

# Submuscular Gluteal Augmentation and Lipoplasty for Buttock Beautification

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**Background:** The number of gluteal augmentation procedures with implants has increased in the last years. However, due to high complication rates related to the placement of the implants, surgeons have started to avoid using implants. The objective of the present study was to describe the details of the submuscular gluteal augmentation technique together with lipoplasty techniques and to increase the prevalence of its use.

**Methods:** All methods are complementary to each other rather than being superior to each other. That is why the author has used submuscular gluteal augmentation with implant technique and lipoplasty together during the surgeries. The complication rates are lower with this easy-to-learn technique described in this article. Eighty-six patients aged 20–46 underwent surgery. The follow-up period was 6–24 months. The implants used consisted of round cohesive silicone, with the most commonly used size being 330 cm<sup>3</sup>. The average volume of infiltrated fat was 514 cm<sup>3</sup>.

**Results:** The sciatic nerve is well protected by the surrounding anatomical structures, indicating that submuscular technique can be used safely. Partial wound dehiscence was noted in 1 patient, implant malposition in 5 patients, and seroma in 2 patients. All patients reported that they are highly satisfied with the results of the procedure.

**Conclusions:** The author advocates that the combination of lipoplasty with the submuscular technique described is safe, easy to perform, has a short operative time and low complication rates. It can be preferred in buttock beautification as a simple and safe technique. (*Plast Reconstr Surg Glob Open* 2021;9:e3576; doi: 10.1097/GOX.0000000000003576; Published online 18 May 2021.)

## INTRODUCTION

The perception of beauty has changed over time, but the emphasis given to breasts and gluteal areas remains constant. The form and size of these areas have been culturally perceived as defining symbols of feminine appearance.

The first report of gluteal augmentation was described by Bartelli et al in 1969 for aesthetic and reconstructive purposes by using silicone breast implants in a patient with gluteal muscle atrophy.<sup>1</sup> Given the increasing aesthetic expectations and demands regarding the shape, structure, and location of the implant, many surgical

methods have been developed and applied since then. In time, gluteal augmentation has gained a substantial place in aesthetic body surgery.<sup>2,3</sup> Though gluteal augmentation had started with implants, these were not used for a long time due to high complication rates.<sup>4,5</sup> According to Rosique et al, it is not right to talk about the attractiveness of the gluteal region without the presence of a proportionate body.<sup>6</sup> The hourglass shape has been widely perceived as a symbol of attractiveness. The ideal ratio of the waist (the narrowest part between the iliac crest and the ribs) to the hip (the most protruding part of the buttock) should be between 0.67 and 0.80.<sup>7</sup> It is better to evaluate the buttock area as a whole, including the hip and the waist together. Therefore, it is important to recognize that most augmentation with implants alone is not sufficient, and that areas around the buttock should also be shaped. Gluteal augmentation has taken a new dimension with the fat transfer methods applied by Gonzalez and Spina in 1986.<sup>8</sup> However, this method also has its advantages, disadvantages, and complications.<sup>9–11</sup> De La Pena argued that

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liposuction, applied only around the gluteal area, could also provide a good projection.<sup>12</sup>

Currently, mainly implants and fat transfer are used for gluteal augmentation. The popularity of augmentations carried out using implants has increased again due to reduced complication rates as a result of accumulated experiences and the improvements from anatomical studies and newer procedures. Gluteal augmentation with implants is classified according to the location of the implant as submuscular, intramuscular, or subfascial.<sup>13</sup> Advantages and disadvantages of each method have been described. In some studies, the complication rates were reported to be higher in implants compared with fat transfer with implant-related complications involving subfascial and intramuscular techniques.<sup>14</sup>

