Published in final edited form as:
Female Pelvic Med Reconstr Surg. 2011 ; 17(1): 30–35. doi:10.1097/SPV.0b013e318205e263.

Sexual function before and after non-surgical treatment for stress urinary incontinence

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Abstract

Objectives—(1) to describe sexual function in women seeking treatment of stress urinary incontinence (SUI); (2) to compare the impact on sexual function of three SUI treatments; and (3) to investigate whether non-surgical treatment of SUI is associated with improved sexual function.

Methods—Women with SUI were randomized to continence pessary, behavioral therapy (pelvic floor muscle training and continence strategies), or combination therapy. Sexual function was assessed at baseline and 3-months using short forms of the Pelvic Organ Prolapse-Urinary Incontinence Sexual Function Questionnaire (PISQ-12) and the Personal Experiences Questionnaire (SPEQ). Successful treatment of SUI was assessed with a patient global impression of improvement. ANOVA was used to compare scores between groups.

Results—At baseline, sexual function was worse among women with mixed incontinence compared to those with pure SUI. After therapy, successful treatment of SUI was associated with

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greater improvement in PISQ-12 score (2.26 ± 3.24 versus 0.48 ± 3.76, p=0.0007), greater improvement in incontinence with sexual activity (0.45 ± 0.84 versus 0.01 ± 0.71, p=0.0002), and greater reduction in restriction in sexual activity related to fear of incontinence (0.32 ± 0.76 versus −0.06 ± 0.78, p=0.0008). Among those successfully treated for SUI, improvement in continence during sexual activity was greater in both the combined therapy group (p=0.019) and the behavioral group (p=0.02) compared to the pessary group.

Conclusions—Successful non-surgical treatment of SUI is associated with improvements in incontinence-specific measures of sexual function. Behavioral therapy may be preferred to pessary for treatment of SUI among women whose incontinence interferes with sexual function.

Keywords

Pessary; sexual health; stress urinary incontinence; pelvic muscle training

Introduction

Approximately 25–50% of women with pelvic floor disorders report impaired sexual function [1–3]. It is unknown whether the sexual dysfunction among these women is due to the physical and emotional impact of the pelvic floor disorder or to other factors, such as increased age or other co-morbid conditions [4–6]. However, recent research in clinical populations [7] suggests that symptoms of pelvic floor disorders are independent risk factors for several common sexual complaints, including reduced sexual arousal and increased dyspareunia.

An important question is whether effective treatments for pelvic floor disorders result in improved female sexual function. If we hypothesize that sexual function is worse among women with symptoms of pelvic floor disorders, effective treatment of the underlying disorder should result in improved sexual function. The objective of this secondary analysis of the ATLAS trial [8] was to investigate the impact of three non-surgical treatments for stress urinary incontinence (pessary, behavioral therapy, or combined treatment) on sexual function. Our specific aims were to describe sexual activity and sexual function in women with stress incontinence; to compare the impact of three non-surgical treatments for stress incontinence; and to investigate whether successful treatment of incontinence is associated with a reduction in sexual complaints.

Methods

This was a planned secondary analysis of the ATLAS trial [9]. Briefly, women ages 18 and older with symptoms of SUI who desired non-surgical therapy were randomized into one of three groups: continence pessary, behavioral therapy (pelvic floor muscle training and continence strategies), or combination therapy. Eligibility criteria included at least two SUI episodes on a seven-day bladder diary and a greater number of stress leaks than other types of leaks recorded on the diary. Women whose diary indicated only stress-type leaks were classified as pure stress incontinence with others classified as mixed incontinence. Women with stage III or greater pelvic organ prolapse or neurological disorders associated with UI were excluded. Randomization was stratified by 7-day bladder diary results, including incontinence type (stress only versus mixed) and severity (<14 versus ≥14 total incontinence episodes) [9].

