Combining Fat and Implants for Gluteal Augmentation

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KEYWORDS

• Buttock augmentation • Buttock implants • Gluteal augmentation • Gluteal implant complications • Gluteal implant revision • Gluteal implants

KEY POINTS

- Surgical anatomy for gluteal implant surgery.
- Dual-plane buttock implant pocket dissection, technical suggestion for safe and efficient hybrid gluteal augmentation surgery with both implants and fatgraftin.
- Possibilities of combine waist shaping liposculpture and expansion vibration lipofilling fat grafting.

Video content accompanies this article at http://www.plasticsurgery.theclinics.com.

Gluteal augmentation is steadily increasing in patient demand as well as performed procedures. Large-volume fat grafting for reshaping and/or augmenting buttocks, the so-called BBL procedure, remains the most popular option.[1] According to data from the International Society of Aesthetic Plastic Surgery, on a global scale, 31,330 augmentation procedures involving implant placement have been performed.[2] Buttock implants are less frequently used, as many surgeons shy away from their use, and there is a common perception that buttock implants would be very prone to complications. It is impossible to deduce from the current statistics the number of hybrid buttock augmentation procedures performed, as gluteal augmentation procedures are reported as "fat grafting" or "implant-based," rather than "hybrid" in the society's survey. Combination procedures are not always differentiated. With growing popularity of hybrid buttock augmentation, statistics may one day specify and differentiate the various techniques surgeons used. The buttock implant procedure has been brandmarked with a disproportionally high complication rate, with published values exceeding 38%.[3] It seems reasonable to presume that this high complication rate may reflect surgeon inexperience with the buttock implant procedures, rather than inherent flaws of the operation.

Important advantages of using buttock implants include stable volume augmentation and creation of core projection. Furthermore, buttock implants are, in contrast to fat grafting only BBL, not associated with potentially lethal fat embolism. Fat embolism and the unfortunate downstream consequences have been a major safety concern in the plastic surgery community since its first description in 2015.[4] Safety precautions and techniques are active topics of discussion among experts of plastic surgery society task force groups and the media.

When combining gluteal implants and fat grafting, we generally prefer round implants, although use of anatomical implants has been described and is favored by others.[5] For optimum outcomes with best possible safety profile, we recommend the combination of cohesive silicone gel buttock implants together with large-volume "expansion vibration lipofilling" (EVL) fat grafting and have branded the hybrid approach "supercharged BBL." The original description of this technique was in 2019.[6] Hybrid buttock augmentation has

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also been described with syringe fat grafting technique.[7]

The most important key for success is achieving good soft tissue coverage over the implants. Thus, we suggest a dual-plane pocket technique, dissecting the cranial part of the pocket in a submuscular plane under gluteus maximus and gluteus medius muscles and transitioning to a deep intramuscular level when reaching the sciatic foramen. Dual-plane pocket dissection provides the thickest possible muscle coverage superiorly but also allows for a protective layer of muscle between the implant and sciatic nerve in the critical lower half of the pocket.[8]

The hybrid supercharged buttock augmentation technique is especially suitable for male to female gender reassignment[9] and is currently our first-line option for this patient collective. Description of submuscular approaches exist although we suggest that these in fact may refer to the concept of very deep intramuscular pocket dissection.[10,11] For an optimum outcome, we recommend supplemental fat transfer to the hips, along the lateral edge of the gluteal muscle. Also, if the patient presents with a significant lateral deficiency, it is critical to add volume to the trochanteric depressions. We endorse EVL, described by Del Vecchio and Wall,[12] as the most efficient and efficacious technique for this purpose.

SURGICAL TECHNIQUE

Step 1: Liposuction and Fat Grafting

We favor combination anesthesia with both general anesthesia in addition to a spinal block. We circumferentially scrub and prepare all surgical sites while patients are in the standing position in order place them directly on the operating room table/sterile field; this allows for the freedom to reposition patients intraoperatively without the need for additional supplies, which ultimately saves expenses and time. Surgery is started in the supine position for fat harvest and waist liposculpture. Liposuction technique depends on the preference of each surgeon. There is no evidence for superiority of any single technique over others. Our preference is vibration power–assisted liposuction with fat collection in single closed canister in a closed sterile circuit.

We typically start in the supine position with tumescent infiltration containing adrenaline and tranexamic acid but no lidocaine. Tumescent infiltration and fat equalization are performed with 5 mm or 4 mm basket cannula, shaping liposuction of the abdomen, and the flanks with 4 mm Mercedes cannula. Achieving a good result in gluteal augmentation translates to creating a feminine waist-to-hip ratio. Special emphasis is placed on shaping the area adjacent to the iliac crest, especially the fat pad below the crest, referred to as the BIC (below-iliac-crest) zone. Modest liposuction in this area contributes to the impression of a "shorter and rounder" buttock, whereas overzealous suctioning in this area can create a "subiliac-hollow" appearance; this is very difficult to correct and should be avoided. The exact amount of liposculpting is essential here (**Fig. 1**).

