

Female Genital Cosmetic and Plastic Surgery: A Review

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ABSTRACT

Introduction. This review studies rationale and outcome of vulvovaginal aesthetic surgery.

Aim. Discuss procedures designed to alter genital appearance and function; investigate sexual, philosophical, and ethical issues; examine outcomes.

Methods. (i) Medline search of the existing literature utilizing terms labiaplasty, clitoral hood reduction, hymenoplasty (HP), vaginoplasty (VP), perineoplasty (PP), female genital surgery, sexual satisfaction/body image, and anterior/posterior colporrhaphy; (ii) references from bibliographies of papers found through the literature search and in the author's reading of available literature.

Main Outcome Measures. (i) Demographics and psychosexual dynamics of women requesting female genital plastic/cosmetic surgery; (ii) overall and sexual satisfaction of subjects undergoing these procedures.

Results. The majority of studies regarding patient satisfaction and sexual function after vaginal aesthetic and functional plastic procedures report beneficial results, with overall patient satisfaction in the 90–95% range, sexual satisfaction over 80–85%. These data are supported by outcome data from nonelective vaginal support procedures. Complications appear minor and acceptable to patients. There are little data available regarding outcomes and satisfaction of HP, or function during the rigors of subsequent vaginal childbirth, although the literature contains no case reports of labiaplasty disruption during parturition.

Conclusion. Women requesting labiaplasty and reduction of their clitoral hoods do so for both cosmetic and functional (chafing, interference with coitus, interference with athletic activities, etc.) reasons, while patients requesting VP and/or PP do so in order to increase friction and sexual satisfaction, occasionally for aesthetic reasons. Patients appear generally happy with outcomes. The majority of patients undergoing genital plastic surgery report overall satisfaction and subjective enhancement of sexual function and body image, but the literature is retrospective. Female genital plastic surgery procedures appear to fulfill the majority of patient's desires for cosmetic and functional improvement, as well as enhancement of the sexual experience. Little information is available regarding HP outcomes. **Goodman MP. Female genital cosmetic and plastic surgery: A review. J Sex Med **;**:**–**.**

Key Words. Labiaplasty; Labial Reduction; Labial Hypertrophy; Vaginoplasty; Perineoplasty; Vaginal Rejuvenation; Vaginal Tightening Procedures; Clitoroplasty; Clitoral Hood Reduction; Hymenoplasty; Hymenorrhaphy; Female Genital Plastic Surgery; Female Cosmetic Genital Surgery; Vulvovaginal Aesthetic Surgery; Prevalence of Sexual Dysfunction; Sexual Function after Vaginal Support Procedures; Sexual Satisfaction and Body Image

Introduction

Reconstructive reparative procedures designed for cosmetic and functional improvement have been available for thousands of years. As women become more comfortable with the idea of procedures on other parts of their bodies designed to enhance their appearance and self-confidence, it is not surprising that they may wish to alter,

change, “rejuvenate,” or reconstruct even more intimate areas of their bodies.

Although gynecologic surgeons have for years performed surgical procedures resulting in alterations in genital size, appearance, and function (repairs after obstetrical delivery, perineorrhaphy, anterior/posterior colporrhaphy, and of course intersex and transsexual surgical procedures), Honore and O'Hara in 1978, Hodgekinson and

Hait in 1984, and Chavis, LaFeria, and Niccolini in 1989 were the first to discuss genital surgical alterations performed for aesthetic and/or sexual reasons [1–3].

This review will give an overview of the most commonly performed procedures: labiaplasty of the labia minora and/or labia majora (LP), clitoral hood size reduction (RCH), perineoplasty (PP), vaginoplasty (VP) (the latter two sometimes referred to by patients as “vaginal rejuvenation” (VRJ), and hymenoplasty (HP), and will review the literature on the rationale of surgery, ethical issues, patient expectations, training issues, psychosexual issues, demographics, the procedures themselves, and presently available outcome data.

A thorough search of the world literature identifies over 30 articles on the topic of labiaplasty and elective VP. Several of these are in languages other than English, with translation unavailable. Many others are case reports of only one or several cases, are procedure modification descriptions, or are on the topic of indicated labial reduction in pediatric patients with significantly hypertrophic labia. Series reports of <10 patients, most procedure modifications and the pediatric reports are not included in this review.

Anatomic Considerations

There is a wide range of normality in vulvar and vaginal anatomy [4]. Labia come in an array of shapes and sizes. Standing, many women’s labia minora are tucked away, not visible from above. Protrusion well beyond the labia majora with the thighs abducted is often a cause of dissatisfaction [5], and is one of the cosmetic reasons for which women seek alteration.

