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The Impact of Stress Incontinence Surgery of Female Sexual Function

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Abstract

Objective—To describe change in sexual function 2 years after surgery to treat stress urinary incontinence.

Methods—This analysis included 655 women randomized to Burch colposuspension or sling surgery. Sexual activity was assessed by the PISQ-12 among those sexually active at baseline and two years after surgery.

Results—Mean PISQ-12 total score improved from baseline 32.23±6.85 to 36.85± 5.89. After surgery, fewer subjects reported incontinence (9% vs. 53%, p<0.0001), restriction of sexual activity due to fear of incontinence (10% vs. 52%, p<0.0001), avoidance of intercourse because of vaginal bulging (3% vs. 24%, p<0.0001) or negative emotional reactions during sex (9% vs. 35%, p<0.0001). Women with successful surgery had greater improvement PISQ-12 scores (5.77 vs. 3.79), p<0.006. Sexually active women were younger, thinner, and had lower MESA scores (total and urge subscale) than sexually inactive women.

Conclusion—Sexual function improves following successful surgery and did not differ between Burch or sling.

INTRODUCTION

Women with urinary incontinence have been shown to have poorer sexual function than continent women. [1-3] However, the relationship between severity of incontinence and level

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Condensation: Improvements in sexual function occur following Burch colposuspension or fascial sling, especially in women with successful surgical outcomes.

of sexual dysfunction is unknown. Likewise, the effects of surgery for stress urinary incontinence on sexual function are inconsistent [4-6]. The Stress Incontinence Surgical Treatment Efficacy Trial [7] [SISTEr] was a multi-center, randomized, controlled clinical trial designed to compare two year outcomes of the Burch colposuspension with the autologous rectus fascial sling procedure. This report describes the cross-sectional relationship between severities of incontinence and sexual function in SISTEr participants prior to undergoing surgery. We also report changes in sexual function two years post-surgery and factors associated with this change.

METHODS

Women with predominant stress incontinence were recruited into the SISTEr trial between February 2002 and June 2004 at nine clinical sites located throughout the United States. A total of 655 women were randomized in the operating room to undergo either a Burch colposuspension or an autologous rectal fascial sling procedure. The study protocol was approved by the Institutional Review Board of each participating institution and all women provided written informed consent. The details of the design of the trial have been previously reported. [7] Briefly, women were eligible for the study if they had stress-type urinary incontinence symptoms for at least three months, desired surgery, and reported voiding fewer than twelve times per day. They were also required to have predominant stress urinary incontinence (SUI) based on a higher percentage of stress-type symptoms reported on the Medical, Epidemiological, and Social Aspects of Aging (MESA) Questionnaire compared to urge-type symptoms. [7,8] Other eligibility criteria were a bladder capacity of ≥ 200 mL, a post-void residual volume of ≤ 150 mL, urethral hypermobility on Q-tip testing (resting angle or maximum straining angle > 30 degrees) and observed urine leakage as a result of a provocative stress test performed with a bladder volume of 300 mL or less.

Women were excluded from the study if they were younger than 21 years of age, not ambulatory, pregnant or planning pregnancy within twenty-four months, within 12 months postpartum, undergoing cancer therapy, diagnosed with a systemic disorder affecting bladder function (e.g., multiple sclerosis, spinal cord injury), urethral diverticulum, prior augmentation cystoplasty or artificial sphincter, recent pelvic surgery or participating in a treatment trial that could influence the results of SISTEr.

Data were obtained prior to (at baseline) and two years after surgery, except for women who underwent retreatment for SUI prior to the two year follow-up; their information was obtained prior to retreatment. Study measures assessed by self-reported questionnaires and clinical examination included socio-demographic characteristics, body-mass index (BMI), prolapse stage by POP-Q (Pelvic Organ Prolapse Quantified), history of hormone replacement therapy (HRT), Q-tip displacement and smoking status. Severity of incontinence was assessed by the MESA, a standardized 24-hour pad test and the Urogenital Distress Inventory (UDI[9]. The UDI instrument includes sub-scales to measure obstructive, irritative and stress urinary symptoms. Possible scores for each sub-scale range from 0 to 100 with a higher score indicative of more urogenital distress.

Overall treatment success was defined as a composite measure that included (1) no SUI symptoms on MESA; (2) a negative pad test (< 15 ml urine leakage over 24 hours); (3) no urinary incontinence on 3-day voiding diary; (4) a negative provocative stress test; and (5) no re-treatment for SUI. Because we did not expect improvement in the urge component of women with concomitant urge incontinence at time of enrollment we defined a second primary outcome as SUI-specific success, which required (1) no SUI symptoms: (2) a negative stress test; and (3) no SUI re-treatment.

