

Safety in Female Genital Plastic Surgery

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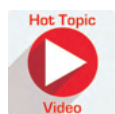
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Learning Objectives: After studying this article, participants should be able to: (1) Identify the most appropriate type of anesthesia for the female genital plastic surgical patient and minimize risks of nerve injury and thromboembolic event through proper preoperative evaluation and knowledge of positioning. (2) Define the vulvovaginal anatomy, including common variants, and assess vulvovaginal tissues after childbirth and menopause. (3) Apply surgical techniques to minimize complications in female genital plastic surgery. (4) Classify the types of female genital mutilation/cutting and design methods of reconstruction after female genital mutilation/cutting.

Summary: Female genital plastic surgery is growing in popularity and in numbers performed. This CME article covers several aspects of safety in the performance of these procedures. In choosing the best candidates, the impact of patient motivation, body mass index, parity, menopause and estrogen therapy is discussed. Under anesthesia, consideration for the risks associated with the dorsal lithotomy position and avoidance of compartment syndrome, nerve injury, deep venous thromboses, and pulmonary embolus are covered. Anatomical variations are discussed, as is the impact of childbirth on tissues and muscles. Surgical safety, avoidance of complications, and postoperative care of a variety of vulvovaginal procedures are discussed. Videos showing anatomical variations and surgical techniques of the most common female genital procedures with recommendations to reduce the complication rate are included in the article. Finally, female genital mutilation/cutting is defined, and treatment, avoidance of complications, and postoperative care are discussed. (*Plast. Reconstr. Surg.* 146: 451e, 2020.)

In the past decade, the number of patients undergoing female genital plastic surgery has grown. In fact, the number of labiaplasty procedures performed in 2011 through 2018 increased from 2142 to 12,756.¹ These procedures are controversial, however, and in 2019, the American College of Obstetricians and Gynecologists reaffirmed its stance against cosmetic vulvovaginal procedures, stating their safety and efficacy have not yet been established.² The aim of this article is to review the safety of female genital cosmetic surgery for those performing these procedures.

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SAFETY AND PATIENT CHOICE

Motivation

Women are motivated to seek labiaplasty for a variety of reasons, including functional, appearance-related, and sexual symptoms.³⁻⁹ Patients interested in vaginoplasty and perineoplasty may complain of vaginal laxity after childbirth, with a loss of friction during intercourse and reduced sexual satisfaction.^{10,11}

Mons and labia majora reduction and augmentation are generally cosmetic concerns. As with any aesthetic procedure, disproportionate dissatisfaction with the appearance of a normal-appearing anatomy may indicate body dysmorphic disorder.

Body Mass Index

The patient's body mass index is a primary consideration in female genital procedures. Obese female patients (body mass index >30 kg/m²) are more likely to experience pelvic floor disorders such as pelvic organ prolapse, urinary incontinence, cystocele, and rectocele.^{12,13} Pelvic floor disorders occur among 23.7 percent of women,^{14,15} and the incidence increases to 90 percent in patients who are morbidly obese.^{14,16} The pressure on the pelvic floor in this patient population makes them poor candidates for vaginal tightening procedures.

Parity

Pelvic floor disorders are also associated with parity. Significant risk factors include a history of vaginal birth, multiparity, instrumental births, and high newborn birth weights.^{17,18}

Evaluation for Vaginal Laxity, Rectocele, and Cystocele

Vaginoplasty/perineoplasty patients should be evaluated for pelvic organ prolapse, including rectocele and cystocele, to determine whether they should be referred to a gynecologist, urologist, or urogynecologist. Pelvic organ prolapse is associated with sexual dysfunction, pelvic pressure, and visualization of prolapse.¹⁹⁻²¹ The short form of the Pelvic Organ Prolapse/Urinary Incontinence/Sexual Questionnaire is an excellent screening tool for plastic surgeons.²² A cystocele is associated with urinary frequency, urgency, and incontinence; a rectocele is associated with constipation, including a history of digital manipulation to facilitate defecation.¹⁹

The patient should be examined in the standing and lithotomy positions. Typically, the perineum is located at the level or within 2 cm of the ischial tuberosities in the standing position. If the perineum is located below this level at rest or

with a Valsalva maneuver, the patient should be referred for an evaluation of pelvic organ prolapse.

In the lithotomy position, placing two fingers in the vaginal canal, the separation of the levators is assessed digitally, measuring the hiatus with muscles at rest and contracted. The number of fingerbreadths may be roughly converted into centimeters. Lax, widely separated levator ani muscles are best addressed with a vaginoplasty.^{10,11} The perineal mucosa may be attenuated with little muscle within the perineal body.¹⁰ A rectovaginal examination is conducted to assess the integrity of the posterior vaginal wall.¹⁰

ANESTHESIA SAFETY

Positioning

The dorsal lithotomy position used in vaginal surgery comes with unique risks, including nerve injury, lower limb compartment syndrome, and deep venous thrombosis.²³ An understanding of the pathophysiology of each entity and their potential linkage is important to preventing these complications.

