

## Chapter

# Creating the Ideal Buttock (Lifting, Implanting or Fat Grafting)

*Angelo Cuzalina and Armando Retana*

## Abstract

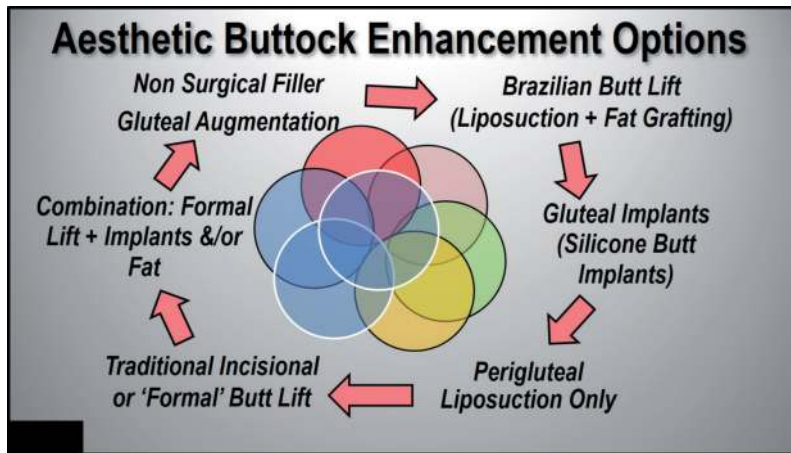
An attractive buttock has become more popular than ever before owing to social media and popular iconic celebrity figures. For many women today, a full, well-rounded buttock is considered attractive and has connotations of health, youthfulness, as well as sexual allure. There are a host of choices that can be used to improve buttock shape, tightness and size including non-surgical injections, implants, fat, skin removal, liposuction and various energy devices. Understanding the diagnosis is critical to formulate an ideal plan and then select the best technique. This chapter will cover the top three surgical procedures in great detail; the formal buttock lift, the Brazilian butt lift (BBL) and gluteal implants.

**Keywords:** Brazilian butt lift, buttock augmentation, gluteoplasty, butt implant, fat grafting

## 1. Introduction

An attractive buttock has become extremely popular in the last decade thanks to social media and some popular iconic figures that make a living simply from having what many think of as a “nice butt.” However, before the recent surge in popularity, various gluteal shaping procedures have been performed over the past half century to correct deformities and improve patient proportions, laxity or size. Most of the procedures remain about the same but many patients’ idea of what a beautiful backside should look like has changed. Still, physiologically, the buttock remains a major weight-bearing anatomic unit as well as a source for moment and strength. It has been the source of inspiration by many artists. Yet, many cultures use the buttocks as the site for corporal punishment. In numerous cultures the buttock plays a significant role in sexual attraction and seduction. A full, well-rounded buttock is considered attractive because it indicates health, youthfulness, and could indirectly be related to fertility, as a larger pelvis is considered more ideal for childbearing.

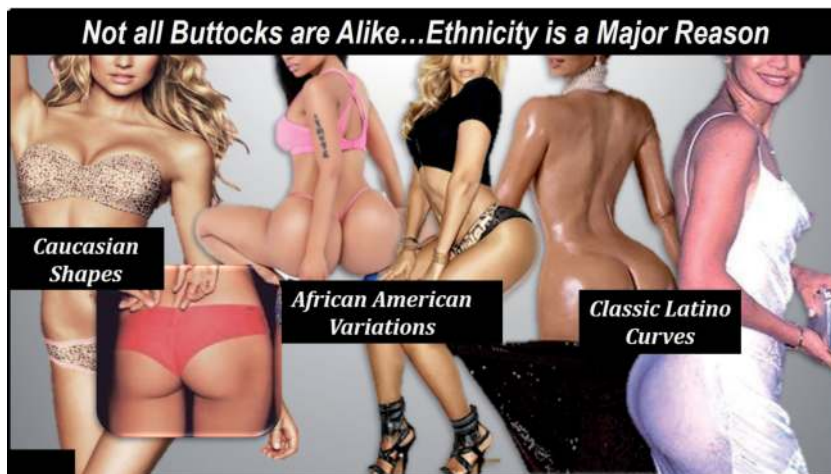
There are a multitude of options that can be used to improve the buttock including non-surgical injections, implants, fat, excisional, liposuction and various energy devices (**Figure 1**). Understanding the diagnosis helps formulate the ideal plan and selection of the best technique to give the patient a pleasing result. This chapter will cover the top three surgical procedures in great detail; the formal buttock lift, the Brazilian butt lift (BBL) and gluteal implants (**Figure 2**). Currently, more than ever, the buttock plays a significant role in physical and sexual attraction. This particular body part has gained an enormous amount of attention in social media



**Figure 1.** Enhancing the buttock can be performed via a wide variety of options. Understanding the diagnosis is critical to select the proper technique for buttock enhancement.

- ### 3 Major Glutealplasty Techniques
1. **Gluteal 'Butt' Implants** (solid silicone)
  2. **Brazilian Butt Lift** (Fat Grafting + Lipo. of adjacent tissues like hips & thighs)
  3. **Formal Buttock Lift** (lifting sagging tissues of the buttock and upper outer thigh)

**Figure 2.** Not including filler injections, the top three surgical gluteal enhancement or 'gluteoplasty' procedures are Brazilian butt lifting (BBL), formal or skin excisional buttock lifting as well gluteal implant placement.

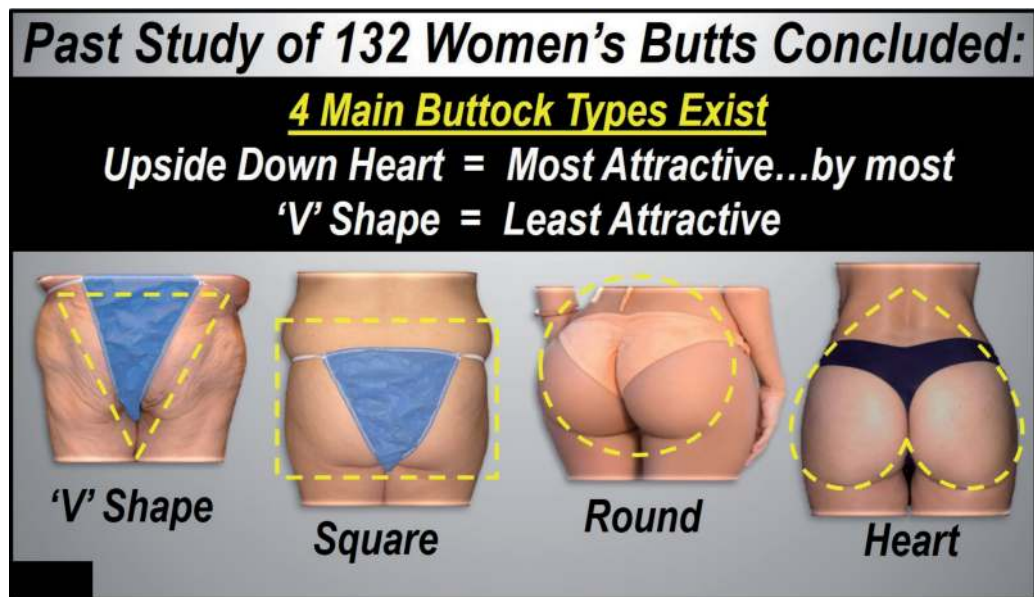


**Figure 3.** The buttock has gained a lot of attention in social media and conventional media due to a number of Hollywood celebrities and the rising popularity of social media models who flaunt their extreme curves in the gluteal area in particular. This has caused an exponential rise in buttock cosmetic surgery procedures in the last decade.

and conventional media due to a number of Hollywood celebrities and the rising popularity of social media models in recent years causing a spike in gluteal enhancement operations (Figure 3).