Fat grafting can be done before or after implant placement, alternatively both, so the larger amount of graft can be placed before implant placement. If sufficient fat is available, additional fat transfer can be performed to smooth transitions and make final shape adjustments after implants are in position.

Fig. 2 shows possible fat grafting areas in green and implant locations inside the gluteus muscle in purple color. The fat is injected into the marked areas by positioning the cannulas in the subcutaneous planes via small incisions made on the flanks and infragluteal folds. The preoperative topographic marking is key for the success of the fat transfer. During this process, graft is injected subcutaneously through several passes using the EVL technique. Care is taken to find the perfect balance between passes for vibration tissue expansion in order to loosen up the tissue scaffold accommodating fat infiltration without over dissection of the soft tissue support. We recommend focusing on the perigluteal areas lateral to the gluteus major muscle border and avoid the incisional zone for pocket access. Our aesthetic focus remains on grafting into the trochanteric depressions (hip dips) where volume replacement is highly desired, because traditional gluteal implants will not provide volume in this region. The liposuction/fat grafting technique is demonstrated in Video 1.

Step 2: Pocket Dissection and Implant Placement

A new sterile field is prepared before dissection is started. In addition, a betadine-soaked compress is sutured over the anus using a number 0 silk stitch, to achieve a watertight separation from the surgical field.

We perform ultrasound measurement of gluteus mayor muscle thickness and subcutaneous fat layer before pocket dissection. The procedure entails making a 5-cm skin incision on both sides of the intergluteal cleft. We favor a 2-incision access over a single gluteal cleft incision. The initial dissection is beveled, leaving adequate subcutaneous fat for closure and preserving the sacrocutaneous

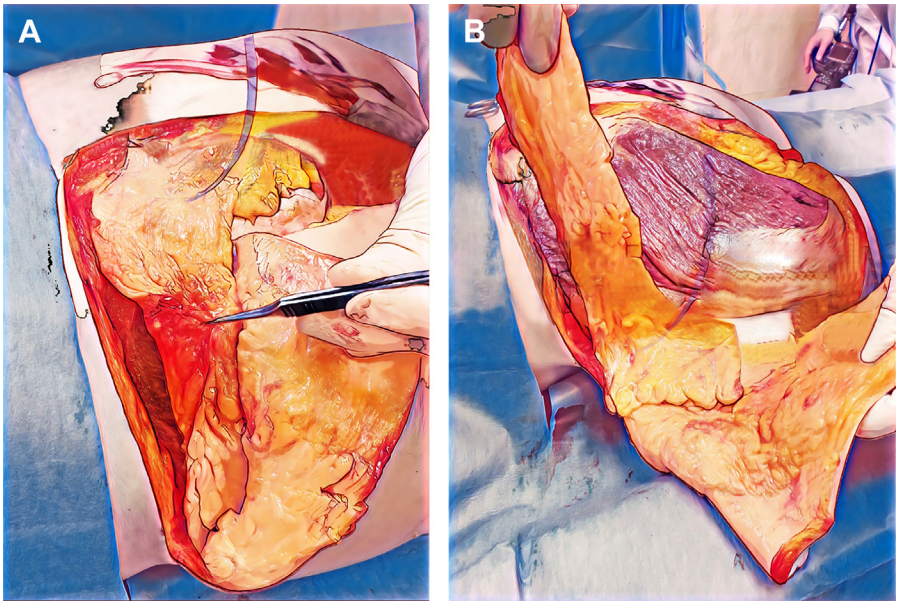

Fig. 1. (*A, B*) Dissection of subiliac fat pad in cadaver specimen.

ligament. The dissection proceeds until the gluteus maximus is identified, at which point direct access to the muscle fascia is created. In the cranial part of the incision, the muscle is split vertically, and a dissection clamp is pushed down to the concavity of the iliac bone shovel. Enough muscle dissection should be made to leave a thick muscle flap of around 3 cm. A blunt dissector is first used to create a submuscular space for the implant in the upper half of the implant pocket (**Fig. 3**). When the dissection approaches the height of the sciatic foramen, the dissector is beveled to a flatter angle to switch into an intramuscular plane (Video 2: Cadaveric dissection). Thus, the implant is submuscular in the cranial half of the pocket and intramuscular in the lower half of the pocket, hence the term "dual-plane" (Video 3: Animation composite gluteal augmentation with dual-plane pocket).