Attempts have been made to define “anatomic normality,” with Murariu et al. in a small study [6] noting that the average width of women not requesting labial alteration was 1.54 cm, while women requesting labiaplasty averaged 3.52 cm in width ($P < 0.05$). Radman [7] and Rouzier et al. [8] define hypertrophy as >5 and >4 cm, respectively. Definitions of “normality” may be moot, however, if labial size is considered to be excessive by its “... wearer.”

The vagina consists of fibroconnective and loose areolar tissue with a mucosal epithelium backed by fascia, mostly devoid of muscles except at its mid and distal-most portion where it is backed by the levator ani and superficial transverse perineal muscles. The muscular diaphragm formed by the levator ani musculature is pierced in

the midline by the urethra, vagina, and rectum, each of which is loosely supported by fibers from the medial portion of the levator ani.

Weakened or stretched by age and/or childbirth, as time goes by, the vulva and vagina undergo several anatomic changes, including vaginal laxity. Aided by genetic predisposition, obstetrical forces (especially large fetuses, application of forceps, multiparity, and a long second stage of labor), and, eventually, age, the vaginal fornices may widen, the bladder loses its fibromuscular support, herniating downward into the vagina (and beyond), the rectum may bulge into the vagina, and portions of vaginal mucosa may exhibit exophy. In addition to obvious challenges to urinary continence and the ability to evacuate stool, these various “pelvic relaxations” very frequently impact a woman’s sexual function both objectively and subjectively.

The processes of pregnancy and parturition involve major adaptations of the vagina and pelvic floor to allow the distension necessary for childbirth and the later return to a near-prepregnant state. Frequently, the recovery process is incomplete; vaginal parity has been identified as an important risk factor for both prolapse and less dramatic changes in the function of the pelvic floor [9–11]. Levator trauma (avulsion injuries) has been found in 15–30% of parous women who delivered vaginally [12–14]. Levator avulsion is a risk factor for “ballooning,” and is associated with a decrease in strength of the pelvic floor [15,16] leading to coital laxity. Even without macroscopic levator trauma, there may be increased distensibility of the hiatus [17].

Procedures

“Female genital plastic and/or cosmetic surgery” (FGPS) is plastic and/or cosmetic surgery involving the vagina and/or vulva (i) for cosmetic (diminishment of perceived large, irregular, cosmetically unappealing vulvar structures) or functional (dyspareunia, discomfort with physical activities, chafing, slippage or protrusion from clothing, hygienic difficulty) purposes; (ii) to help enhance self-esteem; and/or (iii) for reasons of increasing penile–vaginal friction and penile pressure on the clitoral complex, hoping for enhancement of sexual satisfaction.

LP

LP involves surgical alteration, usually via reduction, of the size of the labia. Although this usually

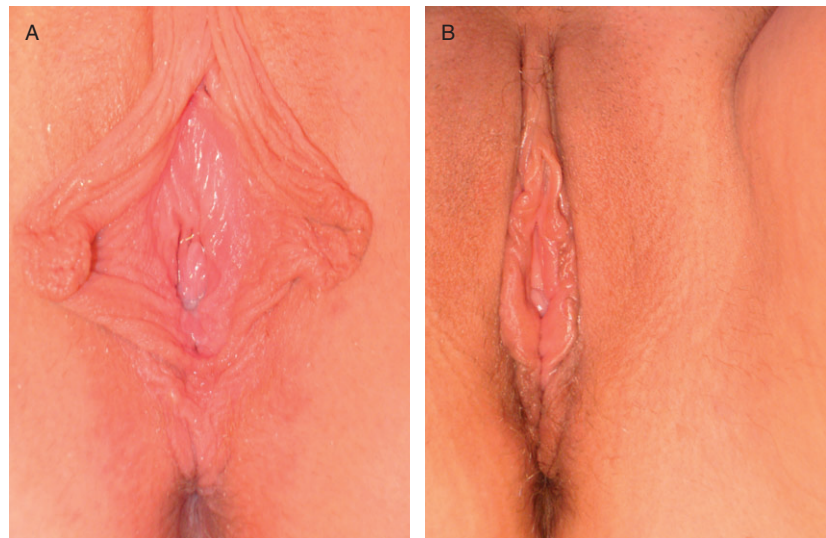


Figure 1 (A) Pre-op LP. Courtesy of M. Goodman, MD. Used with permission. (B) 5 weeks post-op LP via sculpted linear resection. Courtesy of M. Goodman, MD. Used with permission.

involves reduction of the labia minora and/or (less frequently) majora, occasionally, LP involves reconstruction after obstetrical injury or vulvar trauma, or (rarely) enlargement, via injection of bulking agents or autologous fat transfer. The reduction procedure may be performed via modified V-wedge resection; linear removal via scalpel, scissors, radiofrequency (RF), electrical or laser energy; reduction with inferior wedge resection and superior pedicle flap reconstruction; Z-plasty and other less-utilized techniques. The vast majority of labiaplasties is performed via sculpted linear resection, “rotation,” or modified V-wedge excision.

