

A Large Multicenter Outcome Study of Female Genital Plastic Surgery

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ABSTRACT

Introduction. Female Genital Plastic Surgery, a relatively new entry in the field of Cosmetic and Plastic Surgery, has promised sexual enhancement and functional and cosmetic improvement for women. Are the vulvovaginal aesthetic procedures of Labiaplasty, Vaginoplasty/Perineoplasty (“Vaginal Rejuvenation”) and Clitoral Hood Reduction effective, and do they deliver on that promise? For what reason do women seek these procedures? What complications are evident, and what effects are noted regarding sexual function for women and their partners? Who should be performing these procedures, what training should they have, and what are the ethical considerations?

Aim. This study was designed to produce objective, utilizable outcome data regarding FGPS.

Main Outcome Measures. 1) Reasons for considering surgery from both patient’s and physician’s perspective; 2) Pre-operative sexual functioning per procedure; 3) Overall patient satisfaction per procedure; 4) Effect of procedure on patient’s sexual enjoyment, per procedure; 5) Patient’s perception of effect on her partner’s sexual enjoyment, per procedure; 6) Complications.

Methods. This cross-sectional study, including 258 women and encompassing 341 separate procedures, comes from a group of twelve gynecologists, gynecologic urologists and plastic surgeons from ten centers in eight states nationwide. 104 labiaplasties, 24 clitoral hood reductions, 49 combined labiaplasty/clitoral hood reductions, 47 vaginoplasties and/or perineoplasties, and 34 combined labiaplasty and/or reduction of the clitoral hood plus vaginoplasty/perineoplasty procedures were studied retrospectively, analyzing both patient’s and physician’s perception of surgical rationale, pre-operative sexual function and several outcome criteria.

Results. Combining the three groups, 91.6% of patients were satisfied with the results of their surgery after a 6–42 month follow-up. Significant subjective enhancement in sexual functioning for both women and their sexual partners was noted ($p = 0.0078$), especially in patients undergoing vaginal tightening/perineal support procedures. Complications were acceptable and not of major consequence.

Conclusions. While emphasizing that these female genital plastic procedures are not performed to correct “abnormalities,” as there is a wide range of normality in the external and internal female genitalia, both parous and nulliparous, many women chose to modify their vulvas and vaginas. From the results of this large study pooling data from a diverse group of experienced genital plastic surgeons, outcome in both general and sexual satisfaction appear excellent. Goodman MP, Placik OJ, Benson RH III, Miklos JR, Moore RD, Jason RA, Matlock DL, Simopoulos AF, Stern BH, Stanton RA, Kolb SE, and Gonzalez F. A large multicenter outcome study of female genital plastic surgery. *J Sex Med* **,**,**.*-**.

Key Words. Female Genital Plastic Surgery; Female Cosmetic Genital Surgery; Vulvovaginal Aesthetic Surgery; Labiaplasty; Clitoral Hood Reduction; Vaginal Rejuvenation; Vaginoplasty; Perineoplasty; Sexual Enhancement; Labial Hypertrophy; Vaginal Relaxation; Prevalence of Sexual Dysfunction

Introduction

The relatively recent addition of genital plastic procedures to the plastic surgery armamentarium has not been without controversy [1–4]. The procedures and their credibility have touched a nerve in both the medical and lay communities. In September 2007, the American College of Obstetricians and Gynecologists' Committee on Gynecologic Practice issued a Committee Opinion [2] in which they made it clear that in the absence of credible long-term safety and efficacy data, recommending procedures such as “vaginal rejuvenation” (VRJ) and others and touting their potential for enhancing sexual performance and gratification was “untenable.” However, as women become more comfortable with elective procedures on other parts of their bodies to enhance function, appearance and self-confidence, it is not surprising that they may wish to alter, “rejuvenate,” or reconstruct even more intimate areas.

Although obstetricians/gynecologists have historically provided plastic and reconstructive services while repairing episiotomies and vaginal/vulvar lacerations after obstetrical injury, and in performance of vaginal pelvic floor procedures, Hodgekinson and Hait in 1984 were the first to discuss genital surgical alterations performed for purely esthetic reasons [5]. Although many small and moderately powered single facility studies grace both the U.S. and foreign literature, the great majority of these investigate only labiaplasty (LP) [6–14], with the single exception being the investigation on vaginal plastic procedures of Pardo and his group in Chile [15].

While the differences between medically necessary and aesthetic procedures may be understood [16], the line is at times blurred, as in the areas of functional impairment secondary to labial and/or clitoral hood hypertrophy or an enlarged and/or lax introitus, vaginal barrel, and pelvic floor. The challenge has been made [17] for additions to the literature exploring both the reasons women choose the procedures of LP, reduction of the clitoral hood (RCH), and vaginoplasty (VP)/perineoplasty (PP), and the long-term outcome of these procedures, especially in view of marketing claims of satisfaction and enhancement of sexual function.

The procedures investigated are LP, RCH, PP, and VP. These procedures are described briefly here and have been described in detail elsewhere [18].