To avoid the aesthetic complication of a high implant malposition, the surgeon needs to appropriately expand the tight ischiocutanous ligament in the lower pole of the pocket (Video 4: Sciatic release). A sterile surgical compress is immersed in adrenaline solution and placed inside the pocket during the dissection process to prevent excessive

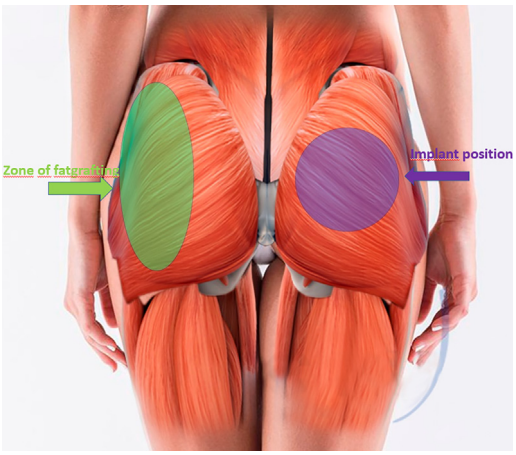

Fig. 2. Fat grafting areas in green and implant locations inside the gluteus muscle.

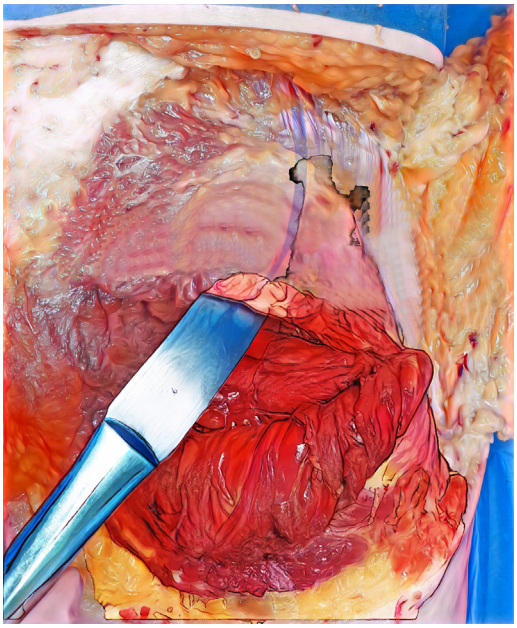

Fig. 3. Entry point into submuscular plane.

bleeding. In order to determine the ideal implant size, the surgeon can use an implant size as used for breast surgery. Alternatively, one can use soaked abdominal surgical compresses to determine pocket size. One abdominal compress corresponds to approximately 130 cc of volume. Determining accurate height and width of the implant ensures an adequate pocket is created to avoid the implant from rotating.

The implant insertion procedure begins with soaking the implant in an antibiotic solution. The implant is then inserted using the plastic funnel devices that have been sterilized. As a measure of preventing excessive fluid from accumulating in the pocket, a number 14 suction drain is placed in each pocket. It is important to double-check that the drain is not located directly on the central undersurface of the implant where it could possibly exert traction force to the sciatic nerve. Placing of final implants into the pockets is greatly simplified by using a sterile Keller funnel style plastic sleeve. For pocket closure, a dynamic suspension suture (Maxon size 0) is used to anchor each gluteal facia to its contralateral side to achieve mutual contralateral stabilization and avoid early gluteal implant ptosis (**Fig. 4**). The concept of mutual stabilization is similar to the columns of an "Arabic arch," and this is why it has been labeled "Arabic arch suture suspension." The subcutaneous layer is closed using a long-term absorbable monofilament suture, and a negative-pressure wound therapy device is used as a dressing for 7 days (**Figs. 5** and **6**).

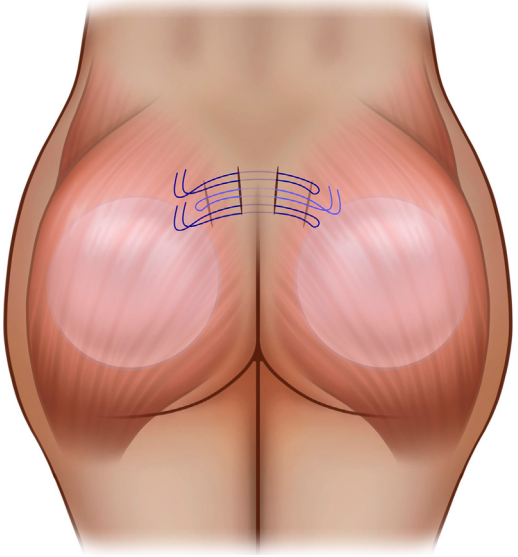

Fig. 4. Dynamic suture suspension between bilateral gluteal muscle fascia (Arabic arch, AASS suspension). AASS, Arabic arch suture suspension.