1. Sculpted linear resection [18–22]. In this technique, a cutting tool such as a focused laser, plastic surgery scissors, electrocautery needle, or RF generator is utilized to linearly resect and “sculpt” the labia, removing as much redundant tissue as desired. The resected edges are repaired with resorbable fine suture. Advantages include small, relatively straight labia flush with or tucked below the labia majora and frequently exhibiting a lighter (“pink”) edge (Figure 1).
2. Modified V-Wedge resection [23–25]. A technique, first described by Gary Alter, MD [23], whereby a V-shaped “wedge” of redundant labium is excised, the superior edge beginning slightly inferior to the prepuceal or frenular folds flowing downward from the clitoral hood, the inferior edge beginning above the posterior commissure. Repair involves securing the subcutaneous tissue and matching the edges (Figure 2).

3. Aesthetic labia minora reduction with inferior wedge resection and superior pedicle flap reconstruction [8,26]. Here, the inferior portion of the labium minus is amputated, and the superior portion is brought down as a pedicle flap and anchored to the denuded inferior edge (Figure 3).
4. Deepithelialized reduction labiaplasty [27]. In this lesser-utilized procedure, the natural contour and anatomy of the labium is preserved by reducing its central width through bi-sided deepithelialization and reapproximation of the central portion with preservation of neurovascular supply to the edge.
5. Z-Plasty reductional labiaplasty [28,29]: A refinement of the wedge procedure, this technique involves removing a central wedge of labium via a “Z”-shaped incision, with a classic Z-Plasty type repair with fine sutures.

The several techniques each have their advantages and disadvantages. The linear resection and modified wedge techniques appear to be the most widely utilized. Advantages of contoured linear resection are potentially smaller, “straighter,” uniform labia and, usually, lightening of the frequently darkened-edge labia. Dissatisfaction with occasional scalloping and scarring (especially in situations where over-vigorous resection was performed), as well as hypersensitivity of the edges, led to the development of the various wedge/flap procedures. These are touted as providing a more “natural”-looking labial edge with rare encounters involving scarring and hypersensitivity, but with a greater risk of postoperative separation.



Figure 2 (A) Pre-op labiaplasty. Courtesy of M. Goodman, MD. Used with permission. (B) Post-op labiaplasty, reduction clitoral hood via modified V-wedge. Courtesy of M. Goodman, MD. Used with permission.

Unknown at this time is how these altered labia perform during childbirth, and whether one technique fares better than another. No citations are noted in the literature regarding subsequent childbirth. The single study in the literature [30] comparing the two most commonly performed procedures, modified V-wedge and linear resection, found little difference in short-term outcomes between the two procedures.

RCH

RCH refers to size reduction of redundant prepuceal folds for cosmetic reasons (Figure 4). Resection is usually via vertical superficial incision(s), excising redundant epithelium.

PP

PP involves surgical reconstruction of the perineum, vulvar vestibule, vaginal introitus, and

distal vagina whereby scarred and redundant tissue is excised, the opening attenuated, and the superficial transverse perineal and levator ani musculature reapproximated in the midline (Figure 5). The purpose of a PP is to strengthen the pelvic floor at and inside the introitus, elevating the perineal body, modestly tightening the introitus and, if present, eliminating the distension and “bulge” produced by a posterior compartment defect, designed to reestablish the downward angle of the vagina, reestablishing penile pressure against the clitoral complex, “pushing” it against the pubic bone with coital thrust.

A plastic perineal repair is only as successful as the levator muscular strength that ensues. Many women desiring PP have weak levator tone and function. Pelvic floor awareness and strengthening exercises with a qualified pelvic floor physical



Figure 3 (A) Pre-op labiaplasty. Courtesy of M. Goodman, MD. Used with permission. (B) Post-op labiaplasty flap rotation. Courtesy of M. Goodman, MD. Used with permission.