Prevention of Nerve Injury

Sensory nerve injury occurs in up to 2.3 percent of patients in the dorsal lithotomy position. As the legs are flexed, abducted, and externally rotated, the positioning can result in pressure or stretching of the femoral, lateral femoral cutaneous, sciatic, and common peroneal nerves.²⁴ Patients who are thin, diabetic, and/or alcoholic, and those who smoke, have peripheral vascular disease, or have subclinical neuropathies, are at higher risk for neurapraxia.²⁵ "Candy cane" leg holders can place direct pressure on the nerves, whereas Allen YelloFin Elite Lift Assist (Allen Medical Systems, Chicago, Ill.) stirrups limit points of contact,²⁴ as can be seen in [Figure 1](#).

Although rare, motor nerve injuries can occur with prolonged stretch or compression. Flexed hips and extended knees can create tension along the sciatic nerve and compress the peroneal nerve against the head of the of the fibula.²⁶ To avoid nerve injury, patients should be limited to no more than 90 minutes in the dorsal lithotomy position, and all compressive and stretch mechanisms should be eliminated. Fortunately, sensory nerve injury typically resolves within 6 months, and these prevention strategies should drive nerve injury rates to less than 0.5 percent.²⁴

Prevention of Compartment Syndrome

Hemodynamic changes and leg elevation can put the patient in the dorsal lithotomy position at



Fig. 1. Unlike other leg holders and stirrups that can place direct pressure on the nerves, the Allen YelloFin Elite Lift Assist stirrups, shown in this photograph, limit the points of contact, minimizing the risk of nerve injury.

risk for compartment syndrome of the leg. Although case studies of compartment syndrome are rare, the consequences are severe, including compromised limb function and muscle damage, leading to rhabdomyolysis, myoglobinemia, and acute tubular necrosis.²⁷ The diagnosis is based on clinical findings, including signs and symptoms of tight fascial compartments, pain on passive stretch, with confirmation by compartment pressure measurements. Compartment pressures greater than 30 mmHg or a pressure within 20 mmHg of diastolic blood pressure are correlated with compartment syndrome.^{27,28} The affected fascial compartment must be released within 6 hours for complete recovery.²⁵ The risk of compartment syndrome is less than 0.3 percent by normalizing leg position every 90 minutes, avoiding hypotension, and limiting operative times.²⁹

Prevention of Deep Venous Thrombosis and Pulmonary Embolism

Deep venous thrombosis and pulmonary embolism are uncommon in the setting of vaginal surgery. A 2016 meta-analysis showed a risk of 2.6 thromboembolic events per 1000 cesarean delivery patients, which was four times higher than patients delivering vaginally.³⁰ Nonetheless, patients should be evaluated for deep venous thrombosis and pulmonary embolism risk factors, including age older than 35 years, body mass index greater than 35 kg/m², hypercoagulability, family history, smoking, and estrogen therapy.²³ A useful tool for risk stratification in these patients is the Caprini scoring system, which takes multiple risk factors for venous thromboembolism into

account and serves as a guideline for degree of deep venous thrombosis prophylaxis, including placement of sequential compression devices and administration of pharmacologic agents. Other prophylactic considerations include early ambulation, adequate hydration, advising weight loss, and temporary cessation of exogenous estrogen 3 to 4 weeks before and after surgery.^{31,32}

Types of Anesthesia

Female genital plastic surgery can be performed under general, local, and pudendal block anesthesia. General anesthesia is ideal for combinations of procedures, such as breast augmentation and labiaplasty, but costs are greater, and patients with multiple comorbidities may be at greater risk for complications.

Local anesthesia, with or without oral sedation, is ideal for labiaplasty, majoraplasty, perineoplasty, and mons liposuction. A vaginoplasty can be performed under general anesthesia or pudendal block. In general, local anesthesia offers a safer alternative to general anesthesia by limiting both minor complications, such as nausea, vomiting, hoarseness, sore throat, and drowsiness; and major complications, such as aspiration, pneumonia, malignant hyperthermia, and thromboembolic events.

ANATOMY

Superficial Anatomy

Textbooks and scientific articles tend to show the vulva in a similar manner: clitoral show



Fig. 2. (Above, left) This patient has a double clitoral hood, with an upper fold and lower fold. In this case, the lateral fold merges onto the superior aspect of the labia minora. (Above, right) In this patient, the lateral clitoral hood merges with the medial labia minora. The labia minora merge superiorly with the medial labia majora. The clitoris is recessed, and clitoral hood projects more laterally than centrally. (Below, left) In this patient, the thick mucosa of the fourchette merges with the raphe over an expansive area. (Below, right) In this patient, the clitoral hood merges onto the medial labia minora, and the labia minora merge superiorly onto the medial labia majora.

underneath the clitoral hood; the lateral clitoral hood not encroaching onto the lateral labia minora; a distinct interlabial sulcus; and an unstretched introitus. This limited view of the anatomy can prove confounding for the novice labiaplasty surgeon faced with an anatomical variant.