LP involves the removal of a portion of the hypertrophied labia minora and the occasionally

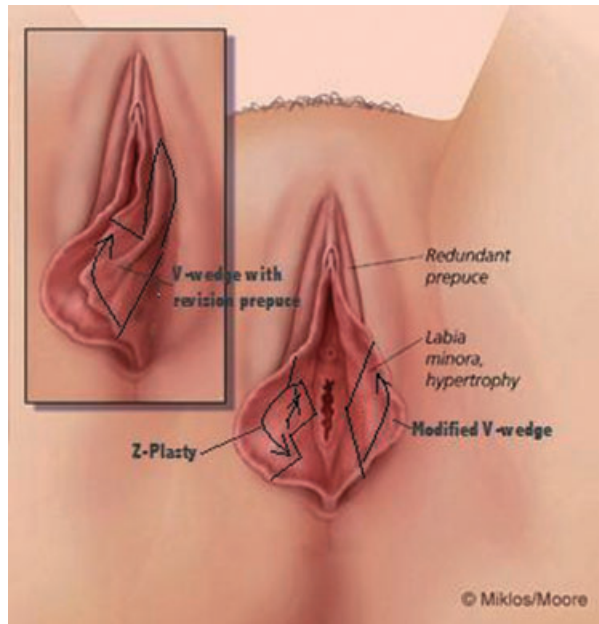


Figure 1 Modified V-wedge and Z-plasty techniques. Courtesy of R. Moore, MD and J. Miklos, MD. Used with permission.

enlarged and redundant labia majora. The majority of times, this is accomplished either via a form of modified wedge resection of the hypertrophic mid-portion with reanastomosis via fine absorbable sutures [12,19,20] (Figure 1) or via a sculpted linear resection with edge repair via similar suture material [6–8,11,14] (Figure 2), although other techniques have been described [13,14].

RCH involves a size reduction of redundant or hypertrophic clitoral hood folds for cosmetic reasons or less frequently, for separation of a phimotic hood to provide more “exposure” of the clitoral glans, theoretically providing improved sensation. Clitoral hood reductions are usually performed via simple plastic excision, either in the midline or utilizing more lateral prepuccial excisions (Figures 1 and 2).

PP is the surgical reconstruction of the vulvar vestibule, vaginal introitus, and distal vagina, whereby scarred and redundant tissue is excised, the opening attenuated, and the superficial transverse perineal and levator musculature reapproximated in the midline to elevate the perineum and pelvic floor (Figure 3).

VP involves the excision of portions of mucosa from the vaginal fornices via tools, including scalpel, needle electrode, or laser via a modified anterior and/or high posterior colporrhaphy and/or excision of lateral vaginal mucosa, designed to “tighten” a relatively lax upper vagina.

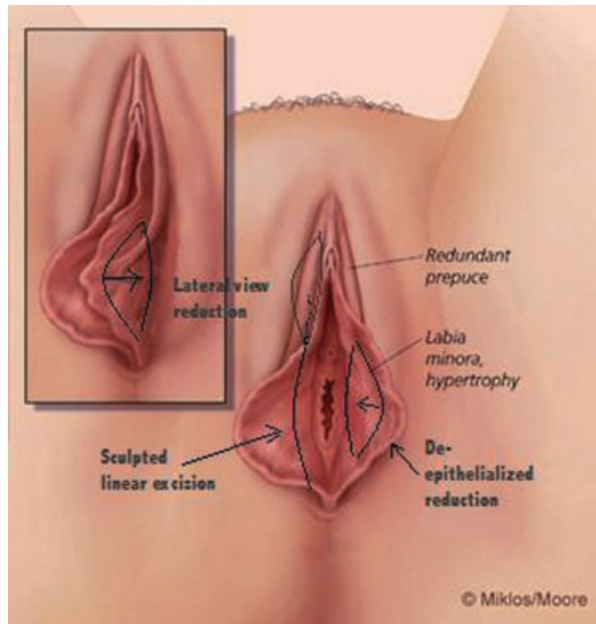


Figure 2 Sculpted linear resection de-epithelialization techniques. Courtesy of R. Moore, MD and J. Miklos, MD. Used with permission.

VRJ is a term first defined and marketed as “Laser Vaginal Rejuvenation”™ and encompasses PP and/or VP. Unfortunately, although graphic, neither patient nor medical professionals know exactly what this term encompasses, and in this article, the more standard medical terminology of PP and VP are utilized.

Cosmetic procedures conducted to alter body shape and contour are a fact of life; they are opportunities for individuals to make a physical change in their appearance, correct a (sometimes self-perceived) “defect,” change how they look and function, address a physical problem of discomfort, enhance their self-esteem, look better in clothes, etc.

Aim

This study is designed to investigate outcomes, in terms of patient overall and sexual satisfaction, of female genital plastic surgery (FGPS) procedures, specifically LP, VP, PP and the reduction of clitoral hood size, and to be powered sufficiently and from sufficiently diverse practices so as to provide valid conclusions.

Materials and Methods

Two hundred fifty-eight patients undergoing 341 separate procedures were included. The patients were initially drawn to physicians via an Internet

search, print or online marketing, physician referral and word of mouth. One hundred four patients had LP alone, 24 had RCH, 49 had a combination of LP and RCH, 47 had PP and/or VP, and 34 had a combination of VP and/or PP plus LP, with or without RCH.

Twelve surgeons known to be experienced in FGPS, from 10 separate private practice centers in eight states were recruited. Making up the group were eight gynecologists (including two urogynecologists) contributing 188 (72%) of the patients, and four plastic surgeons contributing 70 (28%) of the patients. While LP and RCH were performed by both gynecologic and plastic surgeons, VP/PP cases were performed by gynecological surgeons only.

The study received institutional review board approval and a Partial Waiver of Authorization for Recruitment (Western IRB, data on file).