CHOICE OF IMPLANTS

In our practice, we exclusively use smooth cohesive silicone gel implants. As matters stand in 2023, these are not approved in the United States by the Food and Drug Administration (FDA). Hence, surgeons in the United States are limited to the use of solid elastomer silicone implants. Cohesive gel buttock implants come in 3 shapes: round, oval, or biconvex. We favor round implants for approximately 95% of our primary cases. Additional fat grafting gives the surgeon the possibility to alter the shape of soft tissues around the implants. Oval implants are attractive because they can give focused volume to the lower pole, but implant flipping is a problem that is challenging to manage without reoperation. Also, when using oval-shaped implants it is advisable to opt for textured-surface implants to reduce the risk of malrotation. Unfortunately, devices with a textured surface are more prone to seroma formation in the highly vascular gluteus muscle tissue. Biconvex implants provide very good projection but are only available in rather large sizes (above 370 cc) and can cause tissue thinning and atrophy. In slim-built patients with less muscle bulk they should be used with caution, as "soft tissue failure" is a risk factor.

The main objective when using buttock implants is to create projection, and round smooth will enable to achieve this sufficiently in most cases. Hip volume, or rather, filling out of trochanteric depressions, is created by EVL lipofilling. Soft tissue envelope thickening via fat grafting does also reduce visibility issues.

POSTOPERATIVE CARE

We routinely leave drains for a total of 7 days because fluid collections often peak after day 5. Ambulation is limited to the minimum necessary to prevent the implant displacement, seroma, rotation, and other complications. Especially hip flexion needs to be avoided because this brings tension on the dynamic suspension. Patients may use a foam block for "protected sitting." This means that when patients sit on a heightened surface (ie, the foam block) hip flexion is limited to less than 45 degrees. We recommend twice daily skin wash with Hibitane shower gel. Patients receive intravenous antibiotics during the procedure and oral antibiotics for 7 days after. Immediately after surgery and for 4 to 6 weeks afterward the patients are encouraged to wear compression garments. These postoperative restrictions prevent swelling while supporting the surgical areas to enhance patient comfort. Controlled, moderate-intensity stretching exercises