Common variants include redundant folds lateral to the clitoral hood; a double-clitoral hood, as can be seen in [Figure 2, above, left](#); and merging of the lateral clitoral hood onto the lateral labium minus,^{33,34} which can be seen in [Figure 2, above, right](#). The fourchette mucosa can be thick and prominent, merging with a pronounced raphe between the introitus and the anus, as can be seen in [Figure 2, below, left](#). In some instances, the lateral clitoral hood merges onto the medial labium minus, and the superior labium minus merges onto the medial labium majus. This anatomical variant can be confusing and is shown in [Figure 2, below, right](#). In this instance, there is no superior

sulcus where the two labia merge. Labia minora vary in pigmentation, texture (rugose or smooth), thickness, symmetry, shape, and projection.³⁴

There are several classification systems for labia minora, varying in how the length is classified: by degree of protrusion of the labia minora beyond the majora^{33,34}; by the labia minora length from introitus to labial edge^{35,36}; or by the relationship of minora, majora, clitoral hood, and fourchette.³⁷ Although it is important to assess the labial dimensions as part of operative planning, classification of labia by length or protrusion is a minor factor in determining a patient's candidacy for labiaplasty compared with her symptomatology.³⁻⁵

The mons may be ptotic, thick with adipose tissue, flat, or mildly projecting. The labia majora may vary in fullness, firmness, projection, and shape. The introitus may be widened in the postpartum patient, with the posterior wall extending farther toward the anus.

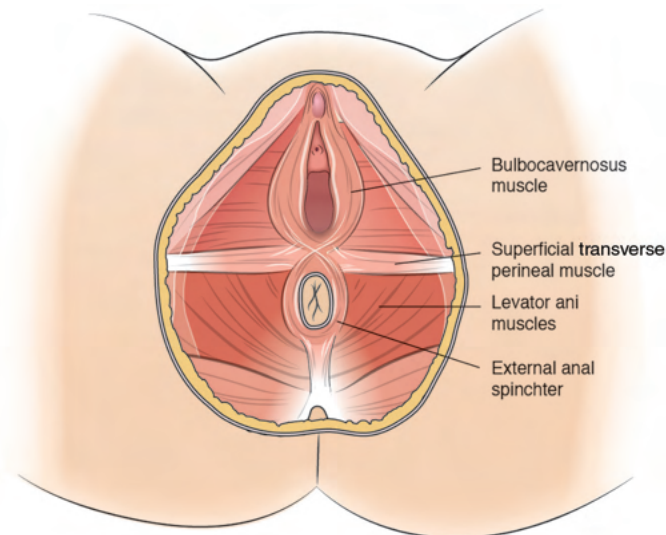


Fig. 3. Vaginal laxity results from the trauma and stretching associated with pregnancy and vaginal delivery. The stretching can attenuate the tissues and separate the levator ani, bulbocavernosus, and superficial transverse perineal muscles, similar to diastasis of the rectus abdominis.

Nerve Supply and Vasculature

The pudendal nerve provides the nerve supply to the external female genitalia. At the superficial transverse perineal muscle, the pudendal nerve splits into the deep perineal nerve, from which the dorsal nerve of the clitoris arises, and the superficial perineal nerve, from which the posterior labial nerve arises.³⁴ A fresh cadaver study demonstrated a heterogeneous distribution of sensory nerves of the labia minora.³⁸

The labia minora have numerous vascular lumens, and the surrounding tissue is nonerectile connective tissue.^{39–41} A central core of nervous tissue parallels the vasculature along the length of the minora.⁴¹ In a prospective study, Placik and Arkins demonstrated that external genital sensation was not diminished following edge (trim) labiaplasty and clitoral hood reduction.⁴²

The labia majora have sparse nerve fibers, but the clitoris has a consistent dorsal nerve, along with erectile tissue in its body. This erectile tissue, nerve, and artery are encapsulated in a dense connective tissue sheath attaching the clitoris crus to the medial aspect of the ischiopubic rami, where it is deep en route to the glans. Thus, injury to the clitoris is unlikely if the surgeon avoids encroaching on the glans and remains superficial to the dartos fascia.

The posterior labial and perineal arteries arise from the pudendal artery to deliver the blood supply to the labia majora and minora. The labia

minora are supplied by a small anterior artery, a dominant central artery, and two moderate posterior arteries. The external pudendal artery supplies the clitoral hood and communicates with the internal pudendal artery by means of the frenulum arteries.⁴³

The bulbocavernosus muscles underlie the labia majora, meeting each other at the posterior introitus, where the medial transverse superficial perineal muscles also meet, altogether forming the bulk of the perineal body. The broad, thin, levator ani muscles, consisting of the pubococcygeus, the iliococcygeus, and the puborectalis, form a major part of the pelvic floor, and when they separate with pregnancy and childbirth, patients may experience vaginal laxity (Fig. 3).^{10,11}

Impact of Childbirth on Tissues

Because several anatomical structures can be injured during delivery, it is helpful to obtain an obstetric history when assessing patients for vaginal laxity. The stretching and trauma of vaginal childbirth, especially during operative vaginal delivery, can result in injury to the levator ani muscle complex, most notably the pubococcygeal muscle,^{44,45} resulting in weakening of the pelvic floor and the urethral support system, predisposing patients to pelvic organ prolapse (Fig. 4).