## 2. Universal proportions and characteristics of a beautiful buttocks

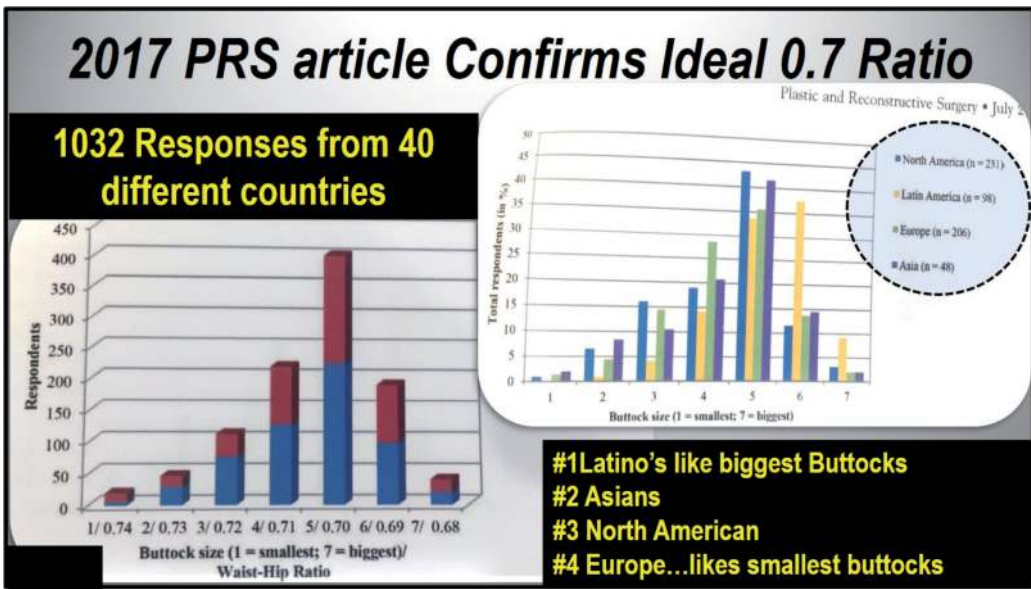
When it comes to body contouring surgery, the surgeon should know the universal characteristics and proportions that make up a universally attractive buttock.



**Figure 4.**  
*The most common four buttock shapes are considered to be the round, square, 'V' shape, and the upside-down heart. With the upside down heart in general being most attractive and the V shape, also known as a frog's buttock' as being least attractive as well as the hardest to correct.*



**Figure 5.**  
*Throughout history, a small waist has generally been considered attractive. A specific waist-to-hip ratio of 0.7 appears most attractive.*



**Figure 6.** Several studies recently validated that the ideal female figure has a waist-to-hip ratio of 0.7, yet they also found ethnic differences in what size buttock various cultures found attractive.



**Figure 7.** Massive weight loss patients often require formal skin excision buttock lifts plus augmentation. Even with maximum effort, it is difficult to achieve a small waist, short infra gluteal crease and upside-down heart shape.

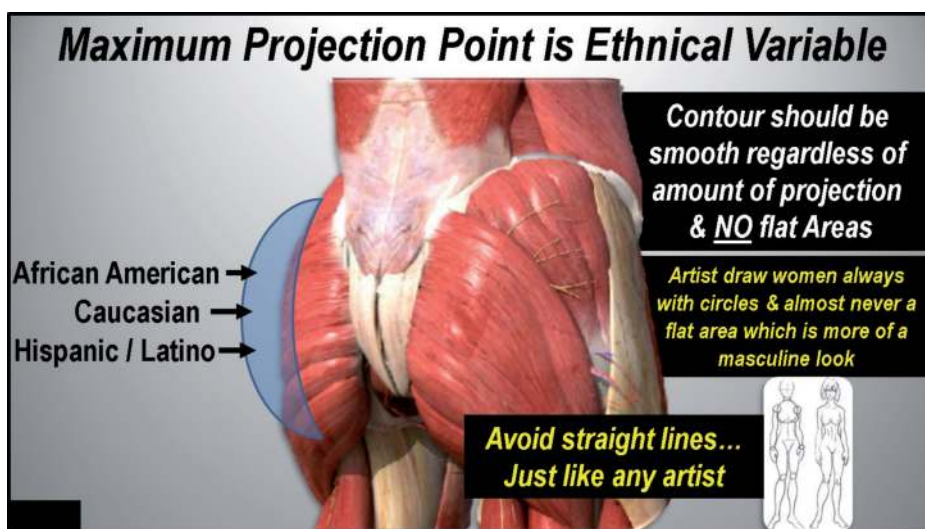
Many have classified buttock into shape categories. The most common four are the round, square, “V” shape, and the upside-down heart (Figure 4). With the upside-down heart in general being most attractive and the V shape being least attractive. In 1993, Singh published his study on the role that the waist-to-hip ratio plays in regards to female physical attractiveness in the Journal of Personality and Social Psychology [1]. After the analysis of three different studies, Singh proposed that there is a correlation between female attractiveness and the proportions of the waist and buttocks which he described as the waist-to-hip ratio (WHR). Moreover, he found that males in those studies considered female figures with a low WHR more attractive,

healthier, and of greater reproductive potential than females with higher WHR. More specifically, the studies indicated that the ideal female figure has a waist-to-hip ratio of 0.7 (**Figure 5**). This ratio is measured by obtaining the circumference of the waist at its narrowest area and dividing it by the circumference of the thighs (“hips”) at the level of the buttocks with maximum projection (**Figure 6**). Another characteristic of a beautiful, youthful, and attractive buttocks includes a short gluteal crease that does not extend past the medial third with no ptosis over this line. Such ideal buttock shapes may be a goal for many but can be exceptional hard to achieve in some patients such as massive weight loss clientele (**Figure 7**).

### 3. Ethnic variations for an attractive buttock

It is fair to say that all cultures find a female body with a waist-to-hip ratio around 0.7 to be very attractive. However, there are significant ethnic differences when it comes to the ideal shape of a buttock. The senior author has performed well over 1000 gluteal augmentations including fat grafting, gluteal lifts and gluteal implants. It is our experience that patient’s satisfaction depends heavily on what their ethnicity perceives as an attractively shaped buttock and did the surgeon’s results match what they hoped to achieve. If the surgeon does not understand how significant the buttock shape is based on ethnicity, a good result from the surgeon’s standpoint may be a terrible result for the patient. This observation is based on over 22 years’ experience performing gluteal surgeries in many parts of the world and on an extremely large number of ethnically diverse patients (**Figure 8**). With the United States and the world as a whole becoming much more diverse due to immigration patterns and medical tourism, it is important for the surgeon to take into consideration ethnic background of the patient when doing this type of surgery. It is also important to go over before and after photos with patients to assess what it is that they consider ideal for their body. The major differences noted among ethnic groups are:

1. **Caucasian female** patients prefer an average fullness but not extremely large in most cases as a general rule of thumb. They like their fullness in the upper

