. The lack of definition over the gluteal area in the preoperative photographs (*above*) resembles a female buttock, whereas the postoperative (*below*) photographs depict the trochanteric depression sharpness and improved volume in the gluteus maximus and medius. Gluteus maximus graft, 350 cc each; gluteus medius graft, 100 cc each.

bruising [five of 374 patients (1.3 percent)] but with no hematoma noted; and prolonged swelling [seven of 374 patients (1.8 percent)]. No major complications (infection, skin necrosis, tissue suffering, fat embolism, or death) were reported. All patients were reevaluated at 24 or 38 hours after surgery. Of the 374 patients included, 254 (67.9 percent) were followed up at 3 years and 182 (48.6 percent) were followed up at 6 years.

Of the 374 patients, 326 (87 percent) provided feedback on satisfaction, with the distribution as follows: above expectations, 243 (74.5 percent); good, 59 (18 percent); average, and 19 (6 percent); and below expectations, five (1.5 percent). None of the patients reported poor results.

Magnetic resonance images confirmed a high percentage (approximately 60 percent) of fat graft integration and survival. Gluteus medius and gluteus maximus grafts improved the volumetric appearance of the male gluteal area, without differences between the subcutaneous and intramuscular layers.

DISCUSSION

Our anatomical approach to contouring of the gluteal region in men resulted in 92.5 percent

Fig. 7. Gluteal high-definition liposculpture in a 32-year-old male patient. A round and feminine buttock is clearly noticed in the preoperative (*above*) photographs. Notice the new masculine and more athletic appearance of the postoperative (*below*) gluteal region. Gluteus maximus graft, 150 cc each; no gluteus medius graft.

patient satisfaction (good or above expectations), with few minor complications and no major complications. Our anatomical approach was designed to achieve an ideal muscular contour for an athletic appearance of the buttocks (Figs. 5 through 7). We divide the gluteal region into distinct zones, based on the underlying anatomy, identifying regions to be avoided and those requiring shaping and enhancement. The following features are emphasized: fat-free and sharp definition of the flank, sacrum, and erector spinae and selective enhancement of the gluteus maximus and medius. Gluteus medius fat graft injection provided a significant benefit by improving the butterfly shape (muscular appearance) but requires careful consideration of the adjacent muscular and vascular structures; safety standards must be evaluated in future research. According to previous evidence,[9] we swift the plane to subcutaneous fat graft injections for enhancement (rather than intramuscular or subfascial fat grafts) for efficacy and safety, with long-lasting outcomes confirmed by magnetic resonance imaging. The complete safety and reproducibility of our anatomically based approach requires confirmation. In addition, we did not use a standardized assessment of patient satisfaction.

AQ9

Table 1. Measured Variables and Additional Procedures

Characteristic	Value
No. of patients	374
Age, yr	
Average	38.2
Range	20–66
Body mass index, kg/m^2	
Average	26.5
Range	22–32
Fat graft volume, ml	
Average	350
Range	200–800
Subcutaneous fat grafting (2015–2019)	239
Multilayer fat grafting (2012–2014)	135
Liposuction volume, ml	
Average	5400
Range	1200–12,800
No. of pectoral grafting patients	197
No. of complete body HD liposculpture patients	339

HD, high-definition.

Regardless of these limitations, our approach did produce high patient satisfaction, with the aesthetic goals achieved in all cases. The long learning curve with procedures needed for satisfactory results must be considered.

SUMMARY

An anatomy-based approach was developed to guide the surgical contouring and shaping of the gluteal region in men. The approach includes specific features, including selective subcutaneous fat grafting of the gluteus medius to achieve the specific athletic features of the male buttocks. Validation of findings is warranted for full acceptance of the approach in practice.

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AUTHOR QUERIES

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