Vaginal delivery can also result in injury to the pudendal nerve, caused by stretching and

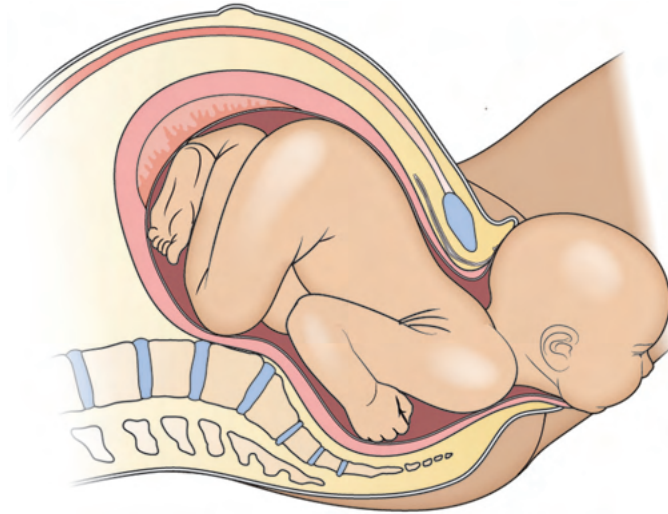


Fig. 4. Vaginal delivery attenuates tissues and separates muscles, akin to the stretching of pregnancy that leads to rectus abdominis diastasis. Pregnancy and vaginal delivery can result in separation of the posterior bulbocavernosus and medial superficial transverse perineal muscles at the posterior introitus, and the levator ani muscles of the pelvic floor, adjacent to the vaginal canal.

compression.⁴⁶ The risk factors for pudendal nerve injury include a large fetus, forceps delivery, and fetal malposition.⁴⁷

Impact of Menopause on Tissues

Estrogen production plummets permanently at menopause, leading to atrophic changes of the vaginal mucosa, vulva, and genital tissues. Symptoms that can result, known as the genitourinary syndrome of menopause, include vaginal pain, vulvar pain, itching, discharge, and dyspareunia from loss of lubrication and narrowing of the vagina. The vaginal pH becomes more acidic in postmenopausal women, predisposing them to urinary tract infections.⁴⁷ Half of postmenopausal women experience this condition within a decade of the onset of menopause.⁴⁸ Locally active estradiol therapy is available as a cream, capsules, tablets, and rings and can increase the thickness of the vaginal mucosa, reduce the vaginal pH, and improve the symptoms of vaginal dryness and dyspareunia.⁴⁹⁻⁵¹

SURGICAL SAFETY, POTENTIAL COMPLICATIONS, AND POSTOPERATIVE CARE

Paralleling the growth in labiaplasty surgery in the United States,¹ studies have consistently demonstrated patient satisfaction outcomes regarding appearance and functionality of greater than 90

percent.^{3,8,9,52-57} Studies of other vulvovaginal procedures are fewer, as they are performed less frequently.^{52,53} Following is a brief overview of possible surgical complications and how to avoid them.

Labiaplasty (Labia Minoraplasty)

Poor labiaplasty results can result in amputation of the labia, dehiscence, scarring, pain, dyspareunia, reduced erotic sensation, deformity, and loss of self-esteem.^{3,6,57} Overresection or amputation of the labia can predispose to dryness, pain from scarring at the introitus, scar contracture, deformity, and constant drainage of vaginal discharge.^{58,59} These complications are nearly all avoidable with good operative technique. The best technique to use is the one the surgeon feels most comfortable doing, while also considering the patient's specific anatomy and aesthetic preference.^{60,61} Surgical Videos 1 and 2 demonstrate a trim labiaplasty with clitoral hood reduction, and Video 3 demonstrates a wedge labiaplasty. [See [Video 1 \(online\)](#), which demonstrates a trim labiaplasty and clitoral hood reduction. Part 1. The surgical technique is shown, and the steps are narrated with subtitles. See [Video 2 \(online\)](#), which demonstrates a trim labiaplasty and clitoral hood reduction. Part 2. The surgical technique is shown, and the steps are narrated with subtitles. See [Video 3 \(online\)](#), which demonstrates a wedge labiaplasty. The surgical technique is shown, and the steps are narrated with subtitles.]

