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# A Prospective Single-Arm Study Evaluating the Effects of a Multimodal Physical Therapy Intervention on Psychosexual Outcomes in Women With Dyspareunia After Gynecologic Cancer



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## ABSTRACT

**Background:** Dyspareunia affects most women after treatment for gynecologic malignancies. However, to date, evidence-based interventions remain limited and no study has examined the effects of multimodal physical therapy on psychosexual outcomes in these patients.

**Aim:** To assess the effects of multimodal physical therapy on psychosexual outcomes including sexual distress, body image concerns, pain anxiety, pain catastrophizing, pain self-efficacy and depressive symptoms in women with dyspareunia after treatment for gynecologic malignancies.

**Methods:** Thirty-one gynecologic cancer survivors with dyspareunia enrolled in this prospective single-arm interventional study. The participants undertook 12 weekly sessions of physical therapy incorporating education, pelvic floor muscle exercises with biofeedback, manual therapy and home exercises. Outcome measures were evaluated pre- and post-treatment. Paired *t*-tests were conducted to investigate the changes from pre-treatment ($P$-value < 0.05) while effect sizes (Cohen's $d$) were calculated to measure the magnitude of the change.

**Main Outcome Measures:** Sexual distress (Female Sexual Distress Scale-Revised), body image concerns (Body Image Scale), pain anxiety (Pain Anxiety Symptoms Scale), pain catastrophizing (Pain Catastrophizing Scale), pain self-efficacy (Painful Intercourse Self-Efficacy Scale) and depressive symptoms (Beck Depression Inventory-II).

**Results:** Significant changes were found from pre- to post-treatment for all psychosexual outcomes. Women reported reductions in sexual distress ($P < 0.001$, $d = 1.108$), body image concerns ($P < 0.001$, $d = 0.829$), pain anxiety ($P < 0.001$, $d = 0.980$), pain catastrophizing ($P < 0.001$, $d = 0.968$) and depression symptoms ($P = 0.002$, $d = 0.636$) with an increase in pain self-efficacy ($P < 0.001$, $d \geq 0.938$) following the intervention.

**Clinical Implications:** The results suggest that multimodal physical therapy significantly improves sexual distress, body image concerns, pain anxiety, pain catastrophizing, pain self-efficacy and depressive symptoms in our sample of women with dyspareunia after treatment for gynecologic malignancies. The medium to large effect sizes obtained with the high proportion of women presenting meaningful changes according to the known minimal clinically important difference or clinical cut-off underlines the significance of these effects.

**Strengths & Limitations:** The current study used validated questionnaires to assess the psychosexual outcomes of a well-designed physical therapy intervention using multiple modalities to address the multifaceted aspect of

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dyspareunia in cancer survivors. This study did not include a control group, which may limit drawing definitive conclusions.

**Conclusion:** Findings showed that multimodal physical therapy yielded significant improvements in psychosexual outcomes in gynecologic cancer survivors with dyspareunia. A randomized controlled trial is indicated to confirm these results. **Cyr M-P, Dumoulin C, Bessette P, et al. A Prospective Single-Arm Study Evaluating the Effects of a Multimodal Physical Therapy Intervention on Psychosexual Outcomes in Women With Dyspareunia After Gynecologic Cancer. J Sex Med 2021;18:946–954.**



**Key Words:** Gynecologic Cancer Survivors; Dyspareunia; Physical Therapy; Sexual Distress; Body Image; Pain Anxiety; Pain Catastrophizing; Self-Efficacy; Depressive Symptoms