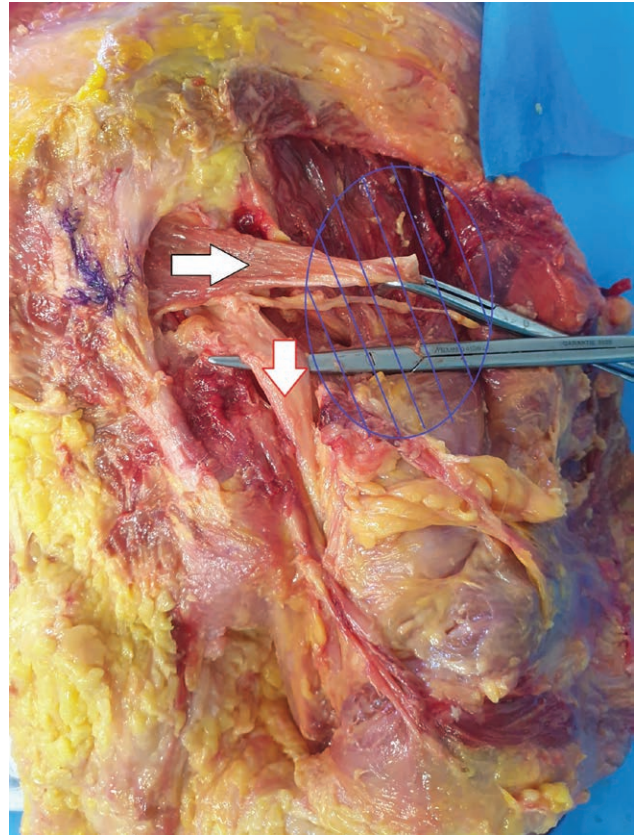
In gluteal aesthetics, the use of submuscular implants and lipoplasty together reduces complication rates and provides more natural aesthetic results.<sup>15</sup> Herein, I discuss the submuscular gluteal augmentation technique, which is preferable due to ease of application, short procedure time, and low complication rates.

## ANATOMY

Buttock region prominence depends on the forward angulation of the pelvis, the gluteus maximus muscle, and the subcutaneous fat tissue.<sup>16</sup> The gluteus maximus muscle moves downward and laterally, terminating in the iliotibial tract of the fascia lata. Although its thickness varies among individuals, it is around 4–7 cm. Its inferior border is consistent with a line between the coccyx and an area 9 cm below the great trochanter from the midline of the gluteal fold.<sup>17</sup> The fascia that covers the gluteus medius is also attached to the fibers of the gluteal aponeurosis and to the fibers within the origin of the gluteus maximus muscle. This is proper for creating a submuscular pocket.<sup>18,19</sup> The infragluteal fold is composed of fascial spicules extending from the bone to the skin.<sup>20</sup> The inferior gluteal artery, supplying 2/3 of the muscle, enters from the inferior border of the piriformis muscle. The superior gluteal artery, supplying the remaining 1/3, enters from the deep portion passing from the superior border.<sup>21</sup> As main branches of the arteries and nerves are very close to the sacrum, sharp and aggressive dissection in that area should be avoided (Fig. 1).

## MARKINGS

I have initially marked the utmost point of the intergluteal fold while the patient is standing. Passing superior to this point would lead to scar visibility. The inferior point of the incision line was the superior part of the pigmented part of the anal area when the patient is in a prone position, which corresponds to approximately 3 cm above the anus. I have marked 2 parasacral incision lines of 5 cm, each 2 cm lateral to the midline. Afterward, with the patient standing, I marked the most prominent point of the gluteal region as the implant center, similar to the nipple-areola in the breast. That circle drawn based on this center determines the implant's base diameter. Fat transfer or liposuction areas are easily marked after deciding



**Fig. 1.** Anatomy. The horizontal arrow indicates musculus piriformis, vertical arrow indicates nervus ischiadicus and the blue circle indicates the place of implant.

the implantation site as their diameters are known. The amount of fat that is enough to correct the deformity has been determined during the operation.

## OPERATIVE TECHNIQUE

All operations were performed under general or epidural anesthesia. Fat removal was performed in the supine position, and the patient was placed in the prone position for implant procedures while the aspirated fat awaited decantation. Compression devices were applied to the lower extremities. The anal area was closed with povidone-iodine absorbed gauze and covered with a drape. A single dose of intravenous 1-g first generation cephalosporin was administered before skin incision. An infiltration solution, containing 2-mg adrenaline and 10-cm<sup>3</sup> Marcaine within a 1000 cm<sup>3</sup> saline solution, was prepared before the incision. It was applied to the incision sites and the submuscular space through an infiltration cannula and rested for at least 15 minutes. Following deep incision of subcutaneous tissue and skin through two parasacral incisions, the gluteus maximus muscle fascia was incised with the aid of blunt scissors, pulled back while it was open, to be close to the sacral bone. Afterward, I accessed underneath the gluteus maximus muscle using the operator's second finger first, the third finger thereafter, and continued the dissection. I continued with a blunt dissector if we could