Patient data collection was retrospective, via an outcome questionnaire mailed to patients undergoing surgery between January 1, 2005 and May 31, 2008. Sub-analyses according to months distant from surgery were not undertaken. The patients were initially contacted via telephone by an office staff and were asked for permission to be mailed a survey questionnaire (Figure 4). When initial contact was unsuccessful, a second call was made. Those who agreed were mailed the questionnaire along with a self-addressed stamped

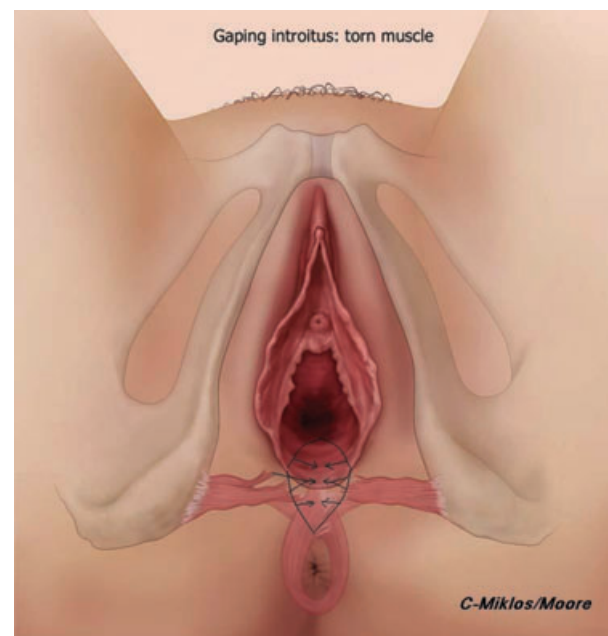


Figure 3 Perineoplasty. Courtesy of R. Moore, MD, and J. Miklos, MD. Used with permission.

THE SURVEY:

- 1) My initial reason(s) for surgery was (check all that apply)
 - a) To look better "down there..."
 - b) To feel more "normal"
 - c) To enhance my self-confidence
 - d) To relieve discomfort with clothes, sexual or sports activities
 - e) To experience enhanced "feeling" with sex
 - f) To enhance my sexual pleasure
 - g) To satisfy my sexual partner
 - h) The procedure was done primarily at the urging of my sexual partner
 - i) Other (specify) _____

- 2) I would describe my sexual functioning and satisfaction **prior to surgery** as:
 - a) Poor
 - b) Fair
 - c) Good
 - d) Great

- 3) The effect(s) of the procedure on my sexual enjoyment is:
 - a) Little or no effect
 - b) Negative effect
 - c) Mild-moderate enhancement
 - d) Significant enhancement

- 4) The effect(s) of the procedure (to my knowledge) on my **partner's** enjoyment
 - a) Little or no effect
 - b) Negative effect
 - c) Mild-moderate enhancement
 - d) Significant enhancement

- 5) Did the procedure accomplish what you'd hoped for? Yes No

- 6) Length of time (weeks) to resumption of full sexual and physical activities: _____

- 7) Do you consider that you had any complications of surgery? Yes No
 If "Yes," what was it/were they: _____

- 8) If you had work done on the vagina (outside or in), has there been any effect on:
 - a) Urinating or ability to hold urine
 no effect _____ better _____ worse _____
 - b) Feeling of strength of pelvic floor; ability to do a "Kegels"
 no effect _____ better _____ worse _____

- 9) The procedure(s) I had done was/were: (circle all that apply)
 - a) Labiaplasty (small lips)
 - b) Labiaplasty (large lips)
 - c) Perineoplasty (repair or modification of the vaginal opening)
 - d) Vaginoplasty or Vaginal Rejuvenation (work on the inner vagina)
 - e) Clitoral Unhooding

Thank You very much for your help! If you wish to receive a copy of the research, please notify our office and a copy will be mailed to you upon completion of the study, which is estimated to take ~ 6-9 months.)

 (signature of surgeon)

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Goodman FGPS Survey Questionnaire

Figure 4 FGPS survey questionnaire.
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PATIENT (#)
PROCEDURE(S)					
AGE AND PARITY					
PRESENTING REASON FOR SURGERY					
NUMBER OF PRE-OP CONSULTS					
METHOD OF INFORMATION CONSENT: WRITTEN OR VERBAL					
PHOTOGRAPHS USED IN COUNSELING (Y/N)					
OP TIME (IN MINUTES)					
EST. BLOOD LOSS					
INTRA-OP COMPLICATIONS? (STATE COMPLICATION)					
ANESTHESIA (GENERAL; LOCAL; CONDUCTION)					
TECHNIQUE OF LABIAPLASTY (V-WEDGE; LINEAR RESECTION; OTHER)					
TECHNIQUE OF VAGINO/ PERINEOPLASTY; (LASER; SCALPEL; CAUTERY)					
DELAYED COMPLICATIONS (STATE)					
NUMBER OF POST-OP VISITS					
RESULTS AT FINAL POST-OP VISIT: EXCELLENT (E); GOOD (G); FAIR (F); POOR (P)					

Figure 5 Physician Data Form.

envelope. The staff attempted to contact all the patients to whom a questionnaire was sent but a response was not returned. Four hundred seventy-three patients were contacted. Three hundred sixty-eight women agreed to receive, and 258 (70%) returned a completed survey.

Physician data (Figure 5) were collected from office and surgical records only on the patients who returned the questionnaires. Both patient and physician data were provided for analysis.

To simplify interpretation and statistical analysis, the separate procedures of LP, RCH, PP, and VP (and all their permutations of combinations) had been combined into three groups: vulvar work (LP, RCH, and the two procedures combined), vaginal/perineal work (PP, VP, and combination of the two), and combined vulvar and vaginal proce-

dures (VP/PP plus LP and/or RCH). Figure 6 is a “before and after” of a typical patient with a combined procedure. The measures studied included demographic data, perioperative data, and outcomes.