Table 1. Summary of Potential Complications Associated with the Wedge and Trim Labiaplasties along with Preventative Measures*

Technique	Complications	Preventative Measures
Wedge	Dehiscence	Consider the blood supply when orienting the wedge: the small anterior labial artery may not be sufficient for a large or long superiorly based flap† Plan the wedge dimensions to allow closure without tension; overresection requires a tight closure, predisposing to at least partial dehiscence Avoid surgery in nicotine-addicted patients A robust suture closure of the central lamina without tension, in addition to mucosal closure, protects against thinning of the tissues along the suture line
	Fenestration	Closing all layers, including the central lamina, securely; avoiding tension; and patients avoiding nicotine use also protects against fenestration, which can occur along the suture line
	Narrowing of the introitus	Watching the advancement of the posterior introitus when planning the wedge can help one avoid overresection that can result in advancement of the fourchette, narrowing the introitus, which may impact intercourse
	Pulling the clitoral hood inferiorly	Just as overresection can draw the fourchette anteriorly, the clitoral hood can be placed under tension and pulled inferiorly
	Color mismatch	Pigment variation along the labia minora, from anterior to posterior, can result in a color mismatch along the incision line; this possibility should be discussed with patients with this predisposing color variation
	Notching	Notching where the scar is slightly depressed can be avoided with secure sutures, particularly along the labial edge, where the tension is the greatest
Trim	Overresection and amputation of the labia	The inexperienced surgeon may hold the labia under tension when excising the redundant distal labium, and the resulting labia may be much shorter than planned; the frenulum serves as a landmark for the anterior resection and should be preserved; the labium should be no shorter than the distance from the sulcus to the frenulum
	Scalloped edges	Running, baseball sutures predispose to scalloped edges; running subcuticular or interrupted sutures prevent the gathering and intermittent strangling and swelling along the baseball suture line
	Hematoma	A hematoma can occur with any technique, but the trim cuts across the vasculature described by Georgiou†; after tissue excision, the central lamina should be carefully inspected for the lumens of vessels, which should be coagulated, even if they are not actively bleeding; suturing can be used both to shape the central lamina and to add further hemostatic protection
	Broad, flat edge	Thick labia may appear broad and flat after their length has been reduced; the central lamina thickness can be reduced centrally, hemostasis achieved, and sutures used to shape the lamina so it narrows from proximal to distal
	Prominent clitoral hood	The heavy clitoral hood should be addressed at the time of the labiaplasty to prevent this imbalance
	Divided frenulum	The excision line should begin posterior to the frenulum, and no more proximal to the sulcus than the frenulum; dividing the frenulum can result in anterior rotation of the clitoris, resulting in painful chafing
	Scar contracture across the fourchette	The posterior labial excisions should not meet one another, as the scar can contract, resulting in pain with intercourse; a perineoplasty may be considered in patients with redundant mucosa in perineal area.

*The wedge and trim labiaplasty techniques are the two most commonly used techniques.

†Georgiou CA, Benatar M, Dumas P, et al. A cadaveric study of the arterial blood supply of the labia minora. *Plast Reconstr Surg*. 2015;136:167–178.

Because different techniques offer unique advantages, however, the labiaplasty surgeon may want to master more than one. The trim and wedge techniques are the most commonly performed techniques. The trim technique, which is also known as a linear, curvilinear, edge, direct excision, or amputation labiaplasty,⁵ may seem less technically demanding than the wedge or other techniques,⁵⁸ so the surgical skill to perform the procedure well may be underappreciated.⁶⁰ The novice labiaplasty surgeon may be surprised how easy it is to overresect and even amputate the labia minora. A scalloped edge can result when the closure is performed with a running suture, particularly one that is under tension. An aggressive trim resection can divide the frenulum and allow the

clitoris to rotate so it projects more anteriorly, subjecting it to chafing, irritation, and pain.

The wedge labiaplasty technique retains the natural labial edge, but if the patient dislikes her thick, darkly pigmented, rough edge, a trim technique can be an excellent option.⁶⁰ In contrast, the wedge can dehiscence when closed under tension or sutured inadequately, and patients with thick labia may be dissatisfied with the persistent labia dimensions. See [Table 1](#) for a summary of the potential complications associated with the wedge and trim labiaplasty techniques, along with preventative measures.

Amputated labia minora can be reconstructed with the clitoral hood flaps, wedge excisions, and YV flaps.⁵⁹ If that local tissue is unavailable, reconstruction is difficult.