not reach the dissection sites using our fingers. The operator continued with his/her fingers to feel the muscle and its fascia for a plane below the gluteus maximus that can be easily located as the reference point to determine the right plane, which could be best felt using finger. After elevating the muscle with a Deaver retractor, the implant was placed under the muscle (Fig. 2). The limits of dissection were determined by the size of the implant. I placed a gauze into the pocket after dissection and continued with the other site. Once both dissections were completed, the gauzes were removed, and the entrance site of the muscle and the fascia was stretched for 3 minutes from the pivot points of the dissectors (Fig. 3). No additional incisions were made. After sufficient stretching, I elevated the muscle with a Deaver retractor and placed the implant intramuscular. I did not suture the muscle because the flexible muscle and the fascia closed spontaneously after implant insertion. I did not use a drain. The operation site was secured with sterile gauze after subcutaneous tissues were closed using continuous 2/0 Vicryl and the skin with 3/0



**Fig. 2.** Gluteus maximus muscle seen on the top.

Monocryl sutures. I then used the same infiltration solution prepared for the implant procedure and applied it to the areas of liposuction. After taking fat via classic liposuction procedures using a 3-mm diameter cannula, I waited for 15 minutes for decantation. After decantation, I transferred these fat tissues using Coleman cannulas to the planned and required areas (eg, over the implant, lateral to the implant, at the level of the hips) via different incisions to the subcutaneous plane. I recommended postoperative compression garments for at least 3 weeks when I performed liposuction with no similar requirement if only implant was performed. Patients could sit and lay down on their back immediately postprocedure.

## RESULTS

I have successfully treated 86 patients between April 2018 and January 2020 by combining the surgical technique of Dr. Francois Petit with lipoplasty techniques (Figs. 4, 5). Of them, 82 were women and 4 were men, with ages between 20 and 46 years. I accepted patients whose body mass index was below 40 and who had grade I and II ptosis according to the gluteal ptosis classification of Gonzalez (Table 1).