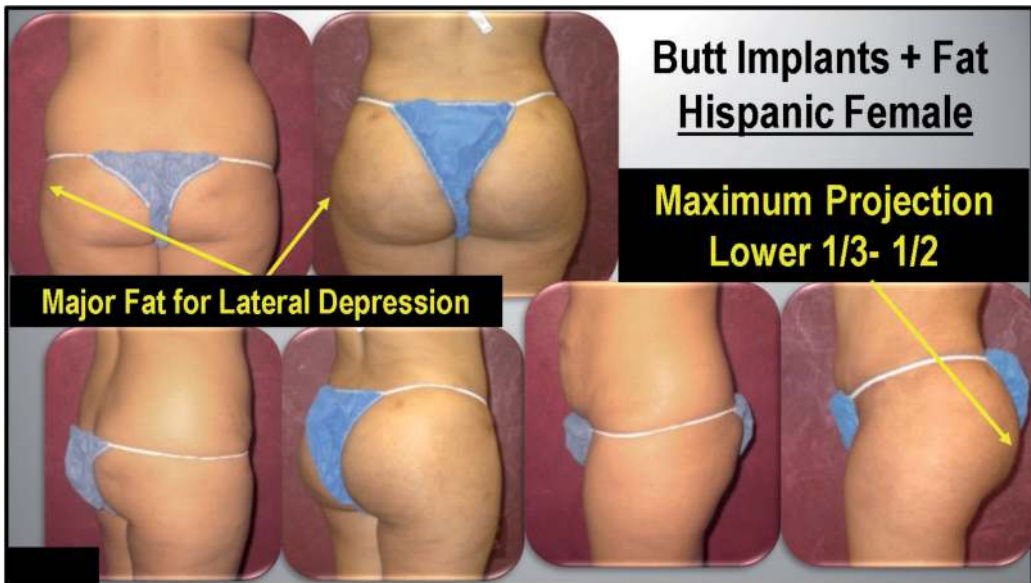


**Figure 8.** Ethnic diversity regarding buttock shape is particularly significant for differences seen between Caucasian, Latinos, and African American women. Maximum projection location is one difference among this group as shown and lateral fullness is another area where Caucasian vary greatly from Latinos or Black women.

to middle third of the buttocks and like an overall upside-down heart shape. However, most Caucasian patients do not like the fullness in the lateral thigh and if it is present, they often request liposuction of this area the call the lateral thigh fat immediately below the greater trochanter depression, “saddlebags”. This same area may be referred to as “hips” by a Latino or Black patient which may be confusing if not understood. Typically, Caucasians like a slimmer and more athletic look to their buttocks (Figure 9).

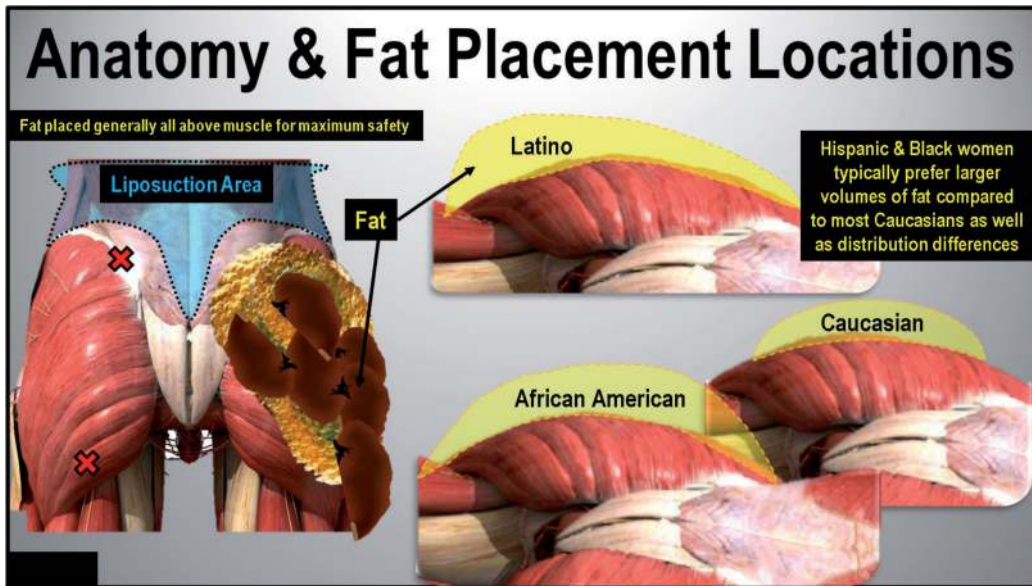


**Figure 9.** BBLs for Caucasian women often require removing a portion of the convexity as shown in the lateral thigh fat not typically removed in Latinos or Blacks. Fat can be grafting into the lateral greater trochanter depression but more grafting in general is focused centrally versus laterally.



**Figure 10.** BBLs for Latino / Hispanic women typically involves significant fat grafting to the mid and lower 1/3 of the buttock as well as major grafting in the lower lateral buttock. Even when a large implant is used, many Hispanic women will also want additional fill laterally with fat to accentuate the upside-down heart shape.

2. Patients of **Hispanic or South American** descent prefer a buttock that is very full (larger volumes than most Caucasians) with significant additional fullness in the lateral buttocks and also in the lateral thigh area (**Figure 10**). For the most part, they prefer their maximum point of projection in the lower one half to one third of the buttocks. The preferred shape among this ethnic group is an extreme upside-down heart with more fullness in the lateral thigh area. Unlike Caucasian patients, liposuction of the lateral thigh area is almost never desired in Black or Hispanic women (**Figure 11**).



**Figure 11.** This figure demonstrate the fat grafting pattern commonly seen with differing ethnicities from a more lateral view. Black and Hispanic females generally prefer larger volumes than Caucasian women but Black women like more rounded appearance with a more accentuated Lordotic curve from back to buttock.



**Figure 12.** BBLs for Latino / Hispanic women typically involves significant fat grafting to the mid and lower 1/3 of the buttock as well as major grafting in the lower lateral buttock. Even when a large implant is used, many Hispanic women will also want additional fill laterally with fat to accentuate the upside-down heart shape.



**Figure 13.**

Most Black females who desire BBLs have very consistent cultural request of a large, round buttocks that is almost “shelf-like” at the top. On average, women of this culture request a large, round buttocks with major fullness of the lateral buttocks and lateral thighs, as well as a substantial lordotic curve.

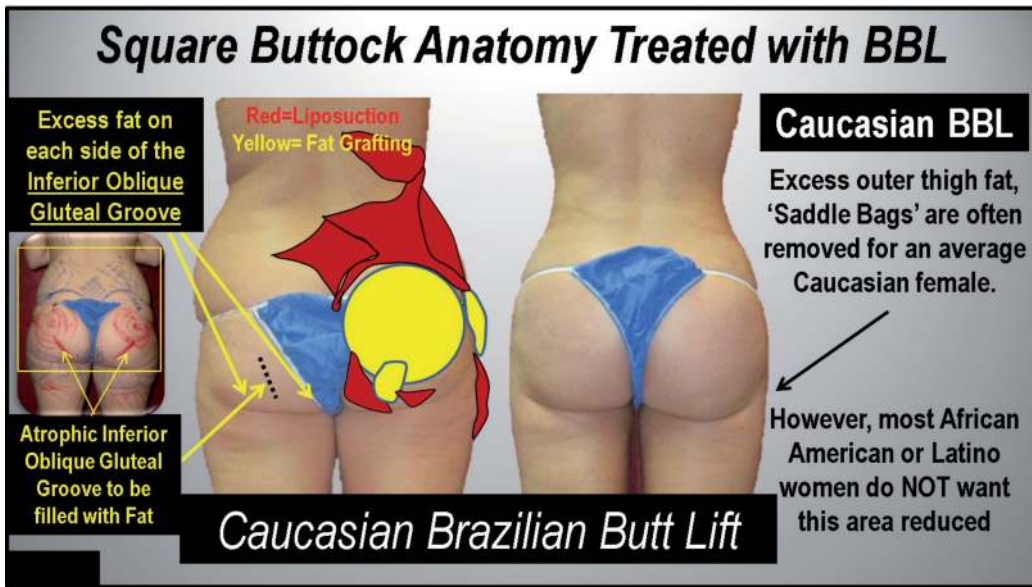
3. **Black female** patients have a very consistent cultural request of a very large and round buttocks (**Figure 12**). Another popular request in this ethnic group is a high “take-off” which is also known as a “shelf-like butt.” In general, women of this culture request a very large, round buttocks with major fullness of the lateral buttocks and lateral thighs, and a major lordotic curve (**Figure 13**).