Women receiving behavioral therapy or combined therapy attended four treatment sessions over an eight week period. Trained interventionists instructed women on appropriate pelvic muscle contraction, prescribed home exercise programs with increasing difficulty over time, and taught women strategies to minimize leakage. Women in the pessary group were fitted

with a continence pessary for use as desired to decrease leakage. All participants received a one-page handout containing tips on incontinence management. All sites obtained IRB approval and all participants provided written informed consent.

A baseline seven-day bladder diary was used to assess incontinence frequency and incontinence type (stress only versus mixed, defined as one or more urge leaks recorded). The ATLAS primary outcome measure [9], collected 3 months after randomization, was the Patient Global Impression of Improvement (PGI-I). For this analysis, successful treatment of urinary incontinence was defined as a PGI-I response of “very much better” or “better”. Pelvic muscle strength was described using the Brinks scale, in which a score is obtained based on the pressure, displacement and duration palpated during a voluntary pelvic muscle contraction [10]. Research staff members who collected the outcome measures were masked to group assignment.

Sexual function was assessed before and after treatment, using two sexual function questionnaires, one generic and one specific for women with pelvic floor disorders. The generic instrument, the 9-item short form of the Personal Experiences Questionnaire (SPEQ) has been validated among peri-menopausal women and reflects several domains of female sexual function, including libido, arousal, and dyspareunia [11–13]. The SPEQ was completed by all participants at baseline (before randomization) and again three months after randomization, when the primary (incontinence) treatment outcome was also assessed. To more directly assess the impact of urinary incontinence on sexual function, we used the short form of the Pelvic Organ Prolapse-Urinary Incontinence Sexual Function Questionnaire (PISQ-12) [14]. Because the PISQ-12 has been validated only among women who are sexually active in a heterosexual relationship, this instrument was administered only to women reporting sexual activity with a partner during the past 3 months, while the SPEQ was administered to all participants.

Three SPEQ domain scores were used to describe libido, arousal and dyspareunia. Sexual desire (libido) was assessed by one item (“…how many times during the last month have you have had sexual thoughts or fantasies”), rated on an ordinal scale, with answers ranging from “never” (0 points) to “several times a day” (5 points). Sexual arousal (”responsivity”) was defined by the average of three items: “How enjoyable are sexual activities for you”, “Do you currently experience orgasm (climax) during sex activity” and “How often during sex do you feel aroused or excited?”, each rated on an ordinal scale, with “1” corresponding to “not at all” and “6” corresponding to “a great deal”. Dyspareunia was assessed among women who reported having a sexual partner. This domain score was based on a single item (“Do you currently experience pain during intercourse?”), rated from 0 (“not at all”) to 5 (”a great deal”), with an option for women who do not have intercourse to mark “not applicable”. Other SPEQ domain scores (feelings for partner, partner difficulty, and sexual frequency) were not included in this analysis. An overall SPEQ score was generated for each participant, with higher scores corresponding to better sexual function.

The PISQ-12 has a maximum score of 48, with higher scores reflecting better sexual function. In addition to reporting the overall score, we considered two individual PISQ-12 items that directly address the impact of incontinence on sexual function: “Are you incontinent of urine (leak urine) with sexual activity?” and “Does fear of incontinence (either urine or stool) restrict your sexual activity?” Both items were rated on a 5-point Likert scale, including “never,” “seldom,” “sometimes,” “usually” and “always.” These items were available only for women who reported sexual activity with a partner during the preceding three months.

We used data from the baseline questionnaires to describe sexual function among women presenting with stress urinary incontinence. We used data from 3 month and baseline questionnaires to compare sexual function before and after treatment. Women who completed the 3 month questionnaire were included in this analysis. Finally, we compared post-treatment sexual function between women with and without successful treatment of SUI (based on the PGI-I, as above).