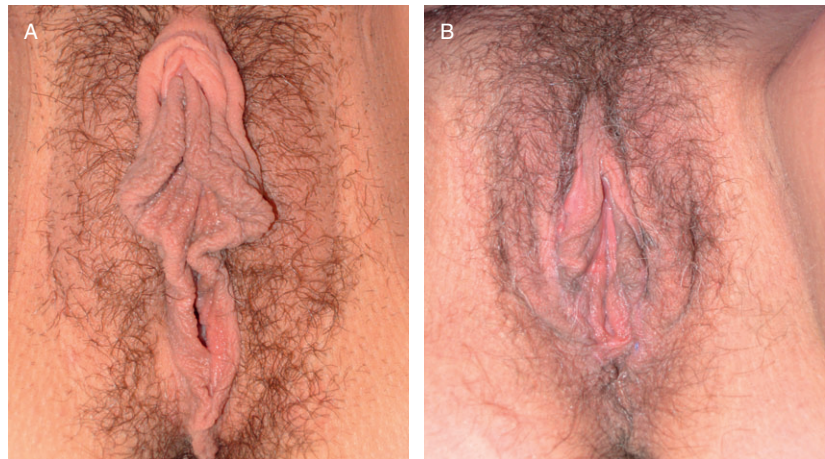


Figure 4 (A) Pre-op LP, RCH. Courtesy of M. Goodman, MD. Used with permission. (B) Post-op LP V-Wedge, RCH. Courtesy of M. Goodman. Used with permission.

therapist postoperatively may improve outcomes [31]. It has been shown that supervised pelvic floor muscle training can increase muscle volume, close the levator hiatus, and shorten muscle length, among other benefits, all of which aid in the long-term success of the procedure [32].

VP

VP involves surgery whereby portions of mucosa are excised from the vaginal fornices via tools including scalpel, needle or RF electrode, scissors, or laser. There presently exists no standardization of the procedures performed and may consist of an anterior colporrhaphy, high posterior colporrhaphy, excision of lateral vaginal mucosa, or a combination of the above, all designed to surgically “tighten” the upper vagina for the purpose of increasing coital friction.

HP

Although several techniques are utilized, no published descriptions exist. In one procedure, diamond-shaped excisions similar to those utilized for a PP are performed, with the maximal width of the diamond just inside the hymenal ring and the

external apex barely onto the vestibule. Each incision is closed vertically with fine absorbable sutures. In another variation, oppositional areas of the hymenal ring are denuded and attached to each other, producing “strands” that rupture with coitus. Both produce a size-compromised aperture designed to increase the probability of tearing and bleeding with subsequent coitus.

Surgical Rationale and Psychosexual Issues

Alter [33], in a study of 407 LP patients from 2005 to –2007, found that 93% of respondents to a retrospective questionnaire gave “improvement of self-esteem,” 71% gave “improvement of sex life,” and 95% gave “diminishment of discomfort” as primary reasons for surgery. Miklos and Moore [20], in their 2008 study of 131 LP patients, noted that 37% (49/131) patients listed “strictly aesthetic” reasons for their surgery, 32% (42/131) listed “strictly functional,” and 31% (40/131) listed a combination of the two factors. They also found “little outside influence” in patient’s rationale for and decision to undergo surgery. Rouzier et al. [8], in a study of 163 patients undergoing LP



Figure 5 Pre-/post-op perineoplasty. Courtesy of B. Stern, MD. Used with permission.

Table 1 Patient's indications for labia and/or clitoral hood revision surgery

Indications>> Author/# LP patients	"Aesthetic"	"Self-esteem" ("Feel more normal")	"Functional" (discomfort with clothes, activities, coitus, etc . . .)			At urging of sexual partner	Combined aesthetic and functional
Rouzier et al. [8] (# 163)	87%		Discomfort in clothes 64%	Discomfort with exercise 26%	Entry dyspareunia 43%		
Pardo et al. [21] (# 55)							67%
Miklos & Moore [20] (# 131)	37%		32%				31%
Goodman et al. [30] (# 211)	55.4%	35.5%	75.3%			5.3%	
Alter [33] (# 407)		93%	95%				71%

for "labial hypertrophy," noted that 87% of their patients gave aesthetic reasons, 64% gave "discomfort in clothing," 26% gave "discomfort with exercise," and 43% gave "entry dyspareunia" as surgical rationale. Goodman et al., in their 2010 study of both LP, RCH, and VP/PP [30], noted a similar distribution (Tables 1 and 2). The goal of these procedures is to obtain a more subjectively aesthetically pleasing appearance of the genitalia without adverse sequelae or anatomical distortion [21].

Extremes of size, dissymmetry, "looseness," or self-perceived unattractiveness adversely effect many women [8,25,26,30]. The association between sexual satisfaction and body image in women has been confirmed [34–36], as has the relationship between sexual satisfaction and general well-being [37]. Women seeking treatment for pelvic organ prolapse (POP), a condition associated with "vaginal laxity," have decreased body image and overall quality of life [38]; body image may be a key determinant for quality of life and may be an important outcome measure for treatment evaluation [38]. Berman notes that women may be very emotionally effected by what they consider to be excessive labial size, and that this adversely effects their sexual function [39]. In their review on the association between sexual satisfaction and body image in women, Pujols et al. from Cindy Meston's group at the University of Texas, Austin showed positive relationships

between sexual functioning, sexual satisfaction, and body image variables, and suggested that "women who experience low sexual satisfaction may benefit from treatments that target these specific aspects of body image." [34] Additionally, according to Berman, a woman's comfort level with her genitals affects her sexual enjoyment [39]. Dr. Berman goes on to say, however, that genital plastic surgery has the potential to harm (sexual) function. She and other sex therapists recommend first less drastic measures, if appropriate, such as Kegel's exercises to strengthen pelvic muscles prior to considering vaginal tightening procedures.