Of note, these ethnic variations are valid for most cases. However, interracial relationships may play a role in what patient’s desire. Some Caucasian, Hispanic and Asian women may request the look of an African-American shape if they are in a significant relationship with an African-American male or if they socialize predominantly with that ethnic group. In a similar fashion, Black and Hispanic females in significant relationships with Caucasians may request reduction of the lateral thighs. Care must be taken to discuss details of what each individual patient hopes to achieve and what their specific preferences are regarding peri-gluteal shape and size.

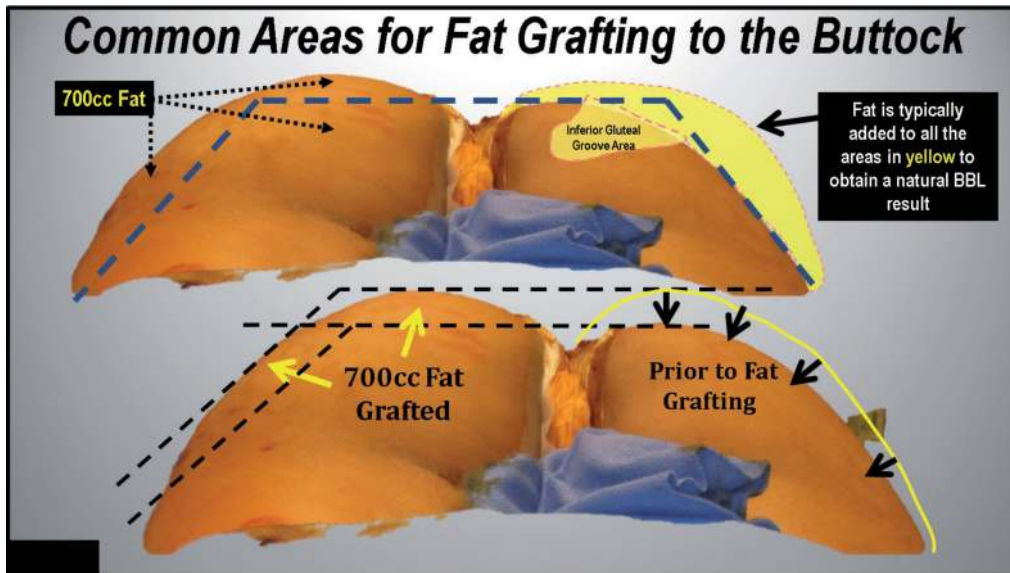
#### 4. Candidates for gluteal enhancements

As patients age, the buttock undergoes changing due to multiple factors including genetics, gravity, weight gain and weight loss. The vast majority of patients experience fat hypertrophy in the peri-gluteal areas and a flattened buttock shape. One of the most important things for a surgeon is to categorize the patient based on their buttock shape. There are four major shapes identified. The “A” shape which the most desired shape as it typically follows the 0.7 waist-to-hip ratio. The “square” shape which is very common seen in those patients with excess waist circumference from increased adipose tissue around the waist and lower back region. The “O” shape is usually made up by a full and round buttock. Finally, the “V” shape buttock is often seen in the massive weight loss patient or in patients who have an atrophic buttock with excess fat adiposity in the “love handle” area (**Figure 4**). Another





**Figure 14.**  
 A square buttock is very common and often is marked by a distinct inferior oblique groove that is observed in the lower pole and close to the medial third as shown. There is usually excess fat on either side of the oblique groove. The square shape is mostly created from excess hip or flank fat.



**Figure 15.**  
 Fat grafting should not be limited to the central buttock for best results. As shown, fat can be added to the oblique groove if present, posterior as well as lateral buttock and greater trochanter depression. Occasionally, fat may need to be blended even further down the patient's thigh.

remarkable finding is the inferior oblique gluteal crease that is most prominently seen in the “square” buttock (Figure 14). It is an oblique groove that is observed in the lower pole and close to the medial third. There is usually excess fat on either side of the oblique groove (Figure 15).

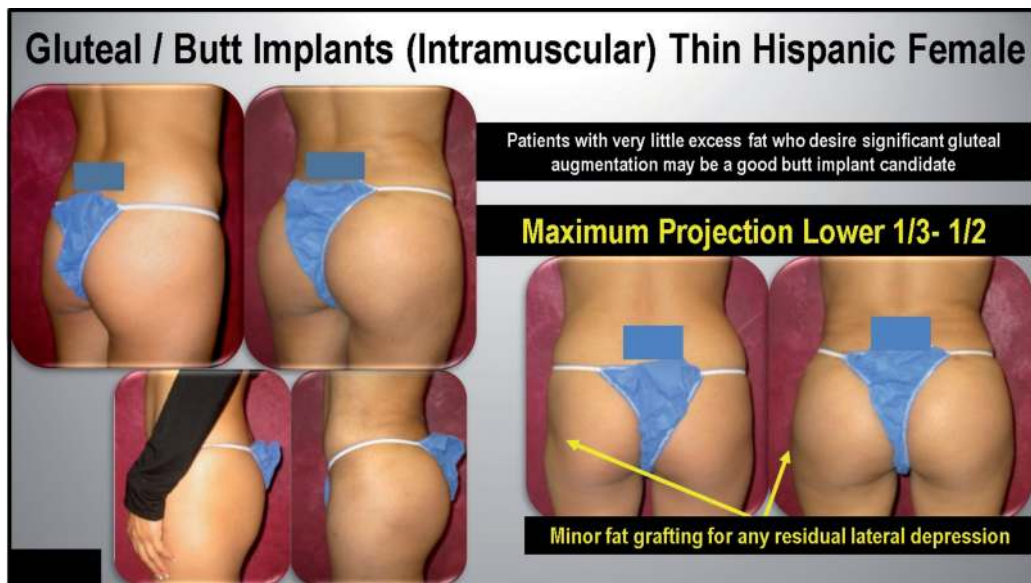
There are certain changes that take place in the gluteal and peri-gluteal region that take place over time which begin to change the buttock shape into a less ideal one. One of them is the loss of the inward curves at the level of the waist and also the inward sweep in the mid-line of the lower back (lumbosacral area). Another unaesthetic change of the aging buttock is the elongation of the infragluteal crease. One of the

most aesthetic of a buttock is the “lifted” look which is why most buttocks that are considered attractive have their most prominent part in the upper to middle third. However, with aging and changes in weight, the buttock may become ptotic with most of its projection in the lower third and likely overhanging over the infragluteal crease.

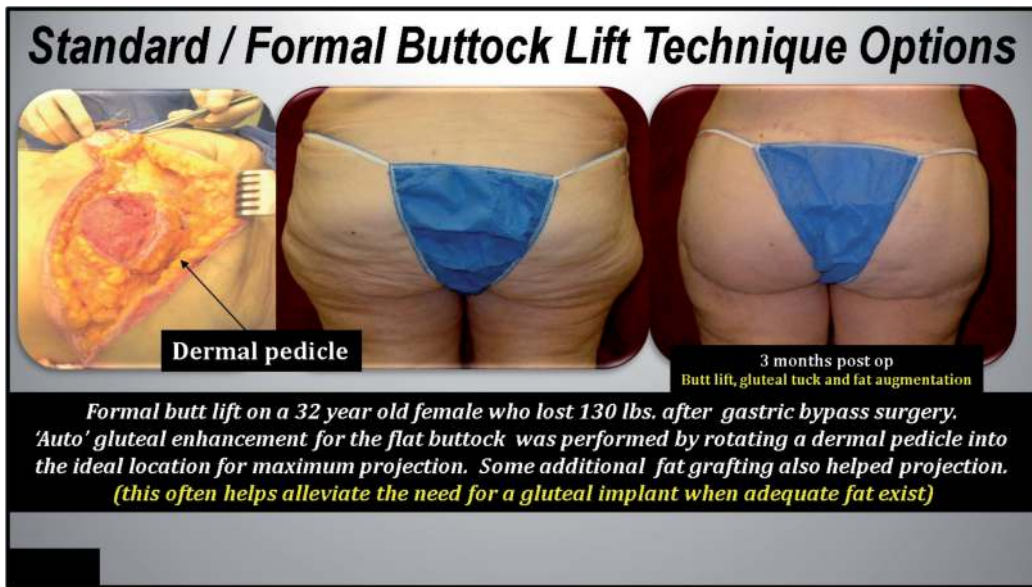
## 5. Aesthetic buttock enhancement options