We compared characteristics of the study population by randomization group using Mantel-Haenszel test or ANOVA. ANOVA, controlling for age, was used to compare Likert scales describing sexual function at baseline by incontinence type and incontinence frequency. Similarly, ANOVA was used to compare changes in sexual function at follow-up by treatment success. Finally, to investigate the impact of changes in pelvic muscle function on sexual function, we considered the relationship between the change in Brink score and the change in sexual function scores. This was accomplished with an analysis of the association between change in Brinks score and change in sexual function score using ANOVA. For all analyses, $P<0.05$ was considered statistically significant.

RESULTS

A total of 445 women enrolled in the study (Table 1), with 149 assigned to pessary treatment, 146 assigned to behavioral therapy, and 151 assigned to combined therapy. The mean age was 49.8 years and 42.2% were postmenopausal. These and other baseline characteristics did not differ by treatment group (Table 1). Of the 445 women who enrolled in this study, 281 (63.1%) reported a current sexual partner at baseline, 83 (8.6%) reported no current sexual partner, and 81 (18.2%) did not answer the question. At baseline, 281 (63.1%) reported sexual activity in the three months prior to enrollment, 121 (27.2%) reported no sexual activity, and 43 (9.7%) did not answer the question about recent sexual activity. There were no group differences in the proportion of women with a current partner ($p=0.115$) or who reported recent sexual activity ($p=0.091$).

At enrollment, the SPEQ was completed by 364 women and the PISQ-12 was completed by the 281 women who reported sexual activities with a partner in the 3 months prior. Sexual function measures differed significantly by incontinence type (Table 2). Compared to women with pure stress incontinence, women with mixed incontinence had significantly lower PISQ-12 scores, reported more frequent incontinence of urine with sexual activity, and were more likely to report that fear of incontinence restricts sexual activity. Dyspareunia scores were also significantly worse among women with mixed incontinence.

We noted a statistically significant association between incontinence type and incontinence frequency ($p<0.0001$, Chi-square test). Specifically, more subjects (60%) with mixed incontinence reported ≥14 incontinence episodes/week than subjects with pure stress incontinence (28%). However, when incorporating incontinence frequency into the model described in Table 2, incontinence frequency was not significantly associated with the PISQ-12 score, while incontinence type remained significant ($p=0.002$).

At baseline, sexual function did not differ among the three treatment groups. Twelve weeks after randomization, the change in measured aspects of sexual function also did not differ among treatment groups. Specifically, there was no difference among treatment groups in the change in PISQ-12 score, SPEQ score, or any component of these scores.

Twelve weeks after randomization, 203 women met our definition for successful treatment of SUI and 142 were not considered successfully treated (the 3-month assessment was not completed for the remaining 100 women). Compared to those who did not experience successful treatment of SUI, those with successful treatment experienced greater

improvement in PISQ score (2.26 ± 3.24 versus 0.48 ± 3.76, p=0.0007) (Table 3). Also, successful treatment of SUI was associated with a greater improvement from baseline in incontinence with sexual activity (0.45 ± 0.84 versus 0.01 ± 0.71, p=0.0002) and a greater reduction in restriction of sexual activity related to fear of incontinence (0.32 ± 0.76 versus −0.06 ± 0.78, p=0.008). Improvement in SUI was not associated with changes in sexual responsivity (p=0.15), dyspareunia (p=0.64), libido (p=0.43) or SPEQ score (p=0.14). A post-hoc power calculation suggested that the power of this study to detect a true difference in SPEQ score of 2–3 points (the range of difference observed) given the observed sample size and a significance level of 0.05 was 32%–55%.

Given that improvement in sexual function was more closely associated with improved continence than was treatment group, we considered whether treatment group had any influence on changes in sexual function. Among those successfully treated for SUI, the mean improvement in score for incontinence during sexual activity was 0.45 greater in the combined therapy group compared to the pessary group (p=0.019, controlling for menopause). Similarly the mean improvement in score for incontinence during sexual activity was 0.42 greater in the behavioral therapy group compared to the pessary group (p= 0.02, controlling for menopause). Among those not successfully treated for SUI, there was no significant difference among groups with respect to any measure of sexual function.