## INTRODUCTION

Sexual dysfunction is a common complaint of women after gynecologic cancer, affecting up to 90% of survivors.[1] This prevalence largely exceeds that of women with no history of cancer, which is between 40 and 50%.[2] Following gynecologic cancer, more than half of women experience dyspareunia.[3,4] According to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-V), dyspareunia is a genito-pelvic pain and/or penetration disorder characterized by a recurrent or persistent genital pain associated with sexual intercourse.[5,6] Although dyspareunia is widespread in patients treated for gynecologic malignancies, it remains understudied. The knowledge derived from women with no history of cancer[7] along with the most recent evidence about dyspareunia in gynecologic cancer survivors[8,9] suggests that dyspareunia results from the interplay of anatomical, physiological and psychosexual factors. It should be noted that the relative contribution of cancer and of each oncological treatment in dyspareunia has not yet been studied. Invariably, women affected are distressed because of the intertwining difficulties related to cancer[10] as well as the burden of living with chronic pain.[11] Body image disturbance, anxiety, depression and marital difficulties often arise after cancer and continue to worsen over time.[12–14] Moreover, they may present with pain-related fear (ie, pain anxiety) and pain catastrophizing[15] as well as low pain self-efficacy,[16] exacerbating their pain experience. Also contributing to higher distress is the limited choice in evidence-based treatment options to alleviate dyspareunia after gynecologic cancer.[17,18]

Vaginal lubricants and non-hormonal vaginal moisturizers are recommended as vaginal atrophy and dryness may play a role in dyspareunia,[19] whereas cognitive-behavioral therapy may help to decrease fear and anxiety.[19,20] However, the efficacy of these interventions is limited and poorly studied among women treated for gynecologic malignancies.[19,20] Because dyspareunia likely results from the interaction of anatomical, physiological and psychosexual factors,[8,9] a multimodal intervention such as physical therapy may be required to treat this complex pain condition. Several recent clinical survivorship guidelines concur in recommending physical therapy to treat dyspareunia.[17,20] A recent prospective study showed a statistically and clinically significant reduction in pain as well as an improvement in sexual function following multimodal physical therapy in women affected by dyspareunia after being treated for gynecologic malignancies.[21] Supporting the rationale for this treatment, a recent cross-sectional comparative study showed heightened pelvic floor muscle tone, lower tissue flexibility, higher pelvic floor muscle stiffness as well as lower coordination and endurance using dynamometry and ultrasound imaging in women with dyspareunia after treatment for gynecologic malignancies in comparison to asymptomatic women.[9] These alterations can be addressed by physical therapy through education, pelvic floor muscle exercises and manual therapy.[22] It can also be hypothesized that the effects of physical therapy extend beyond physical outcomes as it integrates a biopsychosocial approach.[23,24] The educational component entails an overview of the neurobiology and neurophysiology of pain during sexual intercourse and its processing.[23,24] This can help women correct erroneous beliefs in order to change unhelpful behaviors while increasing their adherence to treatment recommendations to reduce the pain.[25] They are also taught several self-management strategies which could lead to functional improvements.[25] In addition to these aspects, the support and guidance provided by the physical therapist are helpful to women for gradually resuming pain-free intercourse.[26] In parallel, the educational component and the role of the physical therapist likely contribute to improving psychosexual outcomes.[23–27] For instance, several studies in women affected by dyspareunia with no history of cancer showed a reduction in sexual distress, pain anxiety and pain catastrophizing as well as an improvement in self-efficacy following a multimodal physical therapy intervention incorporating an educational component.[28–30] However, to date, there is no data related to the effects of this intervention on psychosexual outcomes in gynecologic cancer survivors. As psychosexual outcomes are at the core of genito-pelvic pain associated with sexual intercourse, it is crucial to

determine whether these could be improved with physical therapy. Therefore, the aim of the study was to assess the effects of multimodal physical therapy on psychosexual outcomes including sexual distress, body image concerns, pain anxiety, pain catastrophizing, pain self-efficacy and depressive symptoms in women suffering from dyspareunia after treatment for gynecologic malignancies.

## MATERIALS AND METHODS

This single-arm study is part of a multicenter prospective interventional study conducted in Sherbrooke and Montreal Canada. The study was reviewed and approved by the institutional ethics committee. One of the objectives of this study (ClinicalTrials.gov identifier: NCT03935698) was to assess the multidimensional effects of multimodal physical therapy in women with dyspareunia who had received oncological treatments for a gynecologic cancer. Please note that all details related to the feasibility and acceptability of the intervention as well as its effects on pain, sexual function and pelvic floor dysfunction symptoms with their impact on the quality of life have been published elsewhere[21] and those on pelvic floor muscle outcomes will be described in another manuscript.