Sexual function was assessed using the short form of the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12) in women who reported sexual activity with a partner within six months from baseline[10]. Eleven of the items on the PISQ-12 examine the frequency of sexual experience and feeling including, for example, frequency of sexual desire, pain during intercourse, and fear of incontinence. For each of these items, the participant is asked how often the item occurs in five categories from “never” to “always”. The twelfth item asks to compare the intensity of recent orgasms to those in the past on a five-point scale from “much less intense” to “much more intense”. Responses to the individual items were summarized in a PISQ-12 score as recommended by Rogers, et al[11]. Scores for PISQ-12 range from 0-48, with a higher score indicating better sexual function.

Differences in selected clinical and demographic characteristics between women who reported they were sexually active at baseline and those who reported they were not were assessed by cross-classification and the chi-square test for categorical factors, and the t-test for continuously scaled factors. Among women who were sexually active at baseline, the association between urinary incontinence severity and sexual function was assessed by regression of three severity measures on the PISQ-12 total score in women who reported sexual activity in the previous six months. Covariates were added to the regression analysis to assess whether the relationship between severity and sexual function was confounded or moderated by any other patient characteristics. All statistically significant ($p<0.05$) covariables were retained in the multiple regression analysis model. The resulting slope coefficient represents the average change in PISQ-12 score per unit change in the explanatory variable.

We investigated the change in whether women reported being sexually active at baseline and follow-up by cross-classification and the Mc-Nemar test of symmetry. The follow-up time point was defined to be 24 months post surgery unless a woman received surgical re-treatment prior to that time. For those women we used information from the last visit prior to the surgical retreatment. Among women who were sexually active at both time points, we computed the change in PISQ score. To assess whether a change in PISQ-12 score was associated with our definition of treatment success, we compared mean change score by for those who were a success by our definition to those who were not using analysis of variance. All analyses were carried out using the personal computer version of SAS statistical software (SAS Institute, Inc, Cary, NC. Version 9.1).

RESULTS

Prior to surgery, approximately two-thirds of the women enrolled in the trial reported sexual activity with a partner within the past six months (Table I). A significantly greater percentage of those who were sexually active were married or living with a partner compared to those not sexually active. Sexually active women were on average younger (49.5 vs. 57.4 yrs, $p<0.001$), and had a lower body mass index (BMI 29.2 vs. 31.6, $p<0.001$), lower total MESA scores (25.4 vs. 26.7, $p=0.05$), lower MESA urge subscale scores (6.2 vs. 7.1, $p=0.007$) and lower pad weights (38.2 vs. 55.3 grams, $p=0.04$) than women who reported that they were not sexually active.

The mean PISQ-12 score among sexually active women at baseline was 31.6 (sd=7.0) and was associated with incontinence severity. Both the UDI and MESA total scores but not pad weight were negatively associated ($p<0.001$ for both) with the PISQ-12 (Table 2); each measure of incontinence severity explained only a small amount of the variability in PISQ-12 ($R^2 = 0.07$ for UDI and 0.03 for MESA). However, the three UDI sub-scores explained a greater percentage of variation in PISQ-12 than the total UDI score. Of note, the obstructive and irritative sub-scores of the UDI were significantly associated with PISQ-12 while the stress sub-score was not. Similarly, the MESA urge subscale score was significantly associated with

PISQ-12, but MESA-stress subscale was not. The percent of variation explained was the same when the two sub-scores of the MESA were used as when the total score was used. The greatest amount of variation in PISQ-12 was explained with the three UDI sub-scores. Age, HRT and BMI were not significantly associated with PISQ-12 (Data not shown).

Among the 450 women who reported that they were sexually active at baseline, 335 completed the follow-up survey and of those, 38 (11%) reported at two years follow-up that they were no longer sexually active. Conversely, of the 205 women who were not sexually active at baseline, 151 completed the follow-up survey and of those, 27 (18%) reported that they had resumed sexual activity. Women who no longer reported sexual activity had lower baseline PISQ-12 scores (27.5± 6.9) compared to women who remained sexually active (32.3 ± 6.8, $p<0.001$).