To investigate the impact of pelvic muscle training on incontinence-specific measures of sexual function, we considered the relationship between the change in Brink score and the change in sexual function scores. At baseline, the mean Brink score was 8.6±2.1. After treatment, the mean score was 9.3±2.0. Successful treatment of SUI was associated with a significantly higher mean Brink score (9.5±2.0 versus 9.0±2.0, p=0.028). The change in Brink score, representing the change in pelvic muscle strength, was not associated with change in PISQ-12 total score (p=0.19). This finding was not affected by adjustment for age, treatment success and treatment group (p=0.64). Similarly, the change in Brink score was not associated with change in SPEQ score (p=0.79), even after adjusting for age, treatment success, and treatment group (p=0.98).

DISCUSSION

In this planned secondary analysis of data from a randomized trial, comparing pessary to behavioral therapy versus combined therapy, successful non-surgical treatment of SUI was associated with statistically significant improvements in several incontinence-specific measures of sexual function, including less incontinence during sex and less perception that incontinence interferes with sex. Nevertheless, these improvements did not translate into any measurable effect on libido, dyspareunia, or arousal. Thus, while incontinence-specific measures of sexual function improved with restoration of continence, we did not observe improvements in more general aspects of sexual function.

Prior studies document an improvement in PISQ-12 score after surgical treatment of SUI. Frick and colleagues [15], observed a mean increase in PISQ-12 score of 2.9 ± 5.0 one year after mid-urethral sling for treatment of SUI. In another surgical trial, Brubaker and colleagues saw PISQ-12 scores increase by a mean of 5.8 points after successful surgery but only 3.8 points for unsuccessful surgery [16]. The magnitude of improvement seen in our trial, 2.26 ± 3.24 points, was somewhat more modest than the gains documented after surgical intervention, possibly reflecting a less robust treatment effect from non-surgical therapy. Indeed, nonsurgical treatments may have a more modest impact on PISQ score. For example, in a study of women with overactive bladder, [17] medical treatment increased the total PISQ score by 4.7 points, corresponding to a increase in PISQ-12 score of less than 2 points.

Among women with bothersome SUI, there has been little research on the impact that nonsurgical treatments have on sexual function. Although one study found that sexually active women were more likely than their inactive counterparts to continue pessary use, the study did not directly examine the impact of pessary use on sexual function [18]. Some studies of pelvic floor strengthening have suggested improved sexual outcomes in women with stress incontinence [19,20], although other studies [21] have not confirmed these findings. We found no association between changes in pelvic muscle strength, as measured by the Brink score, and either the SPEQ or PISQ-12 scores. This would suggest that pelvic muscle strengthening, in the absence of improved continence, does not have a measurable effect on female sexual function.

Furthermore, our results suggest that improvements in sexual function related to pelvic muscle training are mediated by improvements in continence. Across the three treatment groups, improvements in sexual function were limited to women who experienced successful treatment of SUI symptoms. Thus, women who received behavioral therapy (with pelvic muscle training) did not experience improvement in sexual function unless they reported that their incontinence was “better” or “very much better” after treatment. However, women successfully treated for stress incontinence were more likely to experience improvement in continence during sexual activity after treatment with either behavioral therapy or combined therapy than with pessary. The reason for this treatment effect is not immediately apparent. Study participants were not provided with specific instructions regarding whether they should remove the pessary for sexual activity. We speculate that removal of the pessary for sexual activity, even among those successfully treated, might have prevented these women from experiencing improvements in continence during sex. An alternative conclusion is that behavioral therapy, either alone or in combination, is responsible for the improvement in continence with sexual activity. The literature on how pelvic floor muscle strengthening might improve this aspect of sexual function is not clear. Some researchers have found that pelvic muscle exercise improves broader aspects of sexual function, including desire, arousal and orgasm [20]. We could not confirm these findings, as our participants did not experience improvements in libido, arousal or more general aspects of sexual function. However, our power to detect a difference in SPEQ score was limited.