There are surgical and non-surgical therapies to correct deformities of the buttocks and to enhance its shape and size. The least invasive way to enhance gluteal deformities and irregularities is by injection of fillers such as poly-L-lactic acid (Sculptra by Galderma Laboratories, L.P.) which is a synthetic material that is naturally absorbed by the body over time. Sculptra® is indicated for healthy patients who are looking for correction of irregularities and small areas of atrophy. In the gluteal area is used off label since his FDA approval is for correction of facial wrinkles and deep nasolabial folds. The injection technique is considered subcutaneous to deep dermal in a cross-hatch pattern. It is recommended to ovoid overcorrection because the product is expected to gradually improve the contour deficiency after treatment of the area.

Surgical enhancement of the gluteal region depends largely on the amount of available fat to be harvested with liposuction and fat transfer. It also depends on the degree of skin laxity of the buttocks. Liposculpture (liposuction and fat transfer) is the preferred method of buttock augmentation on those female patients how have excess amounts of fat in the lower back, waist and/or abdominal area. This technique of liposculpture is popularly known and marketed as a “Brazilian butt lift” (BBL) procedure. The necessary amount of fat harvest needed varies on a case by case basis but on average 200–1000 cc of fat is micro-grafted into each side of the buttocks. In a recent reviewed survey of 100 board certified cosmetic surgeons who perform BBLs routinely, the average was 600 cc of fat inject per side. If the patient does not have enough excess fat available and is not willing to gain weight, then gluteal silicone implants are the treatment of choice (Figure 16).



**Figure 16.** Gluteal implants can be a great option for patients who desire significant gluteal enhancement but has very little excess fat. However, sometime even with implants, a Hispanic patient may want additional fullness laterally that can be performed simultaneously if at least some fat is available.



**Figure 17.**

*In the massive weight loss patient with severe skin laxity, a traditional incisional butt lift is the treatment of choice. The enhancement in projection for those patients can be performed with auto-augmentation via use of a dermofatty pedicle as shown. Regrettably, it is limited to an isolated area and often additional fat injection laterally is required or implants if no extra fat source exist.*

In the massive weight loss patient or patients with limiting amounts of fat and severe skin laxity, a traditional incisional butt lift is on treatment of choice. The enhancement in projection for those patients may be performed with micro-fat grafting and/or silicone gluteal implants (**Figure 17**). Auto-augmentation via use of a dermofatty pedicle during a formal butt lift adds bulk and projection, but unfortunately it is limited to an isolated area and often additional fat injection laterally is required or implants if no significant fat source exist.

The other type of patient that is often encountered is the patient that lacks projection in the gluteal region and desires an improved shape but are too thin for autogenous fat transfer. They usually have an athletic build and little to no gluteal ptosis. These patients have one option for aesthetic gluteal enhancement which is the surgical placement of a gluteal implant. Historically, one of the first ways surgeons started to augment the buttocks was with round silicone gel breast implants. However, surgeons quickly realized that breast implants were problematic in the buttock region [2]. Over the years, multiple techniques have been described for gluteal augmentation using prosthesis in three anatomical planes: submuscular, intramuscular and subfascial [3–5]. The submuscular placement is considered unfavorable because of the increased risk of injury to the sciatic nerve. This potential risk was minimized, but not eliminated, by placing the implant in an intramuscular plane. The subfascial technique virtually eliminates the morbidity of sciatic nerve injury but comes with other limitations such as a more visible and palpable implant.

## 6. Technical steps

### 6.1 Liposculpture technique (liposuction with autologous fat grafting, “Brazilian butt lift”)

First, the fat donor sites are established. Common areas for fat harvest include, but are not limited to, the abdomen, chest, lateral thorax, waist, hips, back, arms,

and/or thighs. For the best aesthetic outcomes, the lower back, sacrum, waist and hips are areas that are almost always treated with liposuction to narrow the waist and accentuate the curves and lower the hip/waist ratio.

Next, pre-surgical markings are preformed while the patient is in an upright position. Deep depressions or areas that need to be grafted are outlined in red and areas that need to be liposuction are marked in blue. Once the patient has been put under general anesthesia, foot pumps are applied for deep vein thrombosis prophylaxis and 2 g of cefazolin (Ancef) is given. If allergic to penicillin, clindamycin 600 mg IV is given as antibiotic prophylaxis.

Next, the skin is prepared in a sterile fashion with 4% chlorohexidine diluted with sterile 0.9% normal saline with sterile gauze to clean all areas that will be treated with liposuction or fat grafting. Then, a 20 gauge spinal needle connected to a Wells Johnson® infiltration pump is used to superficially inject the tumescent anesthesia solution. Next, a #11 blade is used to make punctures in all planned liposuction sites. Lastly, a blunt infiltration cannula attached to the infiltration pump is used to infiltrate with majority of the tumescent solution into the deep and superficial fat layers until the tissues have a tense feel to them due to the increase hydrostatic pressure. The tissues area left undisturbed for ~20 min to allow for vasoconstriction by the epinephrine within the tumescent anesthesia infiltrated. During this time, the patient is prepared and draped in a sterile fashion for a second time but this time using a ChloroPrep™ stick. In addition, a lap sponge soaked in betadine solution is placed and secured over the anus with one 3-0 prolene suture at the level of the sacrum and a 3 M ioband dressing to completely seal off the anus from potentially contaminating the sterile field (**Figure 18**). The maximum concentration of lidocaine used is 35 mg/kg and all cases are done under general endotracheal anesthesia.

Next, 3 or 4 mm liposuction cannulas are used to harvest the fat from all areas to be treated. The fat is collected sterile into a 3 L, glass, and reusable sterile canister. Excess fluid and blood settles on the bottom of the canister and fat micro-grafts float to the top of the canister via continuous vibration table. The excess fluid is decanted to isolate only the fat grafts. The fat is then treated with an antibiotic solution



**Figure 18.**

A lap sponge soaked in betadine solution is placed and secured over the anus with one 3-0 Prolene suture at the level of the sacrum and covered with a 3M ioband dressing to completely seal off the anus from the sterile field. Drains are commonly used and punctures sealed sterily in an effort to prevent post op infections.



**Figure 19.**

*The fat infiltration technique used by the authors is a superficial grafting technique above the muscle in a parallel plane to the back which keeps the cannula well above the superior and inferior gluteal veins. Injection should be kept out of the inner bowl of the pelvis and essentially stay above the boney crest.*

containing 80 mg gentamicin and 600 mg of clindamycin mixed in a saline solution of 250 ml. Right before the fat is about to be injected back into the patient, 5–6 cc of platelet rich plasma (PRP) from the patient's own blood is mixed with the fat. A 4 mm infiltration cannula with a single hole is used to pump the fat back into the patient's buttocks. The fat infiltration technique most often used by the authors is a superficial grafting technique above the muscle in a parallel plane to the back and far from the superior and inferior gluteal veins to avoid injury which could lead to fat emboli (**Figure 19**). A pressure-controlled injection system by Wells Johnson is used which cuts off automatically if it senses pressures higher than central venous pressure. The preferred infiltration system is a closed loop injection system that includes a vibrating table to help with separation of the fat from the supernatant. The advantages of this system when compared to previous methods of fat grafting include efficiency, perfect micro-droplet size, more sterile or cleaner, and low pressure of injection.