Chi-squared statistics tested the equality of proportions across the groups. The superscripted symbols in each table indicate the significant pairwise differences among the groups within a given row of the table. When two of the groups have no symbols in common, then the corresponding percentages differ significantly at the 0.05 level.

Main Outcome Measures

1. Reasons for considering surgery from both patient’s and physician’s perspective.



Figure 6 Combined labiaplasty, perineoplasty, vaginoplasty. Courtesy of B. Stern, MD. Used with permission.

Table 1 Reasons women give for surgery

Reasons for surgery	Chi-squared (<i>P</i> value)	Labiaplasty and/or reduction clitoral hood (N = 177) N (%)	Vaginoplasty and/or perineoplasty (N = 47) N (%)	Labiaplasty with vaginoplasty/perineoplasty with or without reduction of hood (N = 34) N (%)
"To look better"	30.47 (<0.0001)	94 (53.1)*	6 (12.5) [†]	23 (67.6)*
"To enhance self-esteem"	5.08 (0.0788)	58 (32.7)* [†]	12 (25) [†]	17 (50.0)*
"To feel more normal"	6.14 (0.0464)	55 (31.1) [†]	11 (22.9) [†]	17 (50.0)*
"Discomfort (with sex, sports, clothes, etc.); chafing"	72.00 (<0.0001)	134 (75.7)*	5 (10.4) [†]	25 (73.5)*
"Feel loose, large, etc. with or without incontinence"	27.61 (<0.0001)	31 (16.9) [†]	25 (52.1)*	15 (44.1)*
"To increase friction and enhance sexual pleasure"	39.42 (<0.0001)	32 (18.1) [†]	27 (58.3)*	19 (56.8)*
"To increase partner's sexual pleasure"	71.47 (<0.0001)	8 (4.5) [†]	25 (54.2)*	8 (23.5) [†]
"Done at urging of sexual partner"	0.33 (0.8480)	9 (5.0)*	2 (4.2)*	2 (5.8)*

Chi squared statistics test the equality of proportions across all three groups. The superscripted symbols indicate the significant pairwise differences among groups within a given row of the table. When two groups have no symbols in common, then the corresponding percentages differ significantly at the 0.05 level.

2. Preoperative sexual functioning per procedure.
3. Overall patient satisfaction per procedure.
4. Effect of procedure on patient's sexual enjoyment, per procedure.
5. Patient's perception of effect on her partner's sexual enjoyment, per procedure.
6. Complications.

Results

Although demographic and perioperative data were collected on all of the patients and procedures, only surgical rationale, preoperative and postoperative sexual data, and outcome parameters shall be discussed here. Participants received their surgery at centers in eight states, but as all of the participating surgeons perform surgery on patients arriving outside of their local area, data were not available regarding the exact area of the origin of the study sample.

The reasons for surgery from the patient's and physician's perspective (Tables 1 and 2) may be

broken down into five categories: (i) "functional" (discomfort with sexual activities, sports and other activities, "chafing," slippage of hypertrophied labia out from a thong underwear or swimwear, etc.); (ii) "appearance/cosmetic"; (iii) the perception of being "abnormal," adversely effecting self-esteem; (iv) feeling "loose," "lacking friction," adversely affecting sexual pleasure; and (v) to enhance a partner's sexual experience, and/or to enhance of her sexual partner.

Functional and appearance/self-esteem issues predominate in the LP and RCH groups as 75.7% of the patients in the LP and RCH groups describe a functional discomfort. Cosmetic (53.1%) reasons and enhancement of self-esteem (32.7%)/"feel more normal" (31.1%) follow closely behind. Vaginal relaxation (52.1%) and sexual issues (58.3%) predominate in the VP/PP group. The desire to enhance their male partner's sexual experience is also a significant reason women give when seeking VP/PP (54.2%) and combined VP/PP with LP/RCH (23.5%), but very few patients

Table 2 What physicians hear as reasons for surgery

Reasons for surgery	Chi-squared (<i>P</i> value)	Labiaplasty and/or reduction clitoral hood (N = 177) N (%)	Vaginoplasty and/or perineoplasty (N = 47) N (%)	Labiaplasty with vaginoplasty/perineoplasty with or without reduction of hood (N = 34) N (%)
Look better	25.75 (<0.0001)	82 (46.3)*	4 (8.5) [†]	8 (23.5) [†]
Enhance self-esteem; feel more "normal"	18.82 (<0.0001)	54 (30.5)*	0 (0) [†]	9 (26.5)*
Functional (discomfort; dyspareunia, etc.)	47.68 (<0.0001)	108 (61.0)*	4 (8.5) [†]	9 (26.5) [†]
Feel loose, "open"	74.88 (<0.0001)	15 (8.5) [†]	28 (59.6)*	19 (55.9)*
Enhance sexual pleasure	22.22 (<0.0001)	29 (16.4) [†]	22 (46.8)*	13 (38.2)*
Enhance partner's sexual pleasure	37.53 (<0.0001)	5 (2.8) [†]	15 (31.9)*	4 (11.8) [†]

Chi-squared statistics test the equality of proportions across all three groups. The superscripted symbols indicate the significant pairwise differences among groups within a given row of the table. When two groups have no symbols in common, then the corresponding percentages differ significantly at the 0.05 level.