Goodman et al. studied the preoperative sexual function of their patients undergoing a variety of FGPS procedures (Table 5) and found preoperative sexual function in all groups to parallel, but be listed as slightly less satisfactory, that of a population of similar aged women [40–43], especially in the group seeking and receiving vaginal tightening procedures. The findings of a study by Brotto, Goodman, and Fashler directly comparing the preoperative sexual and psychological function and body image of FGPS patients with a control group of patients undergoing gynecological surgery for nonaesthetic reasons suggest that women seeking vulvovaginal aesthetic changes are not motivated by sexual response concerns; however, there may be a beneficial effect of surgery on arousal and desire. Psychological functioning

Table 2 Patient's indications for intravaginal tightening procedures

Indications> Author/# patients	Diminished sensation	"Wide vagina"	Unable to orgasm (previously orgasmic)	Diminished libido	"Want to tighten"	Wish to increase friction and/or enhance sexual pleasure	"Feel loose/ large"	"To enhance partner's sexual pleasure"	At urging of sexual partner
Pardo et al. [21] (# 53)	96%	100%	27%	49%	92%	74%			
Goodman et al. [30] (# 81)						56.8%	50%	40.7%	4.9%

appeared in the normal range and did not change with VVA. However, women seeking VVA had significant preoccupation with their body, avoided looking at their body part, and engaged in a number of behaviors to improve their perceived defect. This preoccupation disappeared postoperatively [Brotto et al. 2010, unpublished data].

Both functional and cosmetic factors provide motivation for labial reduction and include improvement in self-esteem, diminishment of embarrassment caused by a perception of being large or asymmetrical, discomfort in clothing, inability to wear thong-type undergarments, hygienic challenges, chafing, discomfort when taking part in sports, and entry dyspareunia via invagination of protuberant tissue [8,20,30] (Table 1). A recent retrospective qualitative study confirmed this, also noting that reported problems have been present for years, but suggested that some women (especially those expecting an improved sex life postoperatively, and those hoping for an improved relationship) may have unrealistic expectations and may be disappointed [44].

Women request modification or “tightening” of the vaginal introitus and/or inner vagina secondary to displeasure and self-consciousness over the appearance of the opening, discomfort secondary to irritation of exophytic vaginal tissue, absent or poor control of pelvic floor musculature, frequently exacerbated by incontinence, sensation of a “wide vagina,” and less/lack of “feeling”/friction with coitus, occasionally with accompanying orgasmic difficulties [30,45] (Table 2).

Women request revision of their clitoral hoods for cosmetic reasons associated with perceived hypertrophy, and hygienic reasons associated with difficulties in cleansing the area.

Women requesting HP make up a very different group, but their issues are compelling [46,47]. Leaving out a small number of women who seek consultation “. . . to be a virgin again . . .” or as a “gift” to their sexual partner, the bulk of this group seeks surgery to conform to religious or ethnic rules on virginity. In many societies, most notably Islamic cultures of the Middle East, Eastern Europe, North Africa, and parts of Asia (and their transplanted members around the globe), it is important, even imperative, that a woman be a virgin upon consummation of her marriage, as evidenced by introital tightness and loss of blood upon penetration. Indeed, women marrying in some Islamic cultures may need to submit to an examination to assure the families and clergy that

the prospective bride is indeed a virgin. A lot may be riding on an “intact,” tightened introitus, the absence of which may be familial embarrassment, ostracism, and consequences difficult for the culturally uninitiated to imagine. Of course, performance of hymenoplasty opens the door to other social and psychological risks and ethical and moral dilemmas [48,49].

Demographics

Few demographic statistics are kept regarding FGPS. Alter [33] and Goodman et al. [30] in a subanalysis of data from their study (unpublished data) found a significantly different demographic, dependant on procedure performed. While no “official” statistics on the varied FGPS procedures are kept by either the American Academy of Cosmetic Surgeons or the American Society of Plastic Surgeons (ASPS), the ASPS did note a 30% increase in “VRJ” procedures between 2005 and 2006 (793 to 1,030), but did not keep statistics beyond 2006 [50]. The American Society for Aesthetic Plastic Surgery kept demographic data for “VRJ” procedures in 2007, and found that of 4,505 procedures noted, 38.1% were in the “19 to 34” age group, and 54.4% aged 35–50 (and 2.4% 18 and under; 5.1% 51 and older) [51].