## 6.2 Gluteal implants

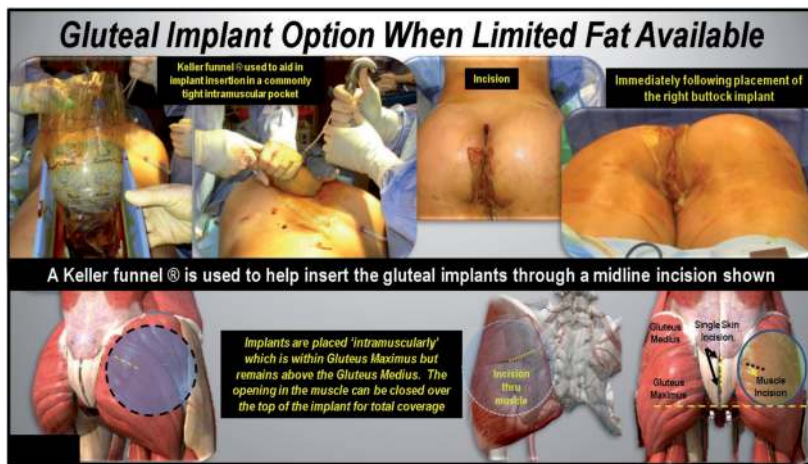
First, the patient's upper and lower gluteal crease are marked. Then, the patient is asked to sit down to mark a horizontal line when the buttocks is touching the chair. The skin marking are made with a custom-designed template. The template fits perfectly into the gluteal area just above the horizontal line previously marked on the skin. Medial extend of the implant is ~2 cm lateral from the external rim of the sacral bone. Once the patient has been put under general anesthesia, foot pumps are applied for deep vein thrombosis prophylaxis and 2 g of cefazolin (Ancef) is given. If allergic to penicillin, clindamycin 600 mg IV is given as antibiotic prophylaxis.

Next, the skin is prepared in a normal sterile fashion and tumescent anesthesia is infiltrated into the sacral and gluteal areas. One single, vertically oriented, 6 cm incision is made in the midline of the sacral region in the intergluteal crease. The incision is made through skin, subcutaneous tissue and proceeds laterally until the lateral borders of the sacral bone and the medial border of the gluteal maximus is identified. A 4–6 cm incision is made intramuscularly blunt dissection is then performed intramuscularly laterally, caudally and in a cephalad direction to create the implant pocket.

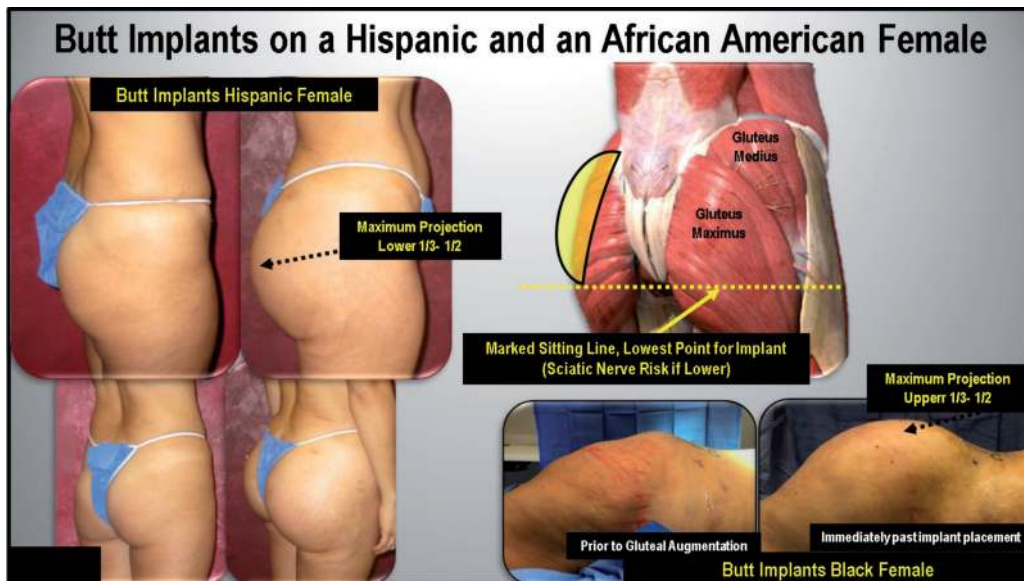
This is performed bilaterally. The implants are then introduced into the pocket through the small incisions using a plastic funnel (Figure 20). The position of the implant is verified with palpation and the aesthetics of the augmentation is assessed from multiple angles. The implant can be adjusted slightly up or down to a limit. Often, a Latino female may want her implants slightly lower than what would be preferred by an African American female (Figure 21). Next, the implants are secure in place using a non-resorbable suture to the underlying fascia. Layered closure is followed.

### 6.3 Formal incisional buttock lifting technique

As previously mentioned, this procedure is common in the massive weight loss patient. It is used to address the damage to collagen and elastic fibers which have been severely



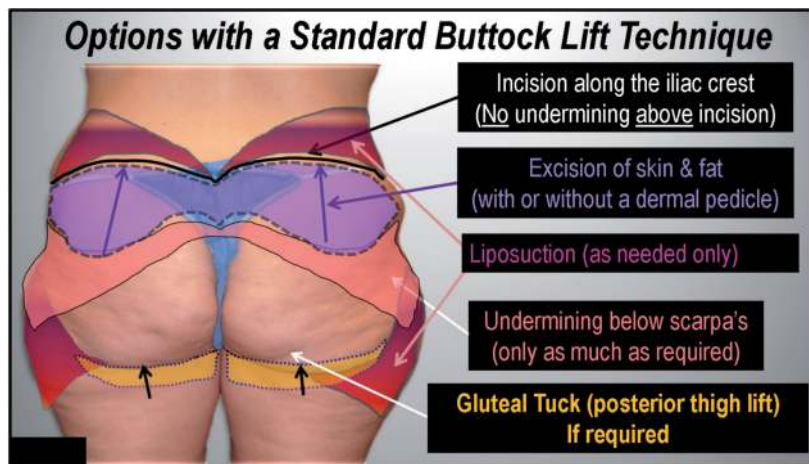
**Figure 20.** A 5cm midline skin incision is used for placement of both butt implants followed by initial blunt dissection within the gluteus maximus muscle to create the implant pocket. After lighted retraction and hemostasis assured, implants are then introduced into the pocket through the small incisions using a Keller funnel®.



**Figure 21.** The position of gluteal implants should be verified from multiple angles. After positioning, the muscle can be sutured primarily over the implant. Often, a Latino female may want her implants slightly lower than would be preferred by an African American female.

stretched. The typical “V” shape appearance of the massive weight loss patient is due to excess skin and lack of skin elasticity. The lack of projection is due to the loss of volume.