### Participants

Women were recruited from 3 university hospitals through invitation letters in addition to referrals by health care providers, newspaper advertising, posters and/or brochures in public health care facilities and word of mouth. Women were eligible if their cancer was deemed in remission after the completion of all oncological treatments (surgery, radiation therapy and/or chemotherapy) at least 3 months earlier. A standardized gynecologic examination performed by a gynecologic oncologist from the research team was part of the eligibility assessment to rule out other conditions known to cause pain (eg, vaginitis, cystitis or dermatitis). Other inclusion criteria included: (i) vulvovaginal pain during intercourse (ie, pain at the entry of the vagina and at the mid-vagina at the level of the pelvic floor muscles) for at least 3 months after completion of oncological treatments; (ii) vulvovaginal pain in more than 80% of intercourse attempts at a minimum average pain rating of 5 on a scale of 0 (no pain) to 10 (worst pain); and (iii) stable sexual partner and willingness to engage in sexual activities including intercourse. Women were excluded if (i) they reported pain unrelated to intercourse or prior to cancer; (ii) they had other pelvic conditions including urinary tract or vaginal infection, deep pelvic pain (ie, pain experienced in the abdomen with deep penetration), chronic constipation according to the Rome III criteria,[31] pelvic organ descent of stage $\geq 3$ based on the Pelvic Organ Prolapse − Quantification system; (iii) they had been treated for another primary pelvic cancer or breast cancer; (iv) they had other vulvar, vaginal or other pelvic surgery unrelated to cancer; (v) they had physical therapy related to pelvic health in the last year; (vi) there were changes in their use or dosage of menopausal hormone therapy in the last 6 months; (vii) they had major medical conditions likely to interfere with study procedures (eg, significant coexisting cardiovascular, hematological, central nervous system, pulmonary or renal disorders); or (viii) they refused to abstain from using other treatments for dyspareunia during their participation in the study. All women gave written informed consent prior to participating in the study.

### Intervention − Multimodal Physical Therapy

The intervention consisted of 12 weekly individual sessions of 60 minutes provided by a physical therapist experienced in pelvic health. Women were invited to reschedule during the same week if they missed a session. The treatment incorporated education, pelvic floor muscle exercises with electromyography biofeedback using a small intravaginal probe, manual therapy and a home exercise program. The educational component entailed information on chronic pain management and the pathophysiology of dyspareunia including the role of the pelvic floor muscles with treatment mechanisms. Healthy vulvovaginal behavioral advice such as the use of vaginal lubricants and moisturizers was also given. Moreover, the physical therapist helped the participants to gain more knowledge about sexual function and guided them into resuming pain-free intercourse. The sexual partner was invited to participate in one session to learn how to help his partner in this process. Relaxation techniques using deep breathing were used to normalize the pelvic floor muscles (ie, reduce muscle tone and tensions). In addition, the home exercise program encompassed pelvic floor muscle exercises that were given 5 times/week and insertion exercises with a finger or graded vaginal dilators that were given 3 times/week. The pelvic floor muscle exercises focused on relaxation, control and contraction, whereas the insertion exercises and manual therapy aimed to stretch, release tensions and desensitize the tissues. The modalities evolved throughout the sessions and were selected to reflect clinical practice[32] to target the pelvic floor muscle alterations previously demonstrated in the literature[9] as well as the multifaceted aspect of pain in cancer survivors. Further details of the treatment protocol are available elsewhere.[21]

### Outcome Measures

Women were invited to attend the pre- and the 2-week post-treatment assessments conducted by an experienced physical therapist who was not involved in the intervention. The characteristics of the participants were collected at the pre-treatment assessment. Validated self-administered questionnaires with strong psychometric properties were used to assess the psychosexual outcomes at pre- and post-treatment assessments. These questionnaires have been widely used in studies conducted in women affected by dyspareunia.[28,33−37]