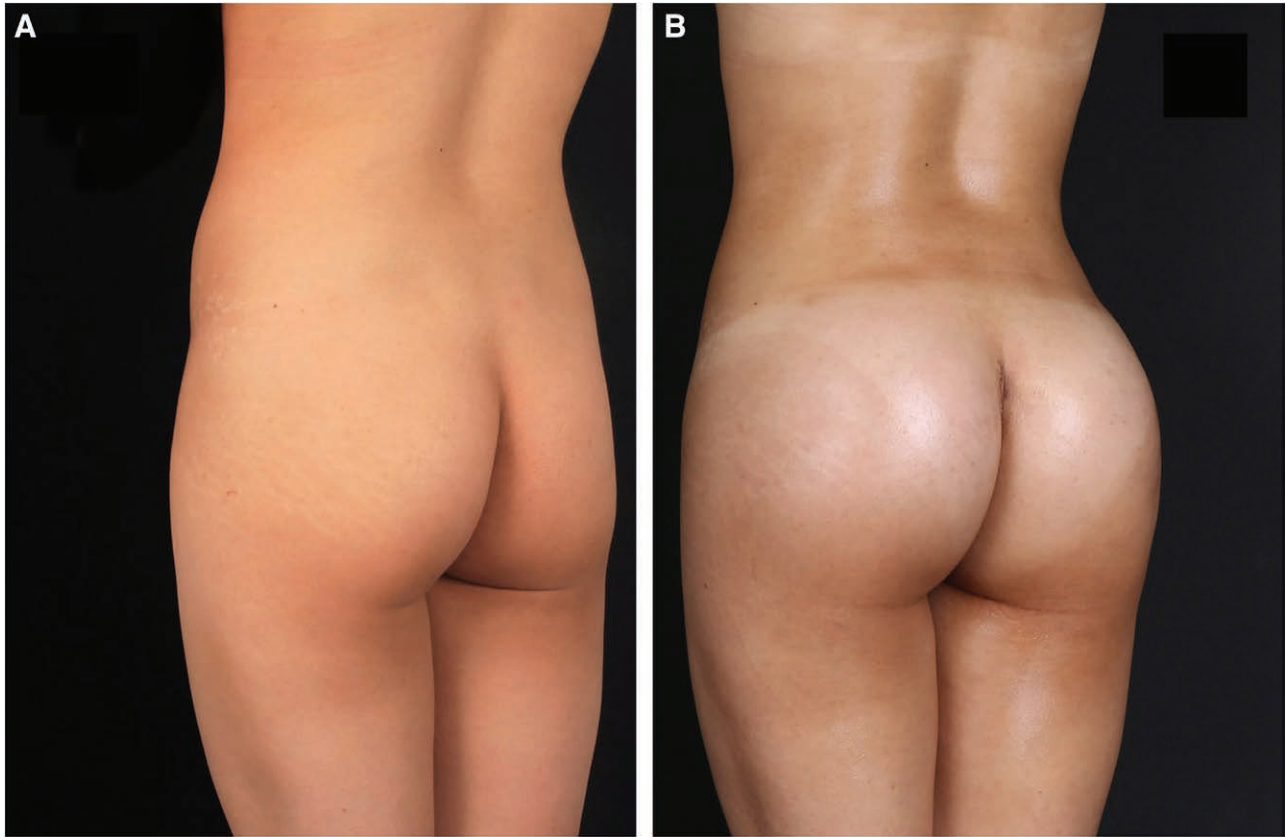
Implant sizes varied between 270 and 560 cm<sup>3</sup>. All were round-shaped and had a smooth surface (Fig. 6). The average volume of infiltrated fat was 514 cm<sup>3</sup> (range, 140–900 cm<sup>3</sup>) (Fig. 7). Fat was not transferred for 12 patients. Implant malposition developed in 5 patients, seroma in 2 patients, and superficial wound dehiscence in 1 patient. In the follow up process, there were no complications observed in the rest of the patients and positive feedback has been received from patients.

## DISCUSSION

It is important to address all structures as a whole in the butt area and to apply similar principles as in breast augmentation.<sup>22</sup> Although ideal patients for gluteal augmentation are healthy, with normal weight and sufficient soft tissue, combining gluteal implants with lipoplasty yields better aesthetic results.<sup>23</sup> It is more correct to consider that all methods are complementary to each other. Liposuction applied to the lower back and waist enables bringing the hip/waist area to an ideal ratio and increases the gluteal region projection<sup>24</sup> (Figs. 8, 9). In implant-based gluteal



**Fig. 3.** The entrance site of the muscle and the fascia was stretched from the pivot points of the dissectors.



**Fig. 4.** A 28-year-old woman with submuscular gluteal implant, waist liposuction, and fat transfer to hips. Before (A) and 6 months after (B) the operation (oblique view).

augmentation, that projection is mostly at the center of the gluteal region.<sup>25</sup> While all gluteal areas could be augmented with fat transfer, fat can also be transferred around the implant to get a more anatomical and natural shape. In addition, complication rates decrease when 2 methods are used together, since less fat is required when using an implant.<sup>2–26</sup> A more successful hip/waist ratio and a better aesthetic appearance can be achieved when implants, liposuction, and fat transfer methods are combined.<sup>26,27</sup> Many surgeons avoid gluteal implants while trying other methods like fat transfer, as they worry about the difficulty involved in the technique and implant-related complications. Three main methods, including subfascial, intramuscular, and submuscular, are used for augmentation of the gluteal region with implants. I prefer the submuscular method, as it is easy to perform, is a quicker procedure, and complications are less. Furthermore, it is easily combined with other methods. Although subfascial gluteal augmentation seems to be an easy-to-perform method and provides better inferior pole fullness, implant palpability, and an unnatural postoperative appearance are 2 main reasons why this method is not preferred.<sup>28</sup> Additionally, ptosis is quite common because the created implant envelope is not very durable. Using submuscular technique, dissection becomes easier and operative time gets shorter, as there is an anatomical plane, similar to breast or calf implant. In the intramuscular technique, dissection is