Our results suggest that women with mixed incontinence have worse dyspareunia scores, worse PISQ-12 scores, worse scores for incontinence of urine with sexual activity, and worse fear of incontinence restricting sexual activity than women with pure stress incontinence. A potential weakness of our study is that our method for classifying mixed versus pure stress incontinence (based on the diary) has not been validated. Nevertheless, our findings are consistent with prior research suggesting that women with mixed incontinence have worse sexual function that those with stress incontinence alone [22]. However, consistent with the literature, more general aspects of sexual function, such as libido and arousal, were not strongly correlated with symptoms of urinary incontinence. Certainly the reasons for impairment in sexual function are complex, multi-factorial and incompletely understood. Continence status is only one of many factors contributing to sexual function.

A strength of this study is the use of validated questionnaires that comprehensively assess the multiple domains of sexual function in a large, well characterized sample of women presenting for conservative treatment of stress urinary incontinence. The PISQ measured condition-specific sexual function, with two of its items (incontinence with sexual activity and restrictions on sex from fear of incontinence) providing the most plausible direct causal links between incontinence and sexual function. In contrast, the SPEQ evaluated generic sexual function. This measure has the advantage over some other measures of sexual function in that it can be completed by women who do not have intercourse. As noted, one-

third of participants in this trial were not sexually active with a partner at enrollment. Thus, the SPEQ provides a validated means of assessing sexual function among the subset of women who do not have a current partner or for whom intercourse is not part of the intimate relationship. Although we found incontinence-specific measures of sexual function improved with restoration of continence, we did not observe improvements in more general aspects of sexual function. These findings suggest that the PISQ measures were more responsive to changes in sexual function related to pelvic floor disorders than the more generic measure in this cohort of women.

One study limitation is that our population of women joining a clinical trial of conservative treatment of stress incontinence may limit the generalizability of the findings. In addition, there are limitations attendant to lack of a sexual partner in nearly 40% of the study population. Although women with more advanced pelvic organ prolapse and severe atrophic vaginitis were excluded from the present study, other unmeasured factors associated with sexual dysfunction could have influenced our results. Finally, women may under-disclose sexual problems, or those complaints may be overwhelmed by women's concerns regarding stress incontinence and its treatment in this cohort of women.

In summary, our results demonstrate that measures of sexual function did not vary among treatment groups three months after randomization in this trial of non-surgical treatment of SUI. Regardless of treatment group, improvements in sexual function were limited to women who experienced successful treatment of SUI. These results should be reassuring to women seeking conservative treatment of stress incontinence. Moreover, we found that successful treatment led to greater improvements in incontinence-specific measures of sexual function among women treated with behavioral therapy than those treated with pessary. Therefore our results suggest that clinicians should consider behavioral therapy (including pelvic floor muscle exercises and continence strategies) for non-surgical treatment of SUI for women with incontinence during sexual activity and for those who restrict sexual activity due to fear of incontinence.

Acknowledgments

Source of funding: Supported by grants from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (K23HD045806, U10 HD41261, U10 HD 41250, U10 HD54136, U10 HD41249, U10 HD41267, U10 HD41248, U10 HD41268, U10 HD41263, U10 HD54214, U10 HD54241, and U10 HD54215); National Institute of Diabetes and Digestive and Kidney Diseases and NIH Office of Research on Women's Health

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Table 1

Characteristics of the study population at baseline, by treatment group. Data presented as N (%) unless otherwise noted.