There appears to be two distinct groups of patients: young women, age ~16 to late 20 s (virtually all LP and RCH requestors), and a more mid-aged group, age late 30 s to mid-50 s. LP/RCH predominate in the younger demographic, while virtually all vaginal tightening procedures, as well as ~1/3 of the LP/RCH performed, lie in the mid-aged group, many of whom have completed their childbearing and request cosmetic changes as they approach midlife.

Ethical Considerations

To answer the question regarding the propriety of vulvar plastic/cosmetic surgery, these procedures have been examined through the lens of established and accepted principles of biomedical ethics: respect for autonomy, beneficence, non-maleficence, justice, and veracity [52,53]. Goldstein and Goldstein have applied these principals to vulvar plastic and cosmetic procedures [54].

These procedures and their credibility have ignited controversy within the medical community. The American College of Obstetricians and Gynecologists’ Committee on Gynecologic Practice in September of 2007 issued a Committee

Opinion [55] in which they made it clear that, in the absence of credible long-term safety and efficacy data, recommending procedures such as VRJ and others and touting their potential for enhancing sexual performance and gratification was "...untenable." The committee went on to caution to give the impression that (vaginal tightening) procedures are accepted and routine was "deceptive" and concerns about "normality" and poor sexual function should first be handled with "nonsurgical intervention, including counseling." Nothing was said by the committee about procedures for labial reduction; however, others have decried these as well [56].

On a more basic level, the "medicalization" (and, by extension, the "surgicalization") of sexual behavior, where drugs and surgery are used to enhance sexual pleasure, has been decried [57], and analogies between the creation of FGPS and the new sexuality pharmaceuticals, examined through the lenses of bioethics, feminist theory, and medical marketing, have been made [58].

Good medical practice argues that a sexual history be obtained, and that the basic sexual health of the patient and absence of any major sexual dysfunction be ascertained prior to scheduling surgery. Likewise, it has been presented that surgery in the absence of a good mutually respectful partner relationship will not achieve the desired results [54].

Pardo, in his article on colpoperineoplasty [45], poses cogent questions: Is a fight against the natural processes of aging an acceptable goal of health care? Is it ethical to medicalize women's sexuality? Is the indication strong enough to balance the risk of an operation? Is sexual education of the couple a better alternative? And what are the long-term consequences of surgery?

Patient Protection

Some risks (e.g., overtightening of the introitus via PP; risks of bowel or bladder entry or risk of producing incontinence by alterations of the anterior or posterior compartments in VP; infection; poor wound healing; etc.) are known. However, as these procedures are relatively new and the literature investigating outcomes and risks is relatively sparse, informed consent may be difficult given the relatively short-term nature of available data.

The importance of adequate surgical training, candid discussion with the patient of limited objective outcome data, and screening for sexual

dysfunction and body dysmorphic disorder has been described [59].

Surgical Risks

Each of the previously described procedures carries its own risks, most of which are listed below.

1. LP Over-repair, disfigurement, scarring and "scallop" of the labial edge, hypersensitivity or hyposensitivity, dyspareunia, partial or complete separation of the repair, infection, cosmetic results not up to the patient's expectations.
2. RCH Cosmetic distortion, scarring with hypersensitivity, over-vigorous repair resulting in damage to the glans or clitoral body, cosmetic results not up to patient's expectations.
3. HP Distortion, over-vigorous repair with secondary dyspareunia or inhibition of penetration, separations of incisions, leaving the hymenal ring with additional "defects;" deception of the male partner, perpetuation of social injustice toward women.
4. PP Over-vigorous repair with inability to allow penetration, dyspareunia, infection/abscess/hematoma, inadvertent entry into the rectum or peritoneum with potential for organ damage, pelvic floor dysfunction, cosmetic distortion, poor wound healing.
5. VP Infection/hematoma/abscess, scarring/distortion disallowing complete penetration, dyspareunia, inadvertent injuries to adjacent organs (bladder, urethra, rectum), incontinence, excessive blood loss, poor wound healing.

Every well-powered study in the literature confirms a major complication rate for FGPS of well <5% [8,21,26,30,33,45], but none are prospective or case-control studies. Minor complications are difficult to evaluate, as many are early postoperative annoyances; in reviewing the various published reports, it is difficult to ascertain whether these are patient-reported or physician-determined. In any case, they do not appear to be associated with patient dissatisfaction, and appear to be short-lived (Tables 3 and 4).