difficult and operative time is long due to the absence of such a plane. Although dissection was facilitated by specifying reference points in the XYZ technique of Gonzalez and a safer intramuscular dissection was targeted, making a dissection at the same level is difficult and requires experience.<sup>29</sup> The presence of a certain fascial pocket in submuscular augmentation reduces hemorrhage and facilitates dissection. Thus, plastic surgeons who want to perform gluteal augmentation have to learn and apply the submuscular method more frequently to experience fewer complications. One of the most important drawbacks in both intramuscular and submuscular technique is that the implant cannot be placed sufficiently inferior in an attempt to avoid sciatic nerve injury.<sup>30,31</sup> The space formed for the implant, according to Robles, is limited and restricted to avoid nerve injury.<sup>32</sup> Hence, the implants remain high using these techniques, and they are not useful for inferior augmentation, as these would not look natural. In cadaveric studies, I have observed that the sciatic nerve was well protected by tissues around the piriformis muscle, and I could create a pocket that enabled us to place the implant more inferiorly without damaging the nerve. Although there is some inferior implant movement over time, I did not encounter any sciatic nerve complications. Hidalgo reported that the line between the coccyx and the greater trochanter was the inferior border of the piriformis muscle and he suggested that this line



**Fig. 5.** A 28-year-old woman with submuscular gluteal implant, waist liposuction and fat transfer to hips. Before (A) and 6 months after (B) the operation (lateral view).

**Table 1. Gonzalez Gluteal Ptosis Classification**

Grade I	The infragluteal fold is like a horizontal line.
Grade II	The infragluteal fold is angulated downward, flattening at the lower 1/3 of buttock.
Grade III	The skin sagged over the infragluteal fold, totally flattening of the buttock.

should not be passed inferiorly.<sup>33</sup> Although this line is the presumed location of the inferior border of the piriformis muscle, the sciatic nerve does not originate directly under this muscle, but at a 90 degree angle nearby, proceeding inferiorly with protection from the anatomical structures of that region. Hence, I have observed that the submuscular implant was safe with regard to the sciatic nerve. In addition, blunt finger dissection is another reason why our method does not damage the sciatic nerve. In the lateral portion, the free edge of the gluteus maximus muscle between the iliac crest and the tensor fasciae latae becomes thinner.<sup>34</sup> Using intramuscular technique, it is quite difficult to proceed at the same level of dissection in the muscle if the surgeon is not well experienced as the muscle segment remains very thin, particularly in the lateral part, and dissection displaces subcutaneously. Using submuscular technique, it is not possible to pass

into the subcutaneous area as the whole muscle is felt superiorly. This supports the principle of Gonzalez that “the deeper the undermining, the greater the muscular covering and the better aesthetic results.”<sup>35</sup> It would be better to combine fat transfer with implants as excessive fat transfer would have a negative effect on the viability of fat grafts.<sup>36</sup> In fact, fat transfer yields much better aesthetic appearance and better outcomes when applied together with implants in the treatment of lateral trochanteric depressions, particularly by complementing each other.<sup>37</sup>

Sinno et al reported implant-related complication rates as 21.6% and fat transfer-related complication rates as 9.9%.<sup>38</sup> These complication rates would decrease when augmentation via submuscular method increased. Main complications include wound dehiscence and seroma. According to Gonzales, the most frequently encountered complication was the wound dehiscence.<sup>39</sup> I did not encounter such a problem because I did not damage the sacrocutaneous ligament by using 2 separate asymmetrical parasacral incisions. The wound dehiscence problem in 1 of our patients was superficial and healed spontaneously. In addition, I did not consider this complication as being directly related to the size of the implant used in submuscular augmentation because the implant remained entirely under the muscle