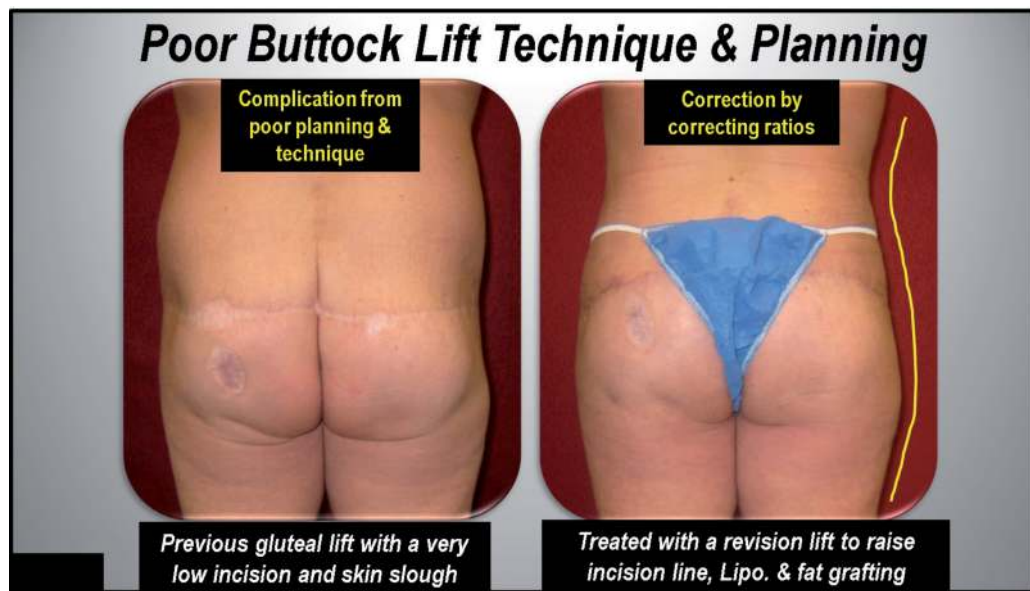
The incisional butt lift is a procedure that can be performed by itself to address the skin laxity and the ptosis of the skin. But it could also be combined with autogenous fat grafting and/or gluteal implants. The first step in this technique is to place the most superior incision along the iliac crest while the patient is standing in the upright position. This upper incision is marked from the mid-line and it ends laterally on the most lateral portion of the iliac crest. This creates a wide “M” shaped incision marking just above the underwear line. Then, a pinch test is performed in order to determine where the lower incision will be marked. The excess skin and fat excision is performed in a “Gull Wing” fashion (**Figure 22**). The patient is prepped and draped in a sterile fashion. Upper incision is made following the markings. No undermining above this incision is recommended. The only undermining of skin and subcutaneous



**Figure 22.** The most superior incision for a formal butt lift is along the iliac crest while the patient is standing in the upright position. Then, a pinch test is performed in order to determine where the lower incision will be marked. The excess skin and fat excision is performed in a “Gull Wing” fashion. Minimal undermining is required and liposuction can be performed simultaneously along with occasional fat grafting or implants when indicated.



**Figure 23.** The patient shown is before and after a standard skin excisional buttock lift with the addition of fat grafting to improve final shape and projection.



**Figure 24.**

The patient shown had complications from what appears to have been poor planning as well as technique. Correction focused on restoring a better hip to waist ratio by scar revision and fat grafting along with removal of fat at the true waist line.

fat is carried out in a caudal direction below Scarpa's fascia (**Figure 23**). Once the desired fat and skin has been excised, further undermining in a caudal direction takes place in order to be able to advance the lower skin and subcutaneous tissues up to the upper incision and close with the least tension as possible. Liposuction of the flanks and thighs is done only as needed. Another common procedural adjunct to an incisional but lift is a gluteal tuck which is also known as a posterior thigh lift.

In certain cases when fullness to the upper buttocks is desired, the surgeon should consider the rotation of a dermal pedicle inferiorly to give the upper buttocks more volume and projection. This could eliminate the need for a gluteal silicone implant. Planning is critical and one must keep correct proportions, maintain the superior incision at the iliac crest and avoid a thin flap to prevent unwanted complications (**Figure 24**).

## 7. Safety considerations

### 7.1 Infection prevention

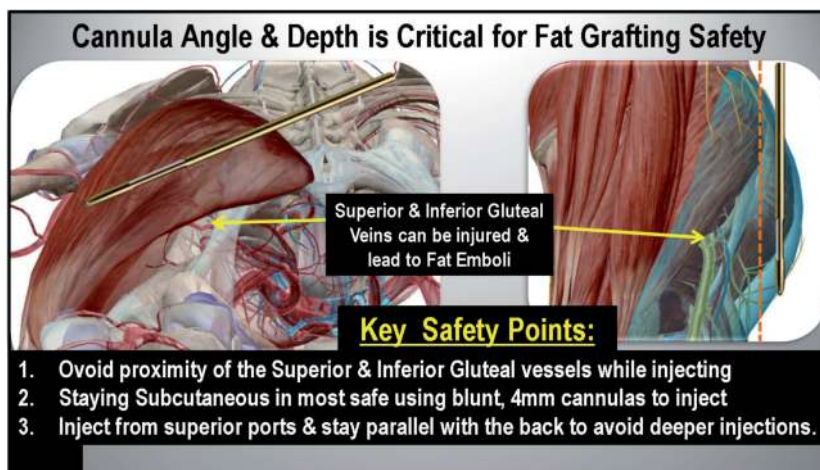
Even though gluteal augmentation surgery has an incidence of infection of <1%, surgeons should avoid this serious complication at all cost. Patients should clean their entire body with an antiseptic skin cleanser the night before or the morning prior to surgery (i.e., Hibiclens® soap). All of our patients get a double prep prior to surgery. One sterile prep takes place prior to tumescent or local anesthesia infiltration and the other prep takes place prior to incision time. Antibiotic prophylaxis with 2 g Ancef q4h, Unasyn 3 g q6h, and gentamicin 5 mg/kg/24 h [6]. In addition, the peri-anal area is also covered with a lap sponge soaked in betadine solution plus a seal over it using a 3 M™ Ioban™ adhesive intra-operatively, using a closed liposuction system for high volume fat harvesting and reinjection prevents the fat from ever being exposed to the open air in the operating room. Thus, reducing the risk for airborne pathogens. Prior to re-injection of fat, the harvested fat in the 3 L canister is treated with an antibiotic solution containing 250 cc of normal saline, 600 mg of clindamycin, and 80 mg of gentamicin. Lastly, all liposuction and injection punctures sites are sutured and sealed with sterile tegaderm dressings.



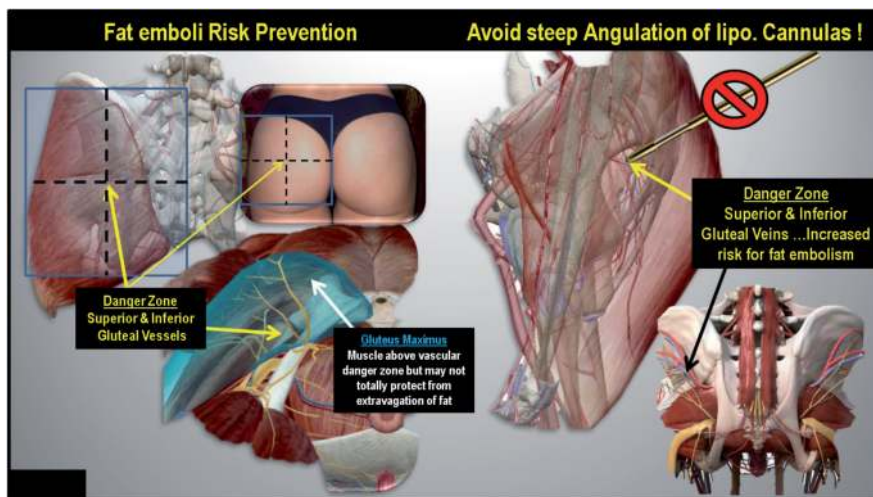
## 7.2 Fat embolism prevention

Considered one of the rapidly evolving and one of the most popular cosmetic procedures of the last decades, the fat transferred procedure marketed as a “Brazilian butt lift” has been in the news in the past couple of years due to an increase in mortality rate associated to the potential risk for fat embolism and its fatal effect on the cardio-pulmonary system. In 2017, a report on mortality from gluteal fat grafting was published on the *Plastics and Reconstructive Surgery Journal*. The reports revealed that the mortality risk worldwide of 1:3000 for those patients undergoing gluteal fat grafting. Before that reports was published, the cosmetic surgery procedure associated with the highest mortality rate was attributed to abdominoplasty which is only 1:18,000. That makes the mortality risk for gluteal fat grafting six times higher when compared to abdominoplasty [7].