Clitoral Hood Reduction

The patient interested in a labiaplasty should also be assessed for a possible clitoral hood reduction, because failure to address a heavy clitoral hood at the time of a labiaplasty can result in patient complaints of a masculine, “penis-like” appearance.⁵⁸ The trim technique is associated with a higher chance of disproportional clitoral hood redundancy.^{57–59} The wedge can reduce the clitoral hood prominence through posterior tension.⁵⁸

Labia Majora Reduction

Liposuction may address anterior majora fullness, usually in continuity with the mons. Use of a cannula 3 mm or smaller minimizes the chance of surface irregularities and should be passed gently to avoid bleeding and injury.⁶²

Patients presenting for labia majoroplasty, in which excess skin and/or adipose tissue are excised, generally have redundant, ptotic, or projecting labia majora.^{62,63} A scar designed to fall along the medial labia majora hairline may be readily noticeable, so an alternative is to conceal it in the interlabial sulcus. Overexcision can result in a widened introitus.⁶² Intensive cyclists can experience chronic swelling of the labium majus, with associated vulvar lymphadenopathy that may limit long-term results of labia majoroplasty.^{64,65}

Labia Majora Augmentation

Patients with flat, empty, or atrophic labia majora may present for augmentation. First described by Felicio in 2007, fat grafting is the most common technique used.^{36,59,66} In their literature review, Jabbour et al. found a wide range of volumes injected per session (18 to 120 ml). Undertreatment is far better than creating oversized labia. The possibility of future weight gain should be considered, particularly in the younger patient.

Alternatively, hyaluronic acid is sometimes used as a volume filler, both subcutaneously and deep to the dartos fascia, with reports ranging from 2 to 6 ml per session.⁶⁶ Reported adverse events include swelling, bruising, and palpable nodules, which can be treated with light massage, intralesional corticosteroid, or hyaluronidase injection.^{64,67,68}

Vaginoplasty and Perineoplasty

Up to 76 percent of women experience decreased sensation associated with

vaginal laxity.^{69,70} Vaginal tightening is performed to improve sexual function.⁷¹

A vaginoplasty can be performed by tightening the anterior wall of the vagina by plicating the vesicovaginal fascia.⁷² More commonly, the posterior vaginal wall is tightened by plicating the rectovaginal fascia in the midline. Wedge excisions of the vaginal epithelium and rectovaginal fascia show favorable results in narrowing the vagina.^{20,73} The surgical technique of a vaginoplasty is demonstrated. [See **Video 4 (online)**, which demonstrates vaginoplasty. The surgical technique is shown, and the steps are narrated with subtitles.]

Tightening of the lateral vaginal canal may be as or more effective than posterior tightening, without a scar in the area of greatest pressure and sensitivity.^{70,74,75} In one study of 40 women, 95 percent experienced improved sexual sensitivity after vaginal tightening without muscle.⁶⁹ Other methods of vaginal tightening involve excision of redundant mucosa, median levator muscle imbrication, and reconstruction of the perineal body with a perineoplasty. Without an objective, reproducible method of measuring vaginal laxity, a correlation between physical width and quality of sensation is not possible.⁷⁰

Infusing tumescent fluid (100 to 120 ml) containing adrenaline posterior to the vaginal mucosa serves as a spacer to prevent entry to the rectum, and the vasoconstrictive action minimizes bleeding, which aids in visualization.⁷⁶ Postmenopausal patients interested in vaginoplasty should be on estrogen to maximize the thickness of their vaginal tissues.^{49–51}

Perineoplasty

Perineoplasties are often performed in cases of postpartum dyspareunia. The posterior bulbocavernosus and the medial transverse superficial perineal muscles are returned to their original midline positions.^{71,76} Nearly 90 percent of patients experience improved sexual intercourse satisfaction rates after a perineoplasty.⁷⁷ A perineoplasty without muscle plication can also be performed for aesthetic reasons in the nulliparous patient (**Fig. 5**).

Monsplasty and Mons Liposuction

Candidates for a monsplasty or mons liposuction are frequently obese. The convex fatty mons with no ptosis can be treated by liposuction, but the ptotic mons demands both skin and fat excision.^{62,78,79} The Scarpa fascia is anchored to the rectus abdominis muscle fascia to avoid descent. The procedure can be combined

Post-Operative Care after Female Genital Cosmetic Surgery

- Dressing of external scars can be done with an antibiotic ointment and a peripad. Some surgeons use topical Estrace to place on the incisions, especially on perineal and vaginoplasty incisions within the vaginal canal.
- Sitting down allows blood stasis in the perineal area. After genital surgery, depending on other procedures done at the same time, the patient should elevate her perineal area. If she has had no other procedures, she can get on her knees and elbows and raise and raise her perineum to maximal height. She can do this five times a day, ten minutes each time.
- Cold packs can be sandwiched in between the patient's underwear and stretchable outerwear, 20 minutes on, 20 minutes off. A Vagi-Kool cold pack is designed to fit alongside the crotch. The cold pack should not come into direct contact with the skin.
- Voiding can be done in the shower without wiping, but cleaning with a hand-held shower head or a squirt bottle.
- Most surgeons use absorbable sutures with genital procedures, and sutures often do not need to be removed.
- Intercourse and use of tampons after labiaplasty is generally delayed at least four weeks, and up to six weeks. Four weeks may be sufficient after a trim labiaplasty, a wedge, with its through-and-through incision may require protection for six weeks. After a vaginoplasty/perineoplasty, intercourse and use of tampons should be delayed six to eight weeks.
- If the introitus and vaginal canal are too narrow for comfort, dilators can be used until the desired diameter is reached.