Among women who reported they were sexually active at both time points (n=293), the mean PISQ-12 total score increased from 32.23 (sd=6.85) at baseline to 36.85(sd=5.89) at follow-up ($p<0.0001$). Improvement in the PISQ-12 was greater in women with successful surgery compared to surgical failures (5.77 (sd=6.16) vs. 3.79 (sd=5.54), $p<0.006$) but did not differ by randomized surgical group assignment, POP-Q stage or concomitant POP surgery (Table 3). Changes in sexual function did not differ by outcome components with the exception of re-treatment affected, although the actual number of women affected was small (Table 3).

Regarding the individual items of the PISQ-12, fewer women reported incontinence 9% vs. 53%, $p<0.0001$), restriction of sexual activity due to fear of incontinence (10% vs. 52%, $p<0.0001$), avoidance of intercourse because of vaginal bulging (3% vs. 24%, $p<0.0001$) or negative emotional reactions during sex (9% vs. 35%, $p<0.0001$) at follow-up than at baseline (Table 4). There was no significant change in frequency of orgasm, or sexual desire, excitement, or satisfaction after surgery.

DISCUSSION

Among women seeking surgery for stress urinary incontinence enrolled in a clinical trial evaluating two common surgical techniques, the Burch colposuspension and the fascial sling, nearly one-third reported that they were not sexually active within the six months prior to baseline. While women who reported that they were not sexually active were older, had a higher BMI and differed on several other baseline characteristics, we believe this relatively high rate of sexual inactivity may be due, at least in part, to the effects of urinary incontinence. This is supported by several measures of incontinence severity, most notably pad weight, which suggested greater severity in women who were not sexually active at baseline. Among all women who reported sexually activity within six months prior to baseline the mean PISQ-12 score was 31.6 out of a possible score of 48. Although a range of scores for this instrument have not yet been established to classify severity of sexual dysfunction, we believe that our findings indicate that women enrolled in our study displayed a significant decrement in sexual function before incontinence surgery. This observation is consistent with several prior studies which have found reduced sexual function in women with urinary incontinence compared to continent women[12-16]. Prior studies of the effects of incontinence surgery in women on sexual function have not been consistent with a wide of effects reported including no change, improvement, or worsening of function. [4-6] [17-19]

Our a priori hypothesis that improvement in sexual function was strongly influenced by the outcome ofsurgery (“success orfailure”)was borne outby the signif icant improvement (increase) in the PISQ-12 score observed in women with successful surgery compared to those whose surgery failed independent of the randomized surgery assignment. Sexual function is a complex process influenced by both biological and psychological factors. The fact that we found that only a small amount of the variance in the PISQ-12 score was explained by either

the MESA or the UDI was not surprising. This suggests that other factors not captured by this symptom index, including body image, confidence, or optimism, may be important factors which influence sexual function in women with urinary incontinence.

There were a number of strengths of our study including use of robust study measures which have been previously correlated to functional or anatomical defects associated with predominant stress incontinence in women planning incontinence surgery. Recently, our study group has reported that BMI, delta Q-tip, POP-Q stage, and smoking status were significantly correlated with the average number of incontinence episodes per day from a 3-day voiding diary as a measure of incontinence severity.[7] In that report, number of incontinence episodes on bladder diary, pad test weight, MESA stress score, and IIQ score were equally useful measures of incontinence severity. Although it is possible that the patient population enrolled in SISTEr were not representative of the women who seek surgery for stress urinary incontinence, there is good clinical reason to generalize the finding that successful surgery is associated with improvement in sexual function. Given that improvement in sexual function was similar in both groups, this finding is likely to be related to improvements in urinary incontinence, regardless of the specific technique; this allows reasonable generalization to other continence procedures, such as midurethral sling. Lastly, a significant proportion of women in this study underwent concomitant surgery for pelvic prolapse, a treatment that independently improves sexual function[20], although improvement was seen in the absence of prolapse surgery.

There were several limitations of this study. The use of a sole measure of sexual function, the PISQ-12, may have failed to identify important domains of sexual function related to urinary incontinence. We also did not assess the timing of urine loss in relation to sexual activity. It is possible that urine loss (or increase in loss) only at the time of sexual activity would result in poorer sexual functioning. On the other hand, any urine loss during sexual activity may be sufficient to adversely affect sexual function and explain the lack of correlation with severity measures. In addition, the minimum important difference for the PISQ-12 is not yet determined. The clinical impact of amount of change in the PISQ-12 score will require additional study.

The intimate and embarrassing aspects of urinary incontinence naturally interface with sexual function in affected women. The presence of incontinence, rather than the severity or subtype of incontinence, may impact sexual function. Studies such as ours provide a more complete view ofa woman’s life experience as she seeks treatment for her urinary incontinence, including a major life event such as surgery. Further research is warranted to advance our understanding ofthe patient’s experience ofthe intimate aspects ofincontinence care seeking and treatment.