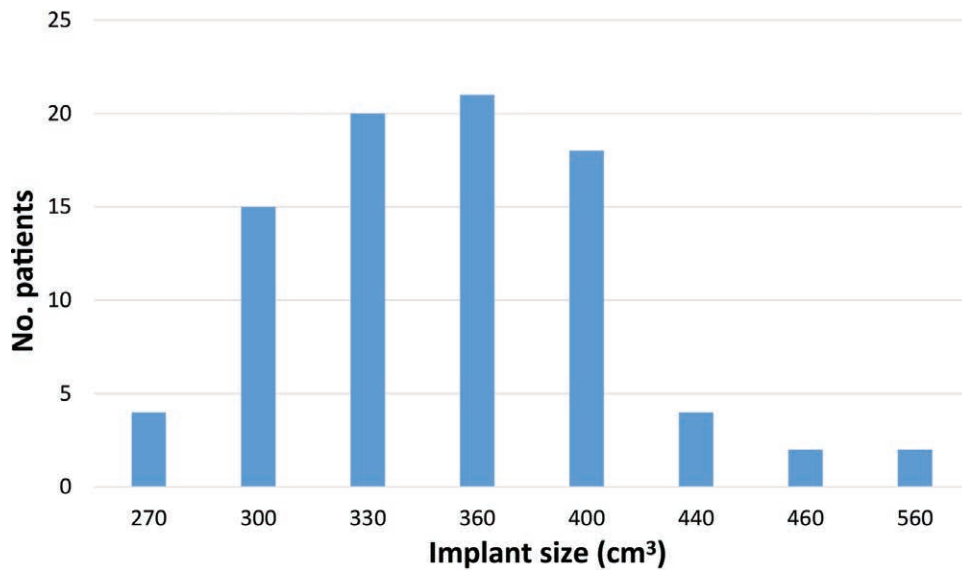


Fig. 6. Implant Sizes.

and did not affect the incision sites. Wound dehiscence can be treated with local wound care or re-suturing.<sup>40</sup> The main reasons for seroma formation include electrocautery usage and weakness of the muscle and tissues over the implant, resulting in implant mobility postprocedure. The implant pocket under muscle has to be created depending on the implant size to reduce seroma risk and to prevent postprocedural implant mobility. To prevent seroma formation without making sharp dissections and by not using electrocautery, instead preferring blunt dissection with the aid of our fingers. Some studies report that seroma develops from postprocedural implant movement due to contamination and related infection.<sup>41</sup> Some others have discussed that this could be related to the implant surface properties.<sup>42</sup> As

I have used the same levels for dissection and implants with the same type of surface, I have theorized that the main reason for seroma may be insufficient compression of the muscle on the implant, leading to implant mobility. I came to this conclusion based on our observations that 2 patients with seroma had loose tissue and weak muscle structure. If seroma occurs, ultrasonography can be used for diagnosis and culturing of the aspirate would be suitable for treatment.<sup>42</sup> Two patients who developed seroma have changed the wound dressings daily and seroma has healed in 2 weeks without any medication.

As fat tissue between muscle and skin in the gluteal region decreases, the muscle structure changes, skin laxity increases as a result of aging/gaining/losing weight, and