Variable	Combined N=150	Behavioral N=146	Pessary N=149	P-value[1]
Mean age (SD)	49.5 (11.8)	49.6 (13.0)	50.2 (11.0)	0.86
Caucasian race	122 (81.3%)	132 (90.4%)	125 (84.5%)	0.26
Menstrual Status				0.91
Pre-menopausal	68 (45.3%)	71 (48.6%)	75 (50.3%)	
Post-menopausal	66 (44.0%)	62 (42.5%)	60 (40.3%)	
Not sure	16 (10.7%)	13 (8.9%)	14 (9.4%)	
Current Estrogen Use	16 (10.7%)	24 (16.4%)	27 (18.1%)	0.17
Body Mass Index (SD)	29.84 (7.54)	29.01 (6.89)	29.50 (6.05)	0.54
Incontinence Type[2]				0.92
Stress Only	70 (46.7%)	65 (44.5%)	69 (46.3%)	
Mixed	80 (53.3%)	81 (55.5%)	80 (53.7%)	
Incontinence Frequency[2]				0.98
≥14 episodes/week	67 (44.7%)	67 (45.9%)	68 (45.6%)	
<14 episodes/week	83 (55.3%)	79 (54.1%)	81 (54.4%)	

[1] ANOVA, controlling for stratification based on baseline incontinence episodes and incontinence type.

[2] Incontinence type and frequency based on 7-day bladder diary: stress (no urge leaks recorded) or mixed (one or more urge leaks recorded).

Table 2

Sexual function at baseline in participants with stress and mixed incontinence[1] Data are expressed as mean (SD).

Characteristic	Stress UI (n=204)	Mixed UI (n=241)	P value[2]
SPEQ total score	9.84 (3.23)	9.30 (3.24)	0.3650
Sexual arousal[3]	4.12 (1.51)	3.90 (1.55)	0.4050
Libido*[4]	3.02 (1.29)	2.76 (1.21)	0.1260
Dyspareunia[5]	1.70 (1.17)	1.99 (1.23)	0.0170
PISQ-12 score[6]	36.28 (5.25)	33.73 (5.96)	0.0007
Incontinence with sexual activity [7]	3.13 (1.13)	2.85 (1.15)	0.0350
Sexual activity restricted by fear of incontinence (either urine or stool) [7]	3.47 (0.93)	3.15 (1.03)	0.0060

[1] Incontinence type based on 7-day bladder diary: stress (no urge leaks recorded) or mixed (1 or more urge leaks recorded).

[2] ANOVA, adjusted for age

[3] Arousal score is the average of “How enjoyable are sexual activities currently for you?”; “How often during sex activities do you feel aroused or excited (heart beating fast/heavier breathing/vaginal wetness/flushing)?”; “Do you currently experience orgasm (climax) during sex activity?” Each is rated on an ordinal scale, with answers ranging from “never” (0 points) to “several times a day” (5 points).

[4] Libido, defined by frequency of sexual thoughts or fantasies (eg. daydreams) during the last month. This SPEQ response is defined by a tLikert scale Never = 1; Several times a day = 6

[5] “Do you currently experience pain during intercourse?” This SPEQ response is limited to those subjects reporting a current sexual partner and was defined by a Likert scale Not at all =1; A great deal = 5

[6] PISQ-12 score is measured among those who have engaged in sexual activities with a partner over the past 3 months

[7] These PISQ responses are defined on Likert scale, 0=always, 4=never

Table 3

Changes in sexual function after treatment, in women successfully treated for stress incontinence versus those whose treatment was not successful. Data are expressed as mean difference (SD).

Characteristic	Not successfully treated (n=142)	Successfully treated (n=203)	P value[1]
Change in SPEQ total score	−5.75 (12.71)	−3.62 (11.00)	0.1358
Change in sexual arousal[2]	−0.15 (0.98)	0.03 (0.99)	0.1505
Change in libido[2]	0.12 (0.96)	0.03 (0.87)	0.4267
Change in dyspareunia[2]	−0.24 (0.94)	−0.18 (0.89)	0.6375
Change in PISQ−12 score[2]	0.48 (3.76)	2.26 (3.24)	0.0007
Change in incontinence with sexual activity [2]	0.01 (0.71)	0.45 (0.84)	0.0002
Change in sexual activity restricted by fear of incontinence (either urine or stool) [2]	−0.06 (0.78)	0.32 (0.76)	0.0008

[1] ANOVA

[2] Outcomes as defined in Table 2