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Table 1

Comparison of selected clinical and demographic characteristics of women who reported sexually activity in the six months prior to baseline with women who did not report sexual activity

	Sexually Active (n=450)		Not sexually active (n=205)		p-value
	N	%	N	%	
Race/Ethnicity					0.09
Hispanic	43	10	28	14	
White, non-Hispanic	332	74	145	73	
Black, non-Hispanic	28	6	15	8	
Other	46	10	11	6	
Education					0.06
Less than High School	33	7	21	11	
High School or equivalent	113	25	57	29	
Some post-high school	194	43	63	32	
Baccalaureate degree	67	15	31	16	
Graduate degree	43	10	27	14	
Marital status					<0.001
Married/living with a partner	360	80	83	42	
Not married	90	20	116	58	
Smoking status					0.03
Never smoked	249	55	103	52	
Former smoker	130	29	76	38	
Current smoker	71	16	20	10	
HRT use					<0.001
No	152	34	79	40	
Yes	133	30	89	45	
Pre-menopausal	164	37	31	16	
POP-Q Stage[1]					0.07
0	21	5	8	4	

	Sexually Active (n=450)		Not sexually active (n=205)		p-value
	N	%	N	%	
I	83	18	45	23	
II	282	63	104	52	
III	51	11	36	18	
IV	13	3	6	3	

	Mean	s.d.	Mean	s.d.	
Age, years	49.5	9.5	57.4	10.1	<0.001
BMI[2]	29.2	5.8	31.6	5.9	<0.001
UDI [3] —Total	150.1	49.2	152.4	47.2	0.58
UDI: Stress	78.8)	21.3	76.1	23.1	0.14
UDI: Obstructive	24.9	21.4	25.5	22.4	0.72
UDI: Irritative	46.3	25.4	50.8	24.4	0.04
MESA [4]: Total	25.4	7.6	26.7	6.9	0.05
MESA: Stress	19.2	4.7	19.6	4.4	0.37
MESA: Urge	6.2	4.0	7.1	3.7	0.007
Pad Weight[5] (gm)	38.2	63.7	55.3	106.4	0.04
PISQ-12[6]	31.6	7.0			

[1] Stage of Pelvic Organ Prolapse: 0 denotes no support loss. I denotes vagina not advanced below 1 centimeter above the hymen. II denotes the most advanced portion of the vagina is within 1 centimeter above (inside) the hymen, and one centimeter below (outside) the hymen. III denotes the most everted portion of the vagina is beyond Stage II, but not within the distance defined by total vaginal length minus two centimeters. IV denotes the most advanced portion of vaginal support loss is within the total length of the vagina minus two centimeters.

[2] BMI = body mass index is defined as weight in kilograms divided by square of height in meters.

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[3]Urinary distress symptoms are scored from 0 (not present) to 4 (present and greatly bothersome) and summed. Subscales are re-scaled to range from 0 to 100. UDI total is the sum of the sub-scales and ranges from 0 to 300. The higher the UDI score, the more bothersome are the symptoms.

[4]Total scores on the Medical, Epidemiological and Social Aspects of Aging (MESA) questionnaire were based on the sum of the scores for each woman, with a range 0 (never) to 3 (always) for the nine questions on stress incontinence and the six questions on urge incontinence, with higher scores indicating more frequent symptoms of incontinence.

[5]The pad weight was based on the average of each woman's mean pad weight difference during her standardized 24-hour pad test.

[6]PISQ-12 items are scored from 0 (lowest function) to 4 (highest function) and summed. Higher scores indicate greater sexual function.

Table 2

Association of the PISQ-12 total score with measures of incontinence severity among sexually active women at baseline (n=450)

Model	Independent Variables	Slope	p-value	R^2
1 UDI - total	UDI: Total	-0.04	<0.001	0.07
2. MESA total	MESA Score	-0.16	<0.001	0.03
3. Pad weight	Pad Weight (in gms)	-0.01	0.11	0.001
4. UDI - subscores	UDI-i	-0.033	0.02	0.12
	UDI-o	-0.10	<0.001	
	UDI-s	0.013	0.39	
5. MESA sub-scores	MESA: Stress	-0.065	0.43	0.03
	MESA: Urge	-0.28	0.004	