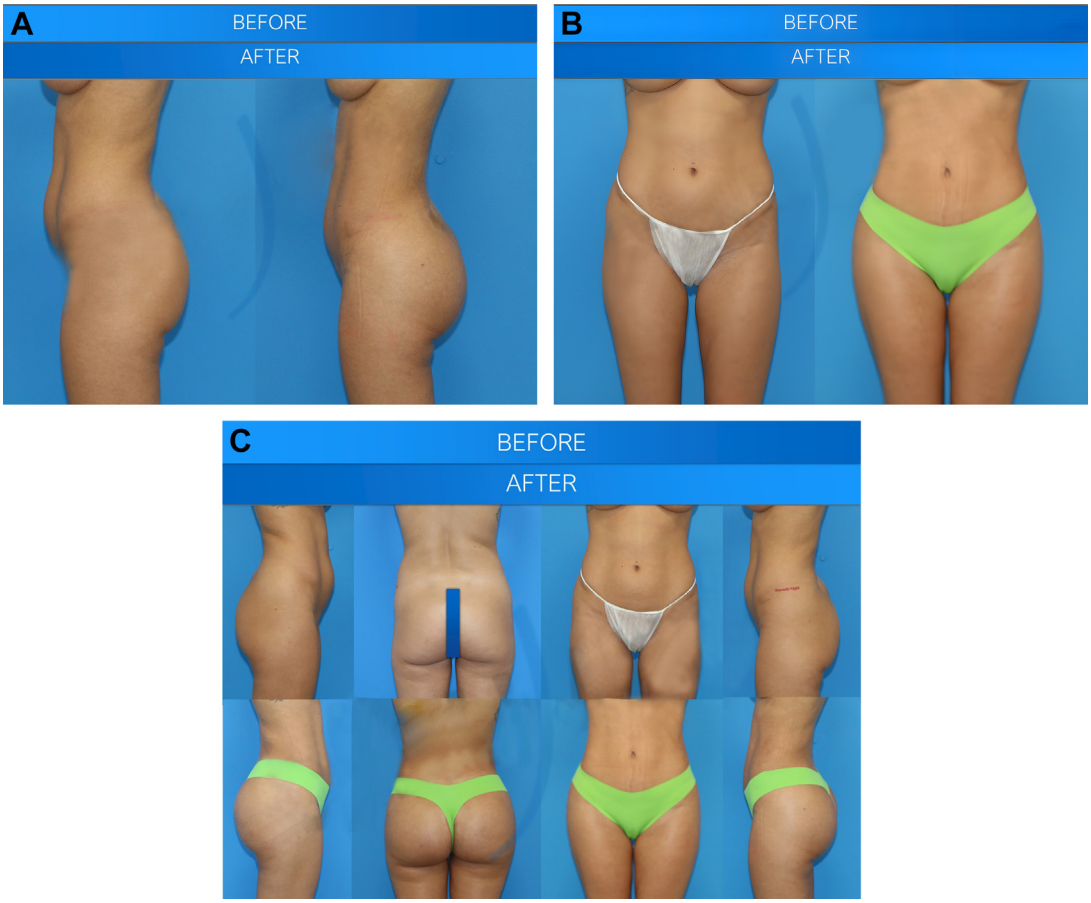

Fig. 5. (*A–C*) Before and after composite buttock augmentation 330 cc round smooth implants with dual-plane pocket, plus 400 cc EVL fat grafting on each side.

ease discomfort and speed up recovery. Regarding exercise after buttock implant surgery, we recommend to gradually increase intensity, at the earliest, 6 weeks after surgery and avoid abrupt overload. Stressing the gluteus muscle too early after surgery can lead to chronic inflammatory symptoms, which may prolong recovery and lead to irreversible damage.

Complications of Buttock Implants

The most frequent, although not necessarily the most relevant, complication in our patient collective are, usually minor, *wound healing problems* of the implant pocket incisions. We submit that one of the key advantages of using the double pocket incision is to maintain a layer of subcutaneous fat tissue padding under the incisions, facilitating secondary healing. Single midline incisions are more prone to proceed to grave problem because they do not have as much soft tissue padding.

Use of vacuum-assisted wound closure systems adapted for the use on skin incisions (3M Prevena, España S.L.) for 7 days postop offers an additional, effective barrier to protect the incision during the initial wound healing phase. Including vacuum-assisted closure systems into our protocols has cut down our incidence of wound healing complications down to 8%, compared with 25% before its use.

The most relevant surgical complication of buttock implant surgery is *periprosthetic seroma* in the implant pocket. Seroma has been reported in literature as a frequent buttock implant complication.[13,14] We propose that the highly vascular thick muscle flap surrounding the implants may encourage seroma formation. A wound opening with serous drainage can be the first clinical sign and should always alert to screen for possible pocket seroma. We advise leaving suction drains for a minimum of 7 days. This period may seem long but helpful because patients are often significantly more mobile around day 5 postsurgery and are hence prone to develop a subacute seroma.

Infection in our experience is nearly always secondary due to an uncontrolled seroma. Drainage of