Fig. 5. Postoperative care after female genital cosmetic surgery.

with an abdominoplasty or performed alone. Careful hemostasis is important, as this area is well-vascularized.^{78,79}

Video 5 shows the preoperative and postoperative appearance of a selection of cosmetic vulvovaginal cases (Fig. 6). [See **Video 5 (online)**, which demonstrates clinical cases of female genital plastic surgery. This narrated video shows different surgical cases with anatomical variations. The cases that are shown through preoperative and postoperative photographs include trim and wedge labiaplasties, clitoral hood reduction, major labiaplasty, and perineoplasty.]

RECONSTRUCTION AFTER FEMALE GENITAL MUTILATION/CUTTING

Female genital mutilation or cutting is defined as the practice of surgically altering the female genitalia without medical indication,⁸⁰ ranging from nicking the clitoral hood to completely severing the majority of the genitalia, with the exception of the labia majora (Table 2 and Figs. 7 and 8).

Often misleadingly described as female circumcision, female genital mutilation/cutting is most commonly performed on young babies, girls, and women for cultural reasons, usually performed without consent.^{81,82} Despite their prevalence, these practices have no medical benefit. Rather, they present extensive, profound, and persistent morbidity, and are internationally classified as a violation of human rights.⁸³

Prevalence in the United States and Demographics

Approximately 200 million women worldwide are affected by female genital mutilation, with 3

million at risk annually.⁸⁴ Despite a decrease in global prevalence, the U.S. numbers have been increasing, with greater than 500,000 women estimated to be at risk each year.⁸⁵ In 1996, a federal law against female genital mutilation/cutting was passed, followed by similar action in 35 states. Nevertheless, the sensitive cultural nature of the issue makes enforcement of the laws difficult.

Complications of Female Genital Mutilation/Cutting

In the absence of anesthetics, victims may suffer from severe and unrelenting pain.⁸⁶ Urinary retention caused by both physical and psychological damage is common.⁸⁷ Babies and girls are at heightened risk of life-threatening hemorrhage and infection,^{86,88} and some progress to shock, sepsis, and death.^{86,87}

Neurologic and genitourinary problems, including recurrent urinary and vaginal infections, may persist or develop later on.^{87,88} Dyspareunia, inability to conceive, an unsuccessful prenatal course, or unsuccessful vaginal labor and delivery may also develop.^{89,90} The lack of self-confidence, embarrassment, and dissatisfaction with appearance following mutilation/cutting, and the fear of being shunned from their cultural community often may deter women from seeking care.⁹¹

Preoperative Evaluation

After a physical and psychological assessment, reasonable expectations of what is surgically feasible should be established with the patient, and her partner (if she has one) should be involved with her care. The extent of the defect is established

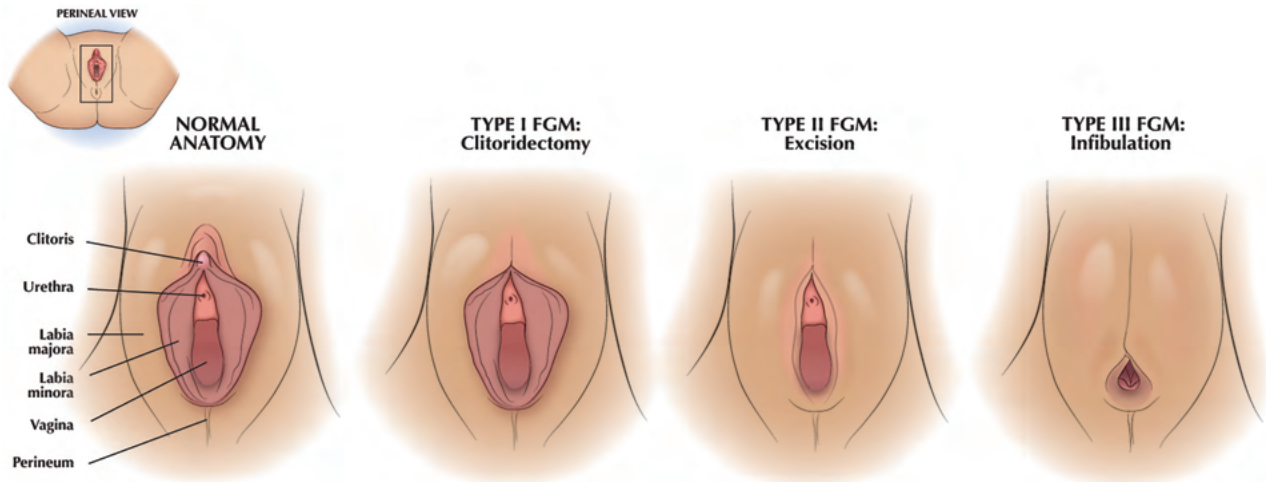


Fig. 6. The different types of female genital mutilation/cutting include type I (clitoridectomy), partial or total excision of the clitoris and/or the clitoral hood (prepuce); type II (excision), partial or total excision of the clitoris and labia minora with or without excision of the labia majora; type III (infibulation), closing of most of the introitus by excising (with or without excision of the clitoris and/or hood), and suturing together the remaining labia minora or labia majora (a small opening remains to allow passage of urine and menstrual blood); and type IV (not illustrated), all other nonmedical methods of injury of the female genitalia, including pricking, nicking, and cauterization.