Table 3 FGPS patient's estimation of their preoperative sexual function

Preoperative sexual function	Labiaplasty and/or reduction clitoral hood (N = 174) N (%)	Vaginoplasty and/or perineoplasty (N = 46) N (%)	Labiaplasty with vaginoplasty/perineoplasty with or without reduction clitoral hood (N = 31) N (%)
"Poor"	36 (20.7)	13 (28.3)	7 (22.6)
"Fair"	44 (25.3)	25 (54.3)	12 (38.7)
Poor/fair	80 (46.0)	38 (82.6)	19 (61.3)
"Good"	68 (39.1)	7 (15.2)	8 (25.8)
"Great"	26 (15.0)	1 (2.2)	4 (12.9)
Good/great	94 (54.1)*	8 (17.4) [†]	12 (38.7)*

A chi-squared test comparing the proportion of good/great outcomes was significant (chi-squared = 16.70, $P = 0.0002$). The superscripted symbols in the final row indicate the significant pairwise differences among groups within a given row of the table. When two groups have no symbols in common, then the corresponding percentages differ significantly at the 0.05 level.

underwent surgery specifically at the urging of their sexual partners (approximately 5% of the total group) (Table 1).

The physicians' perspective regarding the reasons their individual patients underwent surgery (Table 2) parallel that of their patients in all of the groups.

As seen in Table 3, 54.1% of the women who had requested LP and/or RCH, 17.4% of the patients who had requested VP/PP, and 38.7% of the women who had undergone both procedures felt their preoperative sexual function was "good to great," while 82.6% of the women who had VP/PP, 61.3% who had both LP/RCH and VP/PP, and 46% of the women who had undergone LP and or RCH alone rated their preoperative sexual function as "poor" or "fair." Three patients in the LP/RCH and the "combined procedures" groups and one patient in the VP/PP group failed to respond to this question.

Both the patient's (Table 4) and physician's (Table 5) evaluations reported favorable outcomes, with "overall satisfaction" reported by 97.2% of the patients with LP and/or RCH, 83% with VP/PP, and 91.2% with combined procedures. The physician's estimation, combining "excellent" and "good," parallels that of their patients, reporting positive results in 97%, 92%, and 94%, respectively.

The patients noted positive effects on sexual function from FGPS procedures (Table 4) as 64.7% of the women who had LP and/or RCH, 86.6% of the women who had undergone VP/PP, and 92.8% of the women who had combined procedures reported either a "mild-moderate" or "significant" enhancement in sexual function. The same holds true for the effect of surgery on their partner's sexual satisfaction, as estimated by the patient, in the VP/PP (82.2% listed a "mild/moderate" to

"significant" enhancement) and combined VP/PP and LP/RCH (82.2% enhancement). The women undergoing LP and/or RCH intimate sexual enhancement for themselves of 64.7%, while reporting sexual enhancement for their partners of 35.7%. Some of the patients in each group (more so in the LP/RCH groups) failed to submit answers on the effects of their surgery on sexual satisfaction. Not all of the patients were sexually active around the time of their surgery.

Serious complications appeared to be minimal from both the patient's and physician's perspectives (Tables 4 and 5). Of the patients who had LP and/or RCH, 8.5% felt they had a complication of surgery, while 16.6% of the women who had undergone VP/PP and 18.2% of the women who had undergone a combined procedure reported a complication, the majority being self-diagnosed problems with healing, dyspareunia (usually transient) or what the patient considered to be "excessive postoperative bleeding" (Table 4). Combining intraoperative with postoperative complications, these percentages from the physician's perspective were 6%, 25%, and 18%, respectively, statistically insignificant from the patient's report (Table 5).

An attempt was made to compare the two distinctly different methods of LP, modified wedge, and sculpted linear resection (Table 6). Overall, patient satisfaction was virtually the same (95.2% and 95.7%) and complications not dissimilar (8.4% vs. 7.1%). V-wedge appeared to have a slight edge with regard to the "enhancement of sexual function," with 70% of the patients recording a "mild to significant" enhancement with wedge vs. 56% with linear excision ($P = 0.0215$). However, in 24 of the cases, the surgical technique could not be ascertained from the records, making any definitive conclusions regarding the superiority of one technique over the other difficult.