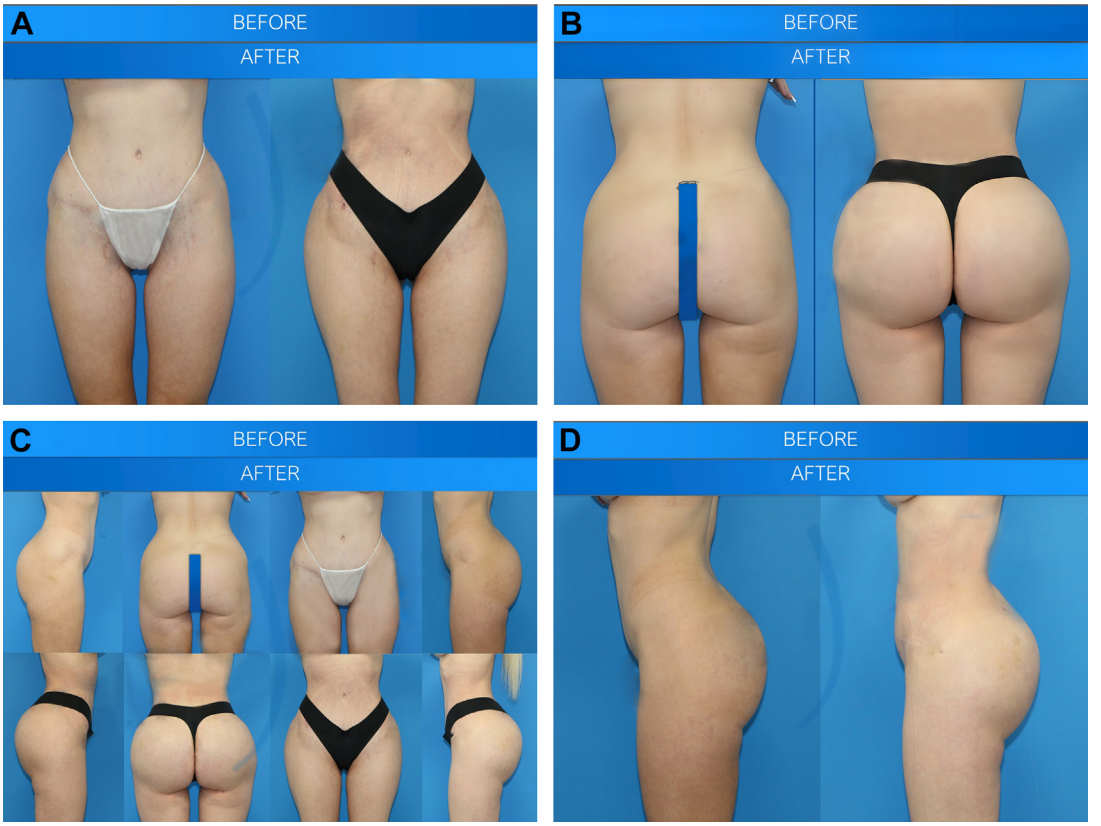

Fig. 6. (*A–D*) Before and after composite buttock augmentation 390cc round smooth implants with dual-plane pocket, plus 450cc EVL fat grafting each side.

seroma through a wound opening is an entry gate for possible infection. In our patient population, we observe a remarkably high resistance of buttock implants against infection. If infection is suspected in the presence of drainage, we recommend taking a bacteriology culture for targeted antibiotic treatment. If there are no progressive local infection signs (redness, fever) and infection parameters drop, conservative treatment is usually successful. Only if the patient develops fever with a sharp increase of infection parameters should the implants be removed.

Sciatic nerve damage is very rare and unlikely with correct and meticulous dissection technique. We recommend to always secure proper motoric function in recovery room by asking the patient to flex and extend the ankle as well as check sensitivity in the peroneal area; this documents there is no direct surgery-related traction injury to the nerve. Should any kind of sciatic neuropraxia symptoms occur in the recovery period, it is recommendable to rule out pressure of possible seroma via ultrasound. If a seroma cannot be identified, symptoms will in most cases be mild, attributable to swelling, and likely resolve with resolution of swelling. Physiotherapy and stretching exercises are very helpful and recommended.

Capsular contracture is unusual and rare in buttock implant surgery. We are not aware of any cases that have been verified with histopathology. The lack of capsular contracture reports in the literature is a matter of debate; however, it seems reasonable to presume that the high vascularity of the gluteus muscles and the naturally high degree of mobility could explain this.

Animation deformity is not actually a complication, but rather, in most cases, a misperception. It is in the nature of an intramuscular implant pocket that implants will move to some degree with muscle contraction. It is also completely logical. Nevertheless, we do periodically see patients who are concerned with the upward displacement of implants on very forceful contraction, although this is actually a sign that implants are correctly positioned. We list this point here to stress the importance of patient education and setting appropriate expectations during the preoperative consultation.

Movement, malposition, and "flipping" of implants can be due to a variety of causes; both

surgeon and/or patient factors can contribute to this complication. Iatrogenic causes include oversizing of implants resulting in muscle atrophy and widening of the pocket or primary pocket overdissection allowing for implant migration. Seromas can also be either a surgeon- or a patient-related issue. Surgeon error includes failure to use closed suction drains, whereas patient-related issues are due to postoperative instruction noncompliance—starting exercise and excessive movements too soon after surgery.

DISCUSSION OF CONTROVERSIES

Fat Grafting Before Versus After Implant Placement

We prefer to perform most of the fat grafting before redraping the patient and initiating the implant pocket dissection. A major advantage is that there are no concerns regarding accidental fat graft injection into the implant pocket. Getting optimal cannula angulation for precise fat grafting is easier and more efficient. Fat grafting with implants in place can inadvertently cause the surgeon to angle the cannula in potentially risky trajectories.

On the other hand, fat grafting after buttock implant placement may allow for more targeted and precise placement of the fat in areas that require the additional volume; this is a strong argument for after-buttock-implant placement, especially in patients with very deep trochanteric depressions or pronounced irregularities.

The wisest solution is to harness advantages from both approaches. The hybrid technique allows us to graft most of the fat before implant placement, and if sufficient fat is harvested, leave some for the fine-tuning adjustments after dissection of implant pockets and placement of the prothesis.

Choice of Dissection Plane

Currently accepted options for pocket dissection apart from our dual-plane technique are entirely intramuscular, entirely submuscular, and subfascial. The logic behind our recommended dual-plane technique is increased muscle tissue cover of the implants in the upper pole. The gluteus maximus muscle is not uniformly thick but has increasing thickness from cranial to caudal (**Fig. 7**). When dissecting a completely intramuscular pocket, the thin upper cranial third is a "weak point" prone to thinning of soft tissue envelope, implant edge visibility, and even herniation of implants. Recruiting additional gluteal medius fibers and staying completely submuscular enforce the pocket soft tissue cover in its weakest cranial part.