Fat embolism takes place when fat enters the venous system. Therefore, it is believed that fat is being grafted into the veins in the gluteal region and traveling up



**Figure 25.**  
*Vascular injury and fat embolism into the superior and inferior gluteal vessels may be avoided by use of 4mm blunt cannulas and avoiding the use of smaller diameter cannulas that may more easily tear the vessels located deep to the gluteus maximus and medius.*



**Figure 26.**  
*The angulation of the infiltrating cannula is very important as shown. In order to avoid the “danger zone,” it is suggested to keep the infiltration cannula as parallel as possible to the lower back and to resist angulating the cannula at a steep angle to avoid the deep gluteal veins.*

into the cardio-pulmonary system. No one is aware of the exact mechanism but there are two theories. One is the “direct cannulation” theory, in which it is thought the cannula tip enters the vein and a bolus of fat is inserted into the vein. The fat bolus then can travel up to the pulmonary circulation and cause cardio-pulmonary instability. The second theory is the “laceration siphon” theory described by Del Vecchio and Wall [8]. In this theory, there is some iatrogenic damage to a large vein which is created under low pressure, which is then followed by fat introduction into the damaged vein under high pressure. It is thought that a pressure gradient in the area may transfer the fat slowly overtime into the damaged vein due to the difference in pressure. This theory has also been called the “Venous Traction” theory.

The evolution in technology used for large volume fat grafting are helping to make this procedure safer. The use of tommie-syringes for fat transferred is now considered outdated and somewhat high risk due to the variable and unpredictable amount of pressure needed to be applied to get the fat to come out. It is highly recommended to use a closed-circuit liposuction system in which the fat is kept sterile in a large cannister and then re-injected back into the patient without being exposed to air. The preferred system is the HVP™ system by Wells Johnson which allows you to precisely control pressure and flow rates. It allows you to manage and control both negative and positive pressures. The average positive pressure generated by a 60 ml Toomey syringe is 80” Hg and a 1 ml syringe reaches up to 1425” Hg. The standard infiltration pump that comes in the HVP™ system can create positive pressures up to 77” Hg, and it allows you to set an upper limit so that the machine would automatically stop.

Another recommendation to ovoid vascular injury and fat embolism into the superior and inferior gluteal vessels is to use 4 mm blunt cannulas, avoiding the use of smaller diameter cannulas. These vessels are located within the fascia or deep to the fascia of the gluteus maximus (Figure 25). Therefore, intramuscular injection of fat is not recommended and/or needed in order to achieve an aesthetic result. However, if the surgeon is going to inject fat into muscle, it is recommended to stay in the superficial portion of the muscle that is part of the convexity at or above the hip bone level, avoiding any deep muscle injection. It is also recommended to inject fat using a micro-droplet technique rather than large pooling boluses of fat.



**Figure 27.**  
*A high risk obese patient is shown who underwent a simultaneous abdominoplasty plus liposuction and fat grafting BBL. A BMI >35 greatly increases her risk for many issues and especially wound problems.*



**Figure 28.**  
*Demonstration of the ideal patient for a BBL, healthy, normal BMI and limited fat volume injected above muscle to may a nice difference.*

The angulation of the infiltrating cannula is also very important. In order to avoid the “danger zone,” it is suggested to keep the infiltration cannula as parallel as possible to the lower back and to resist angulating the cannula in a steep angle (**Figure 26**). In addition, it is recommended to perform fat infiltration from the punctures made in the supra-gluteal crease which makes it less likely to inject fat intramuscularly than using the infra-gluteal crease.

### 7.3 Blood loss and DVT

Any of the main gluteoplasty procedures mentioned have the potential for heavy blood loss especially from aggressive liposuction. Patients with BMIs > 35 and those getting simultaneous abdominoplasty have increased risk of both anemia as well as deep venous thrombosis (DVT) (**Figure 27**).

We obtain pre and post-operative hemoglobin levels and hematocrit levels on all BBL patients as well as implant and formal butt lift patients. All patients have routine pneumatic foot pumps and other routine DVT prophylaxis. Lovenox, heparin or other anticoagulants are used on a case by case basis only since the risk for hematoma often outweighs the risk for DVT for many cosmetic surgery procedures, especially where major tissue undermining may be required (**Figure 28**).

## 8. Conclusions

Gluteal enhancement was a relatively infrequent procedure before the twenty-first century, but gluteal enhancement procedures have exploded in popularity after 2010 thanks mostly from social media and celebrities. Unfortunately, an unheralded increase in numbers of fat grafting procedures to the buttock throughout the world did not allow time for some complications to be realized in a timely manner. Many good surgeons around the world were caught off guard by this dangerous phenomenon. Fat embolism death has been associated with BBL procedures at an alarming frequency (mortality rate 1:3000). Fortunately, research and preventive measures are finally catching up and death rates from this procedure will expectantly fall precipitously in the next few years. This would be a welcome development to an otherwise excellent procedure. Many a patient have been thrilled with their new shape and well-rounded curvy figure and small hip to waist ratio.

Beyond a BBL using fat, there are a multitude of options that can be used to improve the buttock including non-surgical injections, implants, excisional, liposuction and various energy devices. The surgeon must thoroughly understand the diagnosis to formulate the ideal plan and select the best technique for each patient. This chapter attempted to cover the top three surgical procedures (formal buttock lift, the Brazilian butt lift and gluteal implants) in enough detail to be very valuable for those performing these procedures. More than ever, the buttock plays a significant role in physical and sexual attraction and surgeons are asked routinely to obtain results that are beautiful as well as low risk.

## **Author details**

Angelo Cuzalina<sup>1\*</sup> and Armando Retana<sup>2</sup>


1 Tulsa Surgical Arts, Tulsa, Oklahoma, USA

2 American Board of Cosmetic Surgery, Chicago, Illinois, USA

\*Address all correspondence to: [angelo@tulasurgicalarts.com](mailto:angelo@tulasurgicalarts.com)

## **IntechOpen**

---

© 2019 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

## References

[1] Singh D. Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology*. 1993;**65**:293-307

[2] Bartels RJ, Ó'Malley JE, Douglas WM, et al. An unusual use of the Cronin breast prosthesis. Case report. *Plastic and Reconstructive Surgery*. 1969;**44**:500

[3] Robles JM, Tagliapietra JC, Grandi MA. Gluteoplastia de aumento: Implante submuscular. *Cirplast Ibero Latinoam*. 1984;**10**:365-369

[4] Vergara R, Marcos M. Intramuscular gluteal implants. *Aesthetic Plastic Surgery*. 1996;**20**:259-262

[5] De la Pena JA. Subfascial technique for gluteal augmentation. *Aesthetic Surgery Journal*. 2004;**24**:265-273

[6] Roberts TL, Weinifeld AB, Bruner TW, Nguyen K. "Universal" and ethnic ideals of beautiful buttocks are best obtained by autologous micro fat grafting and liposuction. *Clinics in Plastic Surgery*. 2006;**33**(3):371-394

[7] Mofid MM, Teitelbaum S, Suissa D, et al. Report on mortality from gluteal fat grafting: Recommendations from the ASERF task force. *Aesthetic Surgery Journal*. 2017;**37**:796-806

[8] Del Vecchio D, Wall S. Expansion vibration lipofilling: A new technique in large-volume fat transplantation. *Plastic and Reconstructive Surgery*. 2018;**141**:639e-649e