Outcomes

Although outcome studies of FGPS are plentiful, all are retrospective, observational, and not case-controlled. Alter's 2008 outcome study of a series

Table 3 Outcome, labiaplasty

Outcome parameter> Author	MD's estimate of good anatomic results	Satisfied	Dissatisfied	Satisfied aesthetically	Satisfied functionally	"Effect on my sexual satisfaction"	"Effect on partner's satisfaction"	Would undergo procedure again	Complications
Rouzier et al. [8] 163 pts.	93% "good– excellent"	96%	4%	89%	93%			96%	"no surgically-related complications"
Munholz et al. [26] 21 pts.	85% "good– excellent"	95.2%	4.8%						5/21 (23.8%)—"wound healing problems"
Pardo et al. [21] 55 pts		+ 9% +++ 91%							"no major complications"
Alter [23] 166 pts.		95% (average satisfaction score 9.2/10)	5%	"Improved self-esteem" 93%		"Improvement" 71%		98%	4% "significant complication"
Goodman et al. [30] 211 pts	96.6% "good– excellent"	96.2%	3.8%			+ to +++ 64.7	No effect 35.3% + to +++ 35.7% No effect 64.3%		(patient: 8.5%, all minor; mostly poor or prolonged healing, pain) (MD: 7.3%, all minor, mostly poor healing/ dyspareunia)

Table 4 Outcome of vaginoplasty/perineoplasty

Outcome parameter> Author	Overall satisfaction	Patient's satisfaction with regard to width			Physician's estimate of results	"Enhancement of my sexual satisfaction"				"Enhancement of partner's sexual satisfaction"	Complications		
		++	+	O		Much improved 66%	Sufficiently improved 24%	Poorly improved 6%	Worse 4%		According to MD	According to patient	
Pardo et al. [46] 53 patients	74%	++	+	5%	96%	4%						3.8%, "all minor"	
Goodman et al. [30] 81 patients	"Yes"			"No"									
	89%			11%									
					++ to +++ 92.6%	++ to +++ 92.6%	+++ 54.8%	enhancement 34.2%	enhancement 9.6%	No enhancement 1.4%	enhancement 82.2%	+ to +++ enhancement 17.8%	0 to – enhancement 17.3%, none major long-term sequelae

of 407 patients operated upon in 2005–2007 [33] was somewhat hampered by only a 41% response rate, but noted a patient-reported 93% improvement in “self-esteem,” a 71% enhancement of “sex life,” and diminished discomfort in 95%. Average “satisfaction score” graded on a 1–10 scale by the patient was 9.2; 95% of patients confided that they would “undergo the surgery again.” Rouzier et al. [8], in a study of 163 LP patients (61% response rate), found an overall 87/98 (89%) satisfaction with the aesthetic and 93% (91/98) approval of functional outcome (Table 3). For “colpoperrineoplasty” (VP/PP), Pardo et al., in a study of 53 patients [45], after a minimum of 6 months follow-up, reported 94% of their patients stated they experienced a “tighter vagina” and found it “...easier to orgasm.” Seventy-four percent of their patients reported their “expectations fulfilled,” 21% “partially filled,” with 5% of expectations “...not met.” Only 4% of patients “...regretted surgery...” (Table 4).

A multicenter community-based retrospective study including 258 women undergoing 341 procedures [30] looked at both intake and outcome parameters in greater detail (Tables 3 and 4). The study looked at the reasons women desire to undergo FGPS (Tables 1 and 2), their preoperative sexual function (Table 5), and both global and sexually specific outcomes (Tables 3 and 4). The study analyzed both patient’s rationale for surgery, along with their surgeon’s understanding of their reasons. Likewise, outcomes were analyzed via separate questionnaires, one from the patient and the other from her surgeon. Physician appreciation of surgical rationale as well as outcome analyses did not differ statistically between the two groups, providing evidence that studies in the literature that do not specifically delineate whether outcomes were determined directly by the patient, or a postoperative inter-

pretation by the surgeon, still have validity. Overall, after 6 to 42 months of follow-up, 97.2% of patients undergoing LP/RCH, 83.0% undergoing VP/PP, and 92.1% of patients experiencing combined external and internal procedures stated that their surgery had “accomplished what they’d hoped for.” Sexually, 64.7% of LP/RCH patients, 86.6% of VP/PP patients and 92.8% of patients undergoing combined procedures stated that their surgery had enhanced their sexual function. Additionally, LP/VP combination patients self-reported that they felt that their procedure resulted in increased satisfaction for their sexual partners 82.2% of the time [30]. The only other study in the literature to assess male sexual function after vaginal support surgery on the female partner is confirmatory, reporting significant improvement in interest, sexual drive, and overall sexual satisfaction in the male consorts studied [60].