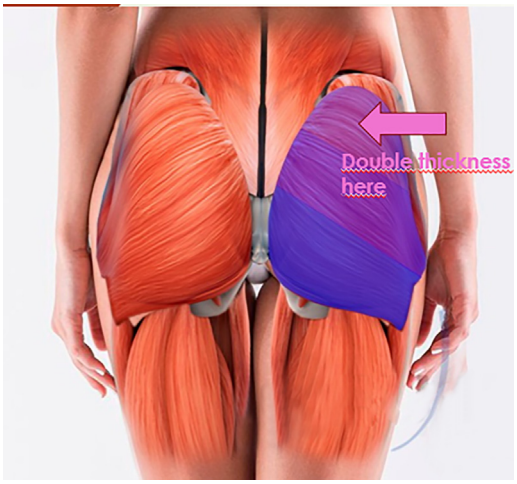

Fig. 7. Three different levels of gluteus mayor muscle thickness.

If one were to try creating a complete submuscular pocket, the dissection would be prematurely halted due to the inability to dissect caudal to the level of the sciatic foramen. The sciatic nerve exits through the foramen, and thus maintaining a submuscular plane below the upper edge of the sciatic foramen would endanger the nerve for traction or partial or complete transection injuries (**Fig. 8**). Given this limitation of dissection, purely submuscular implants result in a rather high implant position with flat lower buttock quadrants. Switching to the deep intramuscular below the

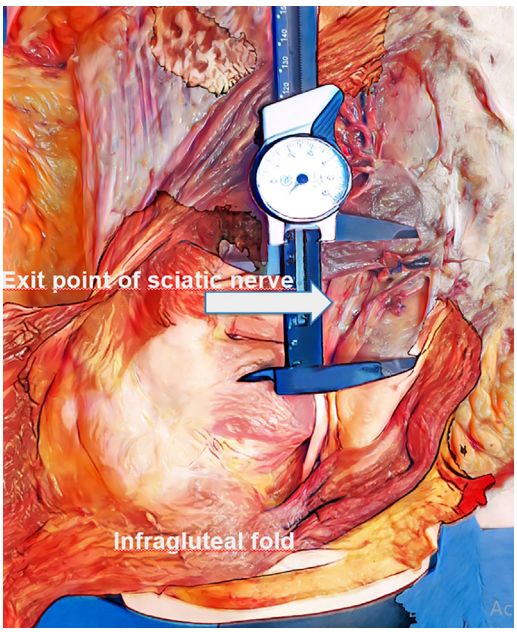

Fig. 8. Anatomical dissection of sciatic nerve through sciatic foramen.

level of the sciatic foramen, as we suggest in dual-plane dissection, enables the surgeon to safely augment the caudal part of the buttock cheeks.

What Are Different Implant Options?

There are key differences between implants available in the United States as opposed to Europe and South America. Implants in the United States are class II medical devices and are only available as solid block silicone. Cohesive silicone gel implants are class III devices and are available to surgeons in Europe and South America, whereas the US market still awaits FDA clearance.

We exclusively use cohesive silicone gel implants; therefore, our experience is limited to these devices. There are mainly 3 styles: round, oval/anatomical, and biconvex. Anatomical implants are designed for patients with long muscles and a high square buttock shape and round implants for patients with a rather short muscle.

When choosing the implant shape, it is important to remember that buttock implants are placed into a strong muscle with constant movement when patients are not just exercising but even when they are walking. Even with perfect implant placement, depending on patient physical activity, a moderate amount of muscle thinning can occur, allowing the implant to flip. With anatomical implants, the consequences can be catastrophic to say the least. Round-shaped implants are far more forgiving regarding this problem. When combining round implants with fat grafting, the surgeon has more freedom to variable volume distribution, addressing each patient's individual anatomy. Hybrid gluteal augmentation therefore makes it largely unnecessary to expose the patient to the problem of flipping anatomical implants. Biconvex implants have a convex shape on both sides, provide increased projection, and theoretically in case of flipping this would be unnoticeable to the patient due to the biconvex shape. They do, however, have an important limitation: currently biconvex implants are only available in sizes greater than 370 cc, which will be slightly oversized for most primary buttock augmentation cases. They are our implant of choice for very thick muscles (ultrasound measurement muscle thickness preoperative >3 cm) or secondary augmentation (implant exchange).