*Sexual distress*. The 13-item Female Sexual Distress Scale-Revised (FSDS-R) was used to evaluate sexual distress (total score ranging from 0 to 52).[38,39] Higher score values represent more sexually related distress (minimal clinically important difference (MCID) of the original 12-item Female Sexual Distress Scale = -7).[40]

*Body image concerns*. The 10-item Body Image Scale (BIS) was administered to assess body image concerns (total score ranging from 0 to 30).[41] Higher score values relate to greater concerns (clinical cut-off score = > 10).[42]

*Pain anxiety*. The 20-item Pain Anxiety Symptom Scale (PASS) is an indirect measure of fear of pain during intercourse (total score ranging from 0 to 100). Higher score values indicate more severe pain anxiety[43] (clinical cut-off score = ≥ 24.6).[44] This questionnaire also includes 4 subscales: cognitive anxiety (score range 0-25), escape/avoidance (score range 0-25), fearful appraisal (score range 0-25) and physiological anxiety (score range 0-25).

*Pain catastrophizing*. The 13-item Pain Catastrophizing Scale (PCS) measures exaggerated negative cognitions and emotions regarding pain (total score ranging from 0 to 52).[45] Higher score values point to higher catastrophizing (MCID = -38%).[46] The PCS is divided into 3 subscales to assess the different components of catastrophic thinking: rumination (score range 0-16), magnification (score range 0-12) and helplessness (score range 0-24).

*Pain self-efficacy*. Adapted from the Arthritis Self-Efficacy Scale,[47] the 20-item Painful Intercourse Self-Efficacy Scale (PISES) assesses pain self-efficacy associated with pain during sexual intercourse with 3 subscales measuring its 3 dimensions (total score ranging from 10 to 100): self-efficacy for controlling pain, self-efficacy for sexual function and self-efficacy for controlling other symptoms.[33] On the 10 (very uncertain) to 100 (very certain) scale, women indicate their perceived ability to achieve specific outcomes in pain management or to carry out sexual activity (no MCID and clinical cut-off score have been reported in the literature).

*Depressive symptoms*. The 21-item Beck Depression Inventory-II (BDI-II) evaluates depressive symptoms (total score ranging from 0 to 63).[48] Higher score values correspond to greater symptoms (MCID = -17.5%).[49]

### Statistical Analyses

Statistical analysis was performed using IBM SPSS Statistics, version 25.0 (IBM Corp., Armonk, N.Y., USA). The normality of the data distribution was checked using visual inspection and the Shapiro-Wilk test.[50] Continuous variables were expressed as mean ± standard deviation (SD) or median (first quartile Q1, third quartile Q3) and categorical variables as the number of participants (percentage % of the total group). Paired *t*-tests were conducted ($P$-value < 0.05) to assess the changes in psychosexual outcomes from pre- to post-treatment. Effect sizes (Cohen's $d$; 0.2 = small effect, 0.5 = medium effect, 0.8 = large effect)[51] were calculated to measure the magnitude of the change. To better evaluate the clinical relevance of the changes, the proportion of participants (%) who had a change that met or exceeded the MCID was computed. The proportion of women (%) who had a score value corresponding to the clinical cut-off was calculated and the proportion at pre- and post-treatment were compared with Z-tests ($P$-value < 0.05).