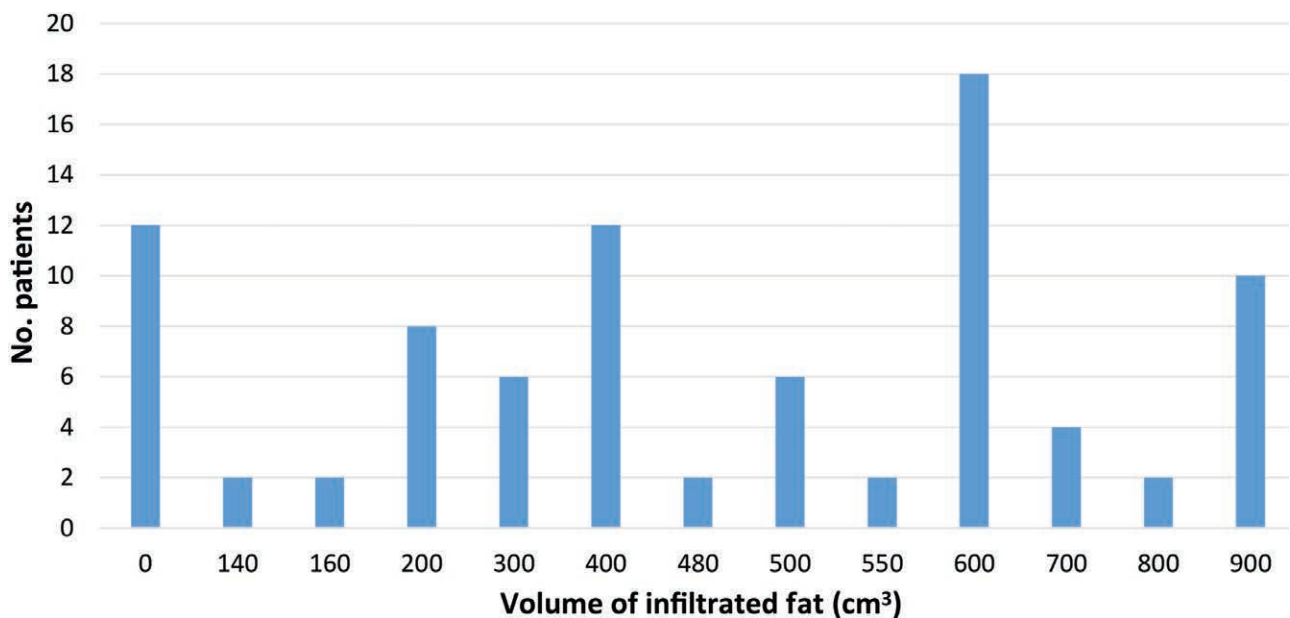


Fig. 7. The volume of infiltrated fat.



**Fig. 8.** A 32-year-old woman with submuscular gluteal implant, waist liposuction and fat transfer to hips. Before (A) and 1 year after (B) the operation (oblique view).

the shape of this region changes, resulting in a flatter buttock appearance.<sup>43</sup> This laxity mostly develops in the inferior 1/3 quadrant. The structure of the infragluteal fold and the degree of ptosis are the main factors that determine the aesthetic appearance.<sup>44</sup> The infragluteal fold is an important indicator of gluteal aesthetics. Normally, its mean length is equal to the intergluteal fold length or 2/3 of it.<sup>45</sup> This results in a ptotic butt if it is longer. Ptosis in this fold can be corrected to some extent with an implant, but if there is much laxity in the infragluteal fold and if correction cannot be done with an implant or if there is grade III ptosis, as shown in Table 1, butt lifting or fold excision should be planned.<sup>46</sup> After intramuscular implantation, a 2%–6% reduction was observed in muscle volume attributable to implant pressure.<sup>47</sup> I have not observed any functional deficiency in the gluteus maximus muscle with this volume loss. Although the implant should be placed parallel to the muscle in both submuscular and intramuscular methods, implant position may be displaced as a result of muscle movements.<sup>48</sup> Therefore, I preferred round implants because of a decreased likelihood of rotation. Serohemorrhagic secretion, which may resolve spontaneously, may be seen within 12–36 hours postoperatively.

Unilateral or bilateral paresthesia may occur due to local anesthetics or sciatic pain.<sup>49</sup> I have observed that unilateral sciatic pain healed spontaneously in 3 patients within 24 hours and in 1 patient within 36 hours. The infection rate has been reported between 1% and 7% following gluteal augmentations.<sup>41</sup> I did not encounter infection in our cases. This may be a result of the rich blood supply in that region. Capsule contracture is a rare complication with a rate of 1%–2%.<sup>50</sup> Implant malposition or turnover is a late complication, usually due to implant movement toward the lateral or the inferior side owing to muscle weakness or over-dissection.<sup>51</sup> It may also develop due to untreated seromas dissecting the tissues. In our 5 patients with implant malposition, it was mostly implant turnover (upside down) and the main reason for this was the pocket's enlargement postoperatively. If such a condition develops, the implant may be turned by a manual maneuver in the early period. However, if it becomes chronic, the implant should be removed.<sup>52</sup> Capsulorrhaphy can also be useful if the implant is not very large. I achieved successful results with capsulorrhaphy in 2 patients who developed implant malposition. However, I had to remove implants in 2 patients in whom I have used large implants. One of



**Fig. 9.** A 32-year-old woman with submuscular gluteal implant, waist liposuction and fat transfer to hips. Before (A) and 1 year after (B) the operation (lateral view).

them was treated with fat transfer and the other with reimplantation after 6 months. I have obtained a successful result with manual maneuver in 1 patient.

I propose that the submuscular augmentation technique described here for butt beautification should be preferred as it is easy to perform, has a short operative time, and has low complication rates. I consider that if aesthetic surgeons have sufficient knowledge about gluteal implants, they can easily use this method.

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