Table 4 Patients satisfaction with surgery

Outcome (patient estimate)	Chi squared (<i>P</i> value)	Labiaplasty and/or reduction clitoral hood N (%)	Vaginoplasty and/or perineoplasty N (%)	Labiaplasty and vaginoplasty/perineoplasty with or without reduction clitoral hood N (%)
Overall satisfaction	13.91 (0.0010)	(N = 177)	(N = 47)	(N = 34)
“ <i>Yes, satisfied</i> ”		172 (97.2)*	39 (83.0) [†]	31 (91.2) ^{*†}
“ <i>No, not satisfied</i> ”		5 (2.8)	8 (17.0)	3 (8.8)
Effect of surgery on my sexual satisfaction	9.70 (0.0078)	(N = 164)	(N = 45) ^{*†}	(N = 28)*
Negative effect		5 (3.0)	1 (2.2)	0 (0)
No effect		53 (32.3)	5 (11.1)	2 (7.1)
Negative/no effect		58 (35.3)	6 (13.3)	2 (7.1)
Mild–moderate enhancement		40 (24.4)	16 (35.5)	9 (32.1)
Significant enhancement		66 (40.3)	23 (51.1)	17 (60.7)
Mild/significant enhancement		106 (64.7) [†]	43 (86.6)*	26 (92.8)*
Effect of surgery on my partner’s sexual satisfaction	44.00 (<0.0001)	(N = 168) [†]	(N = 45)*	(N = 28)*
Negative effect		2 (1.2)	1 (2.2)	0 (0)
No effect		106 (63.1)	7 (15.6)	5 (17.9)
Negative/no effect		108 (64.3)	8 (17.8)	5 (17.8)
Mild–moderate enhancement		29 (17.3)	12 (26.7)	9 (32.2)
Significant enhancement		31 (18.5)	25 (55.5)	14 (50.0)
Mild/significant enhancement		60 (35.7) [†]	37 (82.2)*	23 (82.2)*
Do you feel you had a complication from surgery?	5.63 (0.0598)	(N = 176)	(N = 47)	(N = 33)
No		161 (91.5)	39 (83.4)	27 (81.8)
Yes (list)		15 (8.5) [†]	8 (16.6) ^{*†}	6 (18.2)*
“ <i>Did not heal right; stitches came out; revision, etc.</i> ”		6		1
“ <i>Prolonged healing; excessive pain, etc.</i> ”		5	1	1
“ <i>Pain with sex; VVS-like symptoms, etc.</i> ”		3	2	1
“ <i>Excessive postoperative bleeding</i> ”		1	2	2
“ <i>Perineum or vagina too tight</i> ”			2	1
“ <i>Infection</i> ”			1	

For the sexual satisfaction questions, the groups were compared using a Kruskal–Wallis test. The other questions were analyzed using a chi-squared test for independence. Chi-squared statistics tested the equality of proportions across all three groups. The superscripted symbols indicate the significant pairwise differences among groups within a given row of the table. When two groups have no symbols in common, then the corresponding percentages differ significantly at the 0.05 level.

Discussion

Both functional and cosmetic factors provide motivation for labial reduction. Women request a 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 the exophytic vaginal tissue, absent or poor control of pelvic floor musculature, sensation of a “wide vagina” and less/lack of “feeling”/friction with sexual relations, occasionally with accompanying orgasmic difficulties [15].

Women request revision of their clitoral hoods usually for two reasons. Occasionally, the clitoris is “buried” under an overabundant prepuce, or “trapped” under a tight, phimosed hood, leading to little direct stimulation, regardless of maneuvers attempted. Second, as with hypertrophied labia, many women find their generous prepuce folds unsightly and a source of embarrassment (although rarely do their sexual partners find this to be a problem).

The experiences of the authors and others [7–11,15,19,21–23] confirm that these patients’ visually self-perceived unattractiveness, dissymmetry, “looseness” and discomfort have nagged for years; their decisions do not appear to be hastily made.

According to Laura Berman, PhD, director of a treatment clinic for female sexual dysfunction in Chicago, a woman’s comfort level with her genitals affects her sexual enjoyment [24]. Additionally, pelvic floor hypotonus has been purported to impact negatively on sexual activity [25]. The pelvic floor plays a major role in female sexual function. During sexual activity, pleasure is enhanced for both partners by genital responses provided by a woman’s ability to contract the levator ani and associated musculature [26,27]. It stands to reason then that surgery to strengthen the pelvic floor and re-approximate the levator musculature, especially if combined with pelvic floor physical therapy, may improve sexual function.

All prior reports of FGPS procedures have been single institution studies, the largest of which

Table 5 Results from physician's perspective

Outcome (Physician estimate)	Chi squared (<i>P</i> value)	Labiaplasty and/or reduction clitoral hood (N = 177) N (%)	Vaginoplasty and/or Perineoplasty (N = 47) N (%)	Labiaplasty with vaginoplasty/perineoplasty with or without reduction clitoral hood (N = 34) N (%)
Estimate of overall results				
Excellent		77 (43.5)*	24 (51.1)*	17 (50.0)*
Good		94 (53.1)*	19 (40.4) [†]	15 (44.1) [†]
Excellent/good	2.52 (0.2835)	171 (96.6)*	43 (91.5)*	32 (97.0)*
Fair		2 (1.1)	3 (6.4)	1 (2.9)
Poor		4 (2.3)	1 (2.1)	0 (0)
Unknown				1 (2.9)
Fair/poor		6 (3.4)	4 (8.5)	1 (3.0)
Total complications:				
None	12.79 (0.0017)	164 (92.7)*	35 (74.5)*	28 (82.4) ^{**†}
Yes		13 (7.3) [†]	12 (25.5)*	6 (17.6) ^{**†}
Intraoperative complications				
None	0.78 (0.6762)	175 (98.9)*	46 (97.9)*	34 (100)*
Yes		2 (1.1)*	1 (2.1)*	0*
Intraoperative skin burn requiring revision		1		
Introital narrowing requiring revision		1		
Rectal perforation with repair			1	
Postoperative complications				
None	13.21 (0.0014)	166 (93.8) [†]	36 (76.6)*	28 (82.4)*
Yes		11 (6.2) [†]	11 (23.4)*	6 (17.6) ^{**†}
Partial or complete dehiscence/re-repair		5	1	
Hypersensitivity, dyspareunia		3		2
Significant postoperative bleeding		1		1
"Excessive sutures," scarring		1		
Patient or partner "felt sutures inside"			1	1
Failed stress urinary incontinence therapy			1	1
Temporary stricture vaginal apex			2	
Bleeding with first coitus			1	
"Excessive postoperative pain"			1	
Inadequate tightening			1	
Micro-tear perineum 1-year postoperative			1	
Introital narrowing		1	1	
Urinary urgency			1	
Perineal fistula				1

Chi squared statistics test the equality of proportions across all three groups. The superscripted symbols indicate the significant pairwise differences among groups within a given row of the table. When two groups have no symbols in common, then the corresponding percentages differ significantly at the 0.05 level.