Table 3

Mean PISQ Score Change by Surgical Outcome (baseline-2 yr) (Higher score = greater improvement in function)

	Success N, mean (sd)	**Failure N, mean (sd)**	**P-value (t-test)**
Overall outcome (includes stress test, pad test, diary, retreatment and symptoms)	118, 5.77 (6.16)	153, 3.79 (5.54)	0.006
Stress-specific outcome (includes stress test, retreatment and symptoms)	175, 5.32 (6.08)	112, 3.67 (5.82)	0.02
Stress test	248, 5.07 (5.94)	45, 2.09 (5.64)	0.002
Pad test	261, 4.90 (5.81)	32, 2.31 (6.96)	0.02
Diary	180, 5.33 (6.19)	113, 3.48 (5.48)	0.01
Re-treatment	280, 4.92 (5.85)	13, -3.00 (6.16)	<.0001
Urodynamic stress incontinence	28, 5.89 (6.72)	262, 4.48 (5.9)	0.23

Table 4

Responses to PISQ-12 items for sexually active women with PISQ-12 scores at baseline and 24 month visit (N=293)

	Baseline N* (%)	2 Year N* (%)	P value**
How frequently do you feel sexual desire?			0.42
1: Always	24 (8%)	26 (9%)	
2: Usually	90 (31%)	96 (33%)	
3: Sometimes	127 (43%)	114 (39%)	
4: Seldom	45 (15%)	51 (17%)	
5: Never	7 (2%)	5 (2%)	
Do you climax (have an orgasm) when having sexual intercourse with your partner			0.72
1: Always	42 (14%)	40 (14%)	
2: Usually	106 (36%)	120 (41%)	
3: Sometimes	74 (25%)	68 (23%)	
4: Seldom	51 (17%)	45 (15%)	
5: Never	20 (7%)	18 (6%)	
Do you feel sexually excited (turned on) when having sexual activity with your partner			0.68
1: Always	92 (31%)	91 (31%)	
2: Usually	115 (39%)	120 (41%)	
3: Sometimes	59 (20%)	55 (19%)	
4: Seldom	24 (8%)	25 (9%)	
5: Never	3 (1%)	1 (0%)	
How satisfied are you with the variety of sexual activities in your current sex life?			0.62
1: Always	74 (25%)	79 (27%)	
2: Usually	122 (42%)	129 (44%)	
3: Sometimes	57 (19%)	50 (17%)	
4: Seldom	32 (11%)	26 (9%)	
5: Never	8 (3%)	7 (2%)	
Do you feel pain during sexual intercourse?			<.0001
1: Always	16 (5%)	11 (4%)	
2: Usually	22 (8%)	12 (4%)	
3: Sometimes	91 (31%)	52 (18%)	
4: Seldom	81 (28%)	72 (25%)	
5: Never	83 (28%)	145 (50%)	
Are you incontinent of urine (leak urine) with sexual activity			<.0001
1: Always	28 (10%)	4 (1%)	
2: Usually	33 (11%)	3 (1%)	
3: Sometimes	95 (32%)	18 (6%)	

	Baseline N* (%)	2 Year N* (%)	P value**
4: Seldom	71 (24%)	43 (15%)	
5: Never	66 (23%)	224 (77%)	
Does fear of incontinence (either urine or stool) restrict your sexual activity?			<.0001
1: Always	28 (10%)	3 (1%)	
2: Usually	37 (13%)	4 (1%)	
3: Sometimes	87 (30%)	23 (8%)	
4: Seldom	55 (19%)	26 (9%)	
5: Never	86 (29%)	236 (81%)	
Do you avoid sexual intercourse because of bulging in the vagina (either the bladder, rectum or vagina falling out)?			<.0001
1: Always	8 (3%)	1 (0%)	
2: Usually	19 (7%)	2 (1%)	
3: Sometimes	43 (15%)	7 (2%)	
4: Seldom	32 (11%)	15 (5%)	
5: Never	190 (65%)	267 (91%)	
Do you have negative emotional reactions such as fear, disgust, shame or guilt			<.0001
1: Always	15 (5%)	3 (1%)	
2: Usually	20 (7%)	5 (2%)	
3: Sometimes	69 (24%)	19 (7%)	
4: Seldom	46 (16%)	16 (5%)	
5: Never	143 (49%)	248 (85%)	
Total PISQ Score: Mean (SD)	32.2 (6.9)	36.9 (5.9)	<0.0001***

* N's may not sum to 293 due to missing responses to individual items

** p-values are from symmetry test.

*** p-value from paired t-test