## RESULTS

### Participant Characteristics

Among the 31 women with dyspareunia enrolled in the study, 20 (64.5%) had been treated for endometrial cancer while 11 (35.5%) had received procedures addressing cervical cancer. Of these, only one participant did not complete the post-treatment assessment as she withdrew during the study because of illness in the family. The average age of the participants was 55.9 (SD = 10.8) years old and the average body mass index was 28.5 (SD = 5.3) kg/m$^2$. Regarding their medical history, 16 (58%) women had given birth and 4 (13%) were using menopausal hormone therapy that remained unchanged throughout the study. The stage of cancer varied among the women with 19 (61%) in stage I, 6 (19%) in stage II, 5 (16%) in stage III and 1 (3%) in stage IV. As for oncological treatments, 24 women had surgery: 1 (4%) had a hysterectomy without salpingo-oophorectomy, 18 (75%) had a hysterectomy with bilateral salpingo-oophorectomy and 5 (21%) had a radical hysterectomy with bilateral salpingo-oophorectomy. Of the 31 women, 19 (61%) had brachytherapy, 15 (48%) had external beam radiation therapy and 16 (52%) had chemotherapy. The median number of months since the last oncological treatment was 38 months (Q1 = 9, Q3 = 70). At post-treatment, all women confirmed that they have not been treated with any other intervention or by any other health care provider throughout the study. Further details on participant characteristics are described and discussed elsewhere.[21]

### Outcome Measures

The effects of multimodal physical therapy on psychosexual outcomes are presented in Table 1. Participants with dyspareunia after treatment for gynecologic malignancies improved significantly in all psychosexual outcomes from pre- to post-treatment, as measured with the questionnaires' total score values ($P \leq 0.002$). Changes with large effect sizes were found for all total scores ($d \geq 0.829$), except for depressive symptoms, which were of medium size ($d = 0.636$). Women reported a reduction in sexual distress ($P < 0.001$, $d = 1.108$) and 22/30 (73%) experienced a clinically significant change. Body image concerns decreased after the treatment ($P < 0.001$, $d = 0.829$) and 7/8 (88%) ($P = 0.014$) participants no longer had body image disturbance according to the clinical cut-off. Participants also presented less pain anxiety ($P < 0.001$, $d = 0.980$) following the

**Table 1.** Psychosexual outcome changes from pre- to post-treatment with the proportion of participants with clinically important differences and clinically meaningful outcomes (based on clinical cut-off)

| | Pre-treatment (n = 31) | Post-treatment (n = 30) | Changes from pre- to post-treatment (n = 30) | *P*-value | Effect size (*d*) |
|---|---|---|---|---|---|
| Sexual distress (FSDS-R) | | | | | |
| Total score (0-52), mean ± SD | 26.7 ± 11.2 | 14.2 ± 12.5 | -13.1 ± 11.9 | < 0.001 | 1.108 |
| Proportion of participants with clinically important differences, ≥ \|MCID\| (-7), n (%) | | | 22 (73) | | |
| Body image concerns (BIS) | | | | | |
| Total score (0-30), mean ± SD | 6.4 ± 5.7 | 3.0 ± 3.5 | -3.6 ± 4.3 | < 0.001 | 0.829 |
| Proportion of participants with clinically meaningful outcomes based on clinical cut-off (> 10), n (%) | 8 (26) | 1 (3) | -7 (88)[#] | 0.014 | |
| Pain anxiety (PASS) | | | | | |
| Total score (0-100), mean ± SD | 37.6 ± 12.6 | 20.9 ± 13.4 | -16.7 ± 17.1 | < 0.001 | 0.980 |
| Proportion of participants with clinically meaningful outcomes based on clinical cut-off (≥ 24.6), n (%) | 27 (87) | 11 (37) | -16 (59)[#] | < 0.001 | |
| Cognitive anxiety score (0-25), mean ± SD | 11.4 ± 4.3 | 5.1 ± 4.3 | -6.4 ± 5.9 | < 0.001 | 1.080 |
| Escape/avoidance score (0-25), mean ± SD | 8.1 ± 4.1 | 6.0 ± 3.1 | -2.1 ± 4.9 | 0.027 | 0.424 |
| Fearful appraisal score (0-25), mean ± SD | 8.2 ± 3.9 | 4.5 ± 3.8 | -3.8 ± 4.5 | < 0.001 | 0.843 |
| Physiological anxiety score (0-25), mean ± SD | 9.8 ± 4.1 | 5.3 ± 3.9 | -4.5 ± 5.0 | < 0.001 | 0.897 |
| Pain catastrophizing (PCS) | | | | | |
| Total score (0-52), mean ± SD | 20.9 ± 12.6 | 7.9 ± 10.8 | -13.4 ± 13.8 | < 0.001 | 0.968 |
| Proportion of participants with clinically important differences, ≥ \|MCID\| (-38%), n (%) | | | 23 (77) | | |
| Rumination score (0-16), mean ± SD | 7.4 ± 4.7 | 2.8 ± 3.9 | -4.7 ± 5.4 | < 0.001 | 0.860 |
| Magnification score (0-12), mean ± SD | 2.7 ± 2.7 | 1.1 ± 1.5 | -1.6 ± 2.7 | 0.002 | 0.606 |
| Helplessness score (0-24), mean ± SD | 10.8 ± 6.9 | 4.0 ± 6.0 | -7.1 ± 8.0 | < 0.001 | 0.881 |
| Painful intercourse self-efficacy (PISES) | | | | | |
| Pain score (10-100), mean ± SD | 61.6 ± 18.3 | 82.6 ± 18.4 | 21.4 ± 22.9 | < 0.001 | 0.938 |
| Sexual function score (10-100), mean ± SD | 67.7 ± 20.0 | 91.8 ± 13.4 | 24.8 ± 18.1 | < 0.001 | 1.370 |
| Other symptoms score (10-100), mean ± SD | 61.4 ± 18.7 | 85.4 ± 16.0 | 24.9 ± 19.9 | < 0.001 | 1.253 |
| Depressive symptoms (BDI-II) | | | | | |
| Total score (0-63), mean ± SD | 10.9 ± 9.5 | 6.5 ± 7.2 | -4.6 ± 7.2 | 0.002 | 0.636 |
| Proportion of participants with clinically important differences, ≥ \|MCID\| (-17.5%), n (%) | | | 21 (70) | | |