Benefit of Use of Drains

Similar to breast implant surgery, there is a variance of opinion as to whether it is beneficial to use drains. When considering this question, we recommend considering that the gluteal muscle is extremely vascular and even with limited patient mobility prone to seroma formation. Even minor seroma can create room for implant displacement and flipping. We therefore favor placement of size 14 redon drains. When placing drain tubes, make sure that drains are not placed directly underneath the implants where vacuum can possibly cause traction damage to the sciatic nerve. Regarding best time for removal, we have observed that patients tend to have significantly increased mobility from day 4 or day 5 onward. For our practice, we have determined day 7 after surgery as ideal time for drain removal.

SUMMARY

Composite (supercharged) gluteal augmentation is a very powerful tool in body contouring surgery. The 2 powerful techniques being combined are silicone implant placement and fat grafting, both when combined achieve strong core projection, waist shaping, and hip volume. We suggest dual-plane dissection and dynamic pocket suspension as 2 very strong assets to improve outcomes and reduce incidence of problems. The addition of fat transfer to the superficial subcutaneous layer avoids visibility of the implant contour in thin patients and, if enough fat graft as well as healthy recipient tissue availability, can achieve aesthetically very pleasing volume addition in the area of the trochanteric depression, leading to clearly better outcomes as compared with buttock implants alone.

CLINICS CARE POINTS

- Target points: key factor for success in buttock implant surgery is a pocket that is sufficiently deep to provide a robust and bulky soft tissue cover for buttock implants and at the same time leaves sufficient tissue between implant and muscle to protect the sciatic nerve. We present our strategy for progressive blunt instrument dissection as a time-efficient step-by-step approach to make buttock implants a reliable option for the body contouring surgeon's practice.
- We also share our technical suggestions for combination of hybrid surgery with large-volume fat grafting, which makes results more reliable by enhancing soft tissue cover and the outcome less dependent on the buttock implant only.

DISCLOSURE

The authors have nothing to disclose.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.cps.2023.05.001.

REFERENCES

1. Sinno S, Chang JB, Brownstone ND, et al. Determining the safety and efficacy of gluteal augmentation: a systematic review of outcomes and complications. Plast Reconstr Surg 2016;137(4):1151–6.
2. Cárdenas-Camarena L, Trujillo-Méndez R, Díaz-Barriga JC. Tridimensional combined gluteoplasty: liposuction, buttock implants and fat transfer. Plast Reconstr Surg 2020;146(1):53–63.
3. Mofid MM, Gonzalez R, de la Peña JA, et al. Buttock augmentation with silicone implants: a multicenter survey review of 2226 patients. Plast Reconstr Surg 2013 Apr;131(4):897–901.
4. Deaths Caused by Gluteal Lipoinjection. What are we doing wrong? Plast Reconstr Surg 2015 Jul;136(1):58–66. Lázaro Cárdenas-Camarena 1, Jorge Enrique Bayter, Herley Aguirre-Serrano, Jesús Cuenca-Pardo.
5. Maltez G, Aboudib JH, Serra F. Long-term aesthetic and functional evaluation of intramuscular augmentation gluteoplasty with implants. Plast Reconstr Surg 2023;151(1):40e–6e.
6. Aslani A, Del Vecchio DA. Composite buttock augmentation: the next frontier in gluteal aesthetic surgery. Plast Reconstr Surg 2019;144(6):1312–21.
7. Miranda Godoy P. Alexandre mendonça munhoz 2 intramuscular gluteal augmentation with implants associated with immediate fat grafting. Clin Plast Surg 2018;45(2):203–15.
8. Aslani A, del Vecchio D, Bravo MG, Zholtikov V, Palhazi P. The dual-plane gluteal augmentation: an anatomical demonstration of a new pocket design. Plast Reconstr Surg 2023;151(1):45–50.
9. Del Vecchio D, Bravo MG, Mandlik V, et al. Body feminization combining large-volume fat grafting and gluteal implants. Plast Reconstr Surg 2022;149(5):1197–203.
10. Submuscular Gluteal Augmentation Jorge E. Hidalgo Clin Plast Surg 2018;45(2):197–202.
11. Petit F, Colli M, Badiali V. Buttocks volume augmentation with submuscular implants: 100 cases series. Plast Reconstr Surg 2022;149(3):615–22.
12. Vecchio DD, Wall S. Expansion vibration lipofilling: a new technique in large-volume fat transplantation. Plast Reconstr Surg 2018;141(5):639–49.
13. Senderoff D. Buttock augmentation with solid silicone implants. Aesthetic Surg J 2011;31(3):320–7.
14. Shah B. Complications in gluteal augmentation. Clin Plast Surg 2018;45(2):179–86.