Table 2. Types of Female Genital Mutilation/Cutting

Type	Description
I	Otherwise known as clitoridectomy, involves removal, partial or complete, of the clitoris and sometimes the prepuce
II	Termed excision, it is the partial or complete removal of the clitoris, labia minora, and sometimes the labia majora
III	Known as infibulation and defined as the narrowing of the vaginal opening through repositioning of the labia by means of cutting or stitching
IV	Encompasses other forms of mutilation such as pricking and cauterization of the genital area

during the genital examination. The World Health Organization currently classifies it into four main categories, as listed in Table 2 (Figs. 7 and 8).⁹² If the patient’s discomfort of severe external

scarring prevents a full preoperative examination, findings such as cysts, masses, and internal scarring may not be discovered until a complete examination can be performed in the operating room.

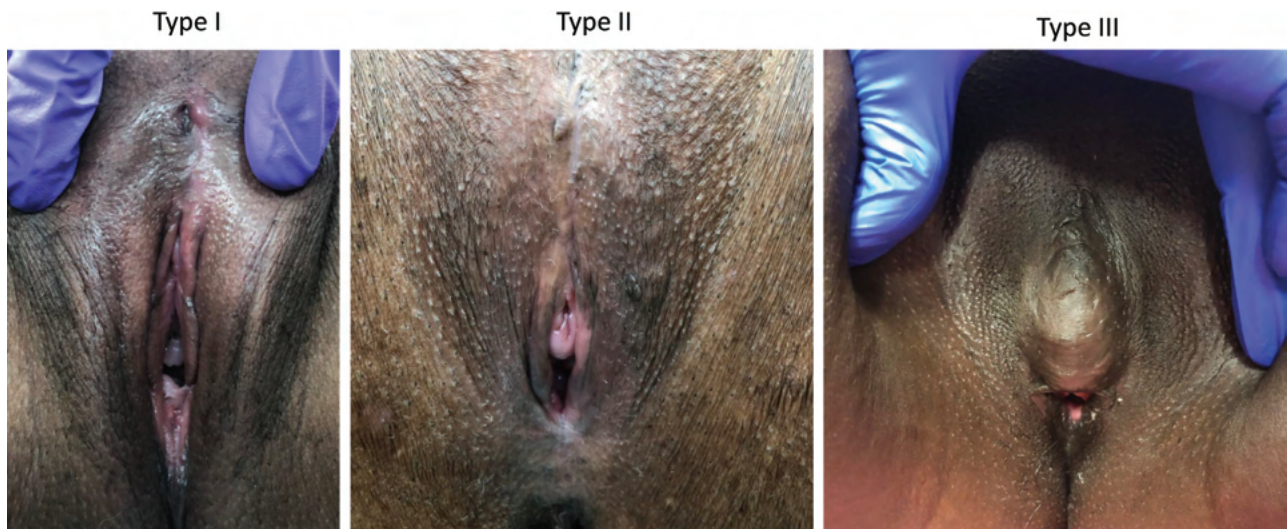


Fig. 7. Types I, II, and III female genital mutilation (FGM)/cutting.



Fig. 8. Reconstruction after female genital mutilation. (Left) Type II female genital mutilation. (Center) Superolateral release of scar tissue of the labia minora and clitoral hood. (Right) Medialization of the labia with mucosal resurfacing of the labia minora and clitoral hood following buccal mucosal grafting.

Reconstructive Approach

The reconstructive approach is guided by the physical findings. Even after “full clitoridectomy,” a viable clitoral remnant deep to the scar tissue can often be salvaged. When resurrected, it is important to support the resurfaced buried structures with buccal mucosal grafting or remucosalization, and to minimize fibrosis, to optimize sensory restoration and functional recovery.⁹³ Long-term bolsters are critical for the success of both grafting and remucosalization.

Labial remnants should be salvaged after incisional release of scar tissue of the labia minora. The scar tissue should not be excised, because it can aid in labial reconstruction by serving as medially based flaps. The labia majora are then transposed medially, and the remnant scar tissue is anchored to the pubic bone to minimize labial adhesion. Finally, the labia minora are resurfaced with mucosal grafting. If there is insufficient graft material to resurface all defects, remucosalization of raw tissue surfaces may be required. Fat grafting is conducted in all cases for volume restoration and support of tissue regeneration.

Postoperative Care

A postoperative dressing regimen helps prevent scarring and readherence. Twice-a-day lidocaine/antibiotic ointment is used for pain and infection control.⁹¹ Restoration of pigmentation and sensation is variable and can take over 1 year. Restoration of sexual function requires both physical and psychological healing.

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