[#]Changes in proportion were calculated following the formula: $(n_{post\text{-}treatment} - n_{pre\text{-}treatment}) / n_{pre\text{-}treatment} \times 100$, in which n represents the number of participants with a dysfunction according to the clinical cut-off.

intervention, which was reflected on all 4 subscales of the PASS and 16/27 (59%) ($P < 0.001$) no longer had pain anxiety based on the clinical cut-off. Reductions in pain catastrophizing ($P < 0.001$, $d = 0.968$) and its 3 components were found, with 23/30 (77%) women presenting a clinically significant difference. Overall painful intercourse self-efficacy increased ($P < 0.001$, $d \geq 0.938$) whereas depressive symptoms reduced ($P = 0.002$, $d = 0.636$) with 21/30 (70%) participants who

showed a change that met or exceeded the MCID after the multimodal physical therapy intervention.

## DISCUSSION

This is the first prospective study to assess the effects of multimodal physical therapy on psychosexual outcomes in patients with dyspareunia after treatment for gynecologic malignancies. Our results showed that this intervention greatly improves sexual distress, body image concerns, pain anxiety, pain catastrophizing, pain self-efficacy and depressive symptoms in our cohort of women suffering from the repercussions of both cancer and pain. The medium to large effect sizes obtained with the high proportion of women presenting meaningful changes according to the known MCID or clinical cut-off underlines the clinical significance of these effects.

Data showed a noticeable decrease in gynecologic cancer survivors' sexual distress after multimodal physical therapy as measured with the FSDS-R. The treatment effect demonstrated a large effect size and was clinically meaningful as most participants reported a difference in total score meeting or surpassing the MCID. The reduction of sexual distress (average reduction of 49% from baseline) was superior to that reported in studies using a psychoeducational session (average reduction of 6% based on the Global Severity Index of the 18-item Brief Symptom Inventory with small effect size)[52] or mindfulness-based cognitive-behavioral intervention (average reduction of 37% on the FSDS)[53] in women after treatment for gynecologic malignancies presenting other sexual issues such as lack of desire or arousal. This may result from the higher number of sessions offered over a longer period in the current study. It is also possible that this increased contact with the therapist with closer supervision enabled more sustained support with additional guidance to help women better understand their condition and manage their symptoms. Moreover, the significant reduction in pain symptoms and improved sexual function[21] following the physical therapy treatment could have contributed to lower sexual distress. The positive change in sexual distress could also be interrelated to the improvement in other outcomes such as body image concerns, pain anxiety, catastrophizing and depressive symptoms.[54]