Major complication rates from all published LP reports have been well <5% [8,21,26,30,32]. A higher percent of minor complications have been reported, but do not appear to interfere with overall patient satisfaction. Pardo et al.’s 2006 study on VP/PP [45] reports a similar rate. Goodman et al.’s 2010 data [30] for VP/PP notes only one (2%) intraoperative complication (inadvertent rectal entry), and 10 (21%) instances where the physician noted a “postoperative problem” (Table 4), although the great majority of “problems” were minor and did not interfere with successful outcome, as evidenced by ~85% overall rates of satisfaction.

Unfortunately, little data exist regarding the outcome, in terms of satisfaction and production of desired results (introital tightening and bleeding with consummation of marriage) of HP. A single paper [46] quoting 20 patients claims that all were satisfied with outcome and “none had regrets.”

Table 5 FGPS patient’s estimation of their preoperative sexual function adapted from Goodman et al. [30]. Used with permission

Procedure> Preoperative sexual function	Labiaplasty and/or reduction clitoral hood (N = 174) No. (%)	Vaginoplasty and/or perineoplasty (N = 46) No. (%)	Labiaplasty with vagino/perineoplasty with or w/o reduction clitoral hood (N = 31) No. (%)
1. “Poor”	36 (20.7)	13 (28.3)	7 (22.6)
2. “Fair”	44 (25.3)	25 (54.3)	12 (38.7)
Poor/Fair	80 (46.0)	38 (82.6)	19 (61.3)
3. “Good”	68 (39.1)	7 (15.2)	8 (25.8)
4. “Great”	26 (15.0)	1 (2.2)	4 (12.9)
Good/great	94 (54.1)	8 (17.4)	12 (38.7)

FGPS = female genital plastic and/or cosmetic surgery.

Additionally concerning is the absence of data on the function of these surgically altered genitalia during the rigors of childbirth, and whether one technique will hold up better than another. This is an important but little discussed issue, especially as there exists more than one technique for labial revision, and outcomes and patient satisfaction appear similar for the most frequently utilized techniques [30].

As noted above, only two studies [30,45] regarding outcome of elective vaginal/pelvic floor “tightening” procedures are available in the literature. However, much is written on the effects of urogynecologic laxity disorders, specifically POP and stress urinary incontinence on sexual function [60–77]. Wehbe, Kellogg, and Whitmore, in their review on the subject [74], note that women with urogynecologic laxity disorders commonly have coincident problems related to sexual function, an observation noted by others [36,38,76]. The majority of studies involving urogenital vaginal surgery and female sexual dysfunction (FSD) [60–69] shows improvement in the domains studied, while others [70–73] note deterioration, possibly related to de novo dyspareunia and postoperative scarring related to disturbance of vaginal nerve and blood supply resulting in difficulties in arousal and lubrication [70,73]. Other authors suspect that the lack of improvement in their populations despite anatomical and functional improvement may be secondary to preexisting behavioral and partner-related factors [71]. These studies evaluate the effects of the surgical procedures of anterior and/or posterior compartment repairs with or without approximation of the levator muscles, essentially the same surgical approach utilized by the majority of genital plastic and cosmetic surgeons performing VP or “VRJ” operations. Levator approximation (levator myorrhaphy), while strengthening the pelvic floor muscles, has been reported to increase postoperative rates of dyspareunia [76,77].

Many additional articles in the literature evaluate outcomes of vaginal mesh-enhanced repairs; these data are not included in this report, however, secondary to the confounding effect of mesh on sexual outcome, and the fact that very few genital plastic surgeons utilize mesh in their vaginal tightening repairs.

These studies of body image and sexual outcomes of reconstructive surgery for POP utilize several validated instruments including the Pelvic Organ Prolapse-Incontinence Sexual Function Questionnaire, Body Image Quality-of-Life

Inventory, Pelvic Organ Quantification, and Female Sexual Function Index, among others.

Summary

The relatively new addition of FGPS to the list of surgical body changes and adjustments available has been controversial. These procedures may be viewed as elective or indicated, depending on whether one looks upon self-perceived genital “disfigurement” or “sensation of a wide vagina” as a sexual or body image dysfunction qualifying for indicated or “medically necessary” therapy, or as a cosmetic dissatisfaction issue, subject to elective revision.

Every study relating to outcome in the peer-reviewed English literature reports subjective success rates well in excess of 80–90%. However, all of these studies are retrospective; all have relatively short-term follow-up of sexual satisfaction, none delve more than superficially into body image issues, and all lack a control group. On the other hand, no evidence other than anecdotal reports exists to substantiate poor outcome, excessive complications, or postoperative sexual dysfunction.

The field of female genital cosmetic revision is new and in flux. As it evolves, it is anticipated that unanswered questions will be addressed by means of well-designed studies evaluating both sexual and body image issues, and evaluating long-term satisfaction, benefit, and risk.

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