[9,28] consists of patients undergoing LP only. The strength of the present study is that it crosses the boundaries of all of the commonly performed female genital plastic procedures except hymeno-

plasty, which, although originally included in the study protocol, was excluded upon IRB review secondary to privacy concerns. It draws patients from diverse practices and surgical specialties and

Table 6 Outcome by labiaplasty surgical technique

Method of labiaplasty	Linear excision (N = 83) N (%)	Modified wedge (N = 70) N (%)	<i>P</i> value (LE vs. MW)
Overall patient satisfaction			
"Yes"	80 (96.4)	67 (95.7)	<i>P</i> = 0.8312
"No"	3 (3.6)	3 (4.3)	
Patient perception of complication			
"None"	76 (91.6)	65 (92.9)	<i>P</i> = 0.7673
"Yes"	7 (8.4)	5 (7.1)	
Enhancement of sexual function:			
"Negative effect"	(N = 81) 2 (2.5)	(N = 67) 2 (3.0)	<i>P</i> = 0.0215
"No effect"	34 (42.0)	18 (26.9)	
"Mild-moderate enhancement"	25 (30.8)	18 (26.9)	
"Significant enhancement"	20 (24.8)	29 (43.2)	

Comparisons of patient satisfaction and perception of complications are based on a chi squared test for independence. Comparison of sexual function enhancement is based on a Kruskal-Wallis test. Perceived function enhancement is significantly better in Modified Wedge Group.

surgeons who utilize more than a single technique to achieve a common goal.

FGPS patients' preoperative sexual function appears to differ among patients requesting different procedures. While 54.1% of the patients who requested an external genital modification considered their preoperative sexual function to be "good" or "great," only 17.4% of the VP/PP patients fell into the "good/great" category ($P < 0.0001$) (Table 3). Conversely, it is not surprising that a large percentage (in this case, a full 82.6%) of the patients who requested a vaginal tightening procedure would consider their existing sexual function to be "fair/poor." The patients who underwent combined external and internal alterations fell somewhere in-between, with 38.7% considering their preoperative sexual function good or great, and 61.3% considering it fair or poor. It is not unexpected that women requesting cosmetic and functional alterations of portions of their sexual organs would, as a group, exhibit diminished sexual function. Although instructive, these statistics do suffer from the lack of a control group. However, a number of large, empirical studies look at sexual function in women in an age group similar to the study participants and tend to show sexual function difficulties (reduced desire, pain, orgasmic difficulties, lubrication problems, anxiety) in numbers not at all different from LP patients, while VP/PP patients as a group appear to exhibit less baseline satisfaction, causing distress [29–33].

Cosmetic, self-esteem and functional (mainly discomfort) reasons predominate for vulvar reduction procedures, while feelings of "looseness," lack of coital friction and other sexual reasons predominate for surgery on and within the vagina and vaginal introitus; these differences are statistically significant ($P < 0.0001$).

The women who requested PP and/or VP appear to emphasize sexual aspects to a somewhat greater degree (Table 1). The physicians appear to put somewhat less of an emphasis on sexual aspects (Table 2). This modest discrepancy could very well be explained by noting that sexual issues are stronger and more personal to the woman experiencing them than to the relatively more remote medical professional.

Beyond the overall patient-reported general satisfaction rates are the effects on both the patient's and her partner's sexual satisfaction. Genital plastic surgeons' marketing claims touting this improvement have been seriously questioned by more than one source [2,34,35]. Results from

the present study support Pardo's results [15] that FGPS does appear to enhance sexual satisfaction.

The enhancement of sexual satisfaction noted by the sexual partners of the women who underwent VP/PP procedures (Table 4) is a perception by the FCGS patient, rather than a query answered by the partner. Although this may somewhat limit the accuracy of these statistics, it is useful as an outcome measure as it helps assess the response of the complete sexual unit.

The discrepancy between the overall satisfaction rate of 83% reported by the patients for VP/PP procedures and the 92% reported by the physicians' estimate of "good" to "excellent" overall results may be explained by the fact that in most cases, physicians take into account only physical and anatomical findings when judging results, while patients might include other more psychological factors, resulting in a lower satisfaction percentage.

The male partner's role in FGPS decision-making appears to be limited, or at least indirect. Very rarely (just over 5% of the cases) is the patient's presentation or concerns at the urging of her sexual partner (Table 1). "It does not bother him; he says he loves me as I am" is a typical comment. Requests for FGPS procedures appear not to be generated by male partners, although women undergoing vaginal "tightening" procedures frequently take their partner's perceived coital stimulation into account when divulging reasons for their VP/PP procedures (Table 1). Outside sources (medical organizations, medical pundits, both male and female physicians not experienced in consulting and working with these women) are frequently a source of discouragement, not understanding that even in the place of medical definitions of "normality," human beings may wish to alter their appearance.