A substantial reduction in body image concerns, with large effect sizes, was found in women with dyspareunia who had been treated for a gynecologic malignancy, and most of those presenting body image disturbance at pre-treatment based on the BIS' total score no longer had any significant concerns after multimodal physical therapy. Comparing our results to the literature is difficult as interventional studies of body image were mainly conducted among breast cancer survivors.[55] Psychoeducational intervention appears to be the gold standard and an effective treatment approach to address body image difficulties in survivors.[55,56] Similarly, the multimodal physical therapy intervention, which included an educational component resembling psychoeducation interventions, could have reduced body image concerns. It is also likely that resuming pain-free sexual intercourse with physical therapy enhanced the women's positive self-view and, hence, reduced their body image difficulties.[57] In addition to the change in body image, pain anxiety and catastrophizing significantly decreased while pain self-efficacy increased in our sample. These effects were considerable and clinically meaningful as most of the women no longer had any pain anxiety according to the PASS' total score and the majority presented a change in catastrophizing that reached or was greater than the PCS' known MCID. Participants also reported a medium-effect reduction in depressive symptoms, and more than half of them showed a clinically significant difference after treatment. To our knowledge, no study has ever evaluated these outcomes in cancer survivors suffering from dyspareunia. Similar findings were observed in younger women affected by vulvovaginal pain during intercourse with no history of cancer who underwent an 8-session multimodal physical therapy program.[28] Correlational studies in this younger population demonstrated that higher pain symptoms are associated with higher levels of fear of pain and catastrophizing as well as lower levels of self-efficacy.[33,34] Some evidence also suggests that depression is a consequence of pain.[7] Reducing pain symptoms in women may have improved these outcomes. Furthermore, the multimodal characteristic of the physical therapy intervention is probably key to these effects. For example, the information given to women to improve their experience with sexual intercourse (ie, with the least pain possible) along with the close and prolonged contact with the therapist to oversee the exercises may have lowered their pain anxiety and catastrophizing.[34] Consequently, their self-efficacy rose[7] as they progressed during the intervention under the care of an experienced healthcare professional using multiple modalities that seemed effective in reducing their symptoms for maybe the first time since the oncological treatments.[58]

The current study presents several strengths. The eligibility criteria included a standardized gynecologic examination to control potential bias. Validated questionnaires were used to assess the effects of multimodal physical therapy on psychosexual outcomes. The intervention was also designed to reflect clinical practice.[32] Experts from various disciplines including gynecologic oncology, sexual therapy and physical therapy collaborated to design the treatment protocol in order to address the complexities and multifaceted aspect of dyspareunia in cancer survivors.[59] Regarding study limitations, this study did not include a control group, which prevents drawing definitive conclusions on causal inference. Although participants received different oncological treatments for either endometrial or cervical cancer for various cancer stages, which may increase the generalizability of the results, the study design did not allow a distinction to be made in the magnitude of the psychosexual effects according to these clinical characteristics. A randomized controlled trial that represents the highest level of evidence (ie, level I) is therefore indicated to confirm our results. Because of the combination of multiple modalities, it is not possible to discriminate the relative effect of each modality on

the outcomes. Nonetheless, several studies have emphasized the need to use a multimodal treatment approach addressing both the physical and psychosexual mechanisms of dyspareunia to optimize clinical outcomes in women.[7,22]

## CONCLUSION

Our findings showed that, on both statistical and clinical levels, multimodal physical therapy significantly improved sexual distress, body image concerns, pain anxiety, pain catastrophizing, pain self-efficacy and depressive symptoms in women with dyspareunia after treatment for gynecologic malignancies. These results advance our understanding of the effects of physical therapy and provide new level II evidence about this promising treatment to improve women's overall condition after gynecologic cancer. Multimodal physical therapy could be implemented as part of the multidisciplinary cancer care continuum.

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