Complications were evaluated by both the patients and their physicians (Tables 4 and 5). One major intraoperative complication was reported (rectal entry); this was promptly recognized and repaired in layers and resulted in no long-term sequelae. The most commonly reported patient issues involved a healing time longer than expected by the patient, unexpected postoperative bleeding, or cosmetic results not equal to the patient's expectations. A total of five patients experienced what they considered to be excessive pain for a variable time after surgery, temporarily interfering with sexual function. A wide range of postoperative complications are reported by surgeons (Table 5); at the same time, however, these same

physicians report “fair” or “poor” results for a much smaller percentage of patients than the percentage of complications reported in the LP/RCH and combination groups. This dichotomy holds as well for patient-reported complications and success rates. The conclusion drawn here suggests that the majority of both patient and physician-reported complications were minor or temporary, not affecting the overall results. It appears that while a number of patients experienced initial discomfort secondary to superficial hypersensitivity or vaginal or perineal constriction (Table 4), the combination of “time,” perineal stretching, and occasional vaginal dilators adjudicated the problem in the majority of cases (authors’ personal experience). Looking back from a 6- to 42-month vantage point, most of the patients, even though they reported “complications,” were generally satisfied with the overall results, and their surgeons tended to agree.

Although several techniques for cosmetic LP are presented in the literature [12–14,19,20,22], most surgeons utilize either a linear sculpting excision technique, with fine absorbable re-approximation of the incised edge, or a modification of the “wedge resection” technique popularized by Gary Alter, MD [19] with removal of a large wedge of redundant central labia, with or without debulking, and re-approximation of cut edges to restore labial anatomy and contour. While some surgeons failed to specifically note their specific technique for LP, the method was discernible for the majority of patients and is presented in Table 6. Most surgeons prefer one method over the other, but several surgeons utilized both methods, depending on the anatomical presentation and the patient’s cosmetic wishes. Both methods offer similar satisfaction and neither appears to generate a greater complication rate.

It is not unexpected that the results for the more cosmetically oriented procedures of LP and RCH should be better than for procedures that have improvement in sexual satisfaction (VP/PP) as their primary goal, as other psychological, personal, and relationship issues may impact on sexual satisfaction.

The weaknesses of the study include a slight disparity in numbers in some of the categories of the patient-generated data, stemming from incomplete answers to all questions by some survey respondents. However, by noting the different numbers in each of these categories, the outcome statistics are based on the patients specifically answering each question, rather than the

total number of patients in that specific group. Another potential weakness lies in the number (54.5%) of patients initially contacted who agreed to receive, and then actually returning the questionnaire (although 70% of those who agreed to receive did return the survey questionnaire), as well as the fact that some surgeons were more successful in encouraging their patients to participate than others, having to do with the persistence of their office staffs in locating, contacting, and following up on their patients. Another weakness may lie in the lack of subanalyses sorted by length of time from surgery. Although a minimum of 6 months from procedure was required for inclusion, it may be argued that differences may exist between the patient groups nearing surgery and those who were more distant.

Recall bias certainly must be considered, as must the use of an unvalidated survey instrument. Bias can occur depending on the quality of existing records or self-recall and whether it is possible to collect information from all eligible FGPS recipients; it is additionally unknown whether patients satisfied or dissatisfied with the outcome would tend to respond or provide more accurate information. It may be argued that unhappy patients may be less likely to respond to questionnaires and that separately analyzing the medical records of patient nonresponders may be revealing. These data were not collected. Additionally, it has been shown that prevalence of existing sexual dissatisfaction and sexual dysfunction (and by extrapolation, improvement in postoperative sexual function) may vary quite widely, depending on the survey instrument utilized [33].

Even when there is some dissymmetry and scarring, virtually all women unequivocally state that they feel much better than before their surgery, which accounts for the very high (97.2%) “general satisfaction” rate for LP among practices. The authors acknowledge that a “1–10 scale” approach may have given better quantified data than “yes/no” answers.

In order to manage the data in a usable form, and keeping in mind one of the purposes of the study, which is to glean average results available in the genital plastic surgery community as a whole, the results from all of the surgeons were lumped together in an effort to obtain more meaningful outcome data giving, the authors feel, a better idea of what obtains in the community as a whole, rather than from a single individual surgeon. This may be both a strength and a weakness of the study.

An important question regarding FGPS remains unanswered, and is an area demanding further study. No evidence appears in the literature, nor are the authors aware of how these genital modifications will withstand the rigors of vaginal childbirth and, more specifically, whether there is a difference in function between the linear resection and V-wedge techniques.

The advent of MySpace, Facebook, and other Internet social sharing sites, along with the online availability of many educational and marketing FGPS sites may be the impetus for the recent increase in requests for genital plastic surgery. "I was not aware that anything could be done about [my problem] until recently . . ." is a refrain familiar to the genital plastic surgeon.

The assumption is made that these procedures, since they are basically cosmetic and sexual in nature, are not a "medical necessity" and thus trivial [2,32,33]. As in other parts of her body, nature has provided women with an enormous natural diversity in the size, shape and design of her genitalia. Because a body part is deemed by others to be "in the normal range," however, does not necessarily mean that its form or function is satisfactory to its "wearer."

Conclusion

Study results show a varied rationale for FGPS, including cosmesis, enhancement of self-esteem, and functional reasons for LP and clitoral hood reduction, and "tightening" and enhancement of sexual pleasure for VP and PP. Complications appear minimal, and relatively short-lived, with a 97.2% overall satisfaction rate for LP/clitoral hood reduction, 83.0% for VP/PP procedures, and 91.2% for combined procedures. Enhancement of sexual pleasure was noted in 64.7% of women and 35.7% of their consorts for LP/RCH, 86.6% of women and 83.4% of their partners for VP/PP procedures, and 92.8% of women, 82.2% of their partners for combined procedures.

In summation, looking at outcome data from a diverse group of practices and patients from across the United States, FGPS procedures appears to provide selected women increased comfort with their genitalia and enhanced sexual pleasure.

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