



Rehabilitation of pelvic floor dysfunction after radiation therapy for a rare gynecological cancer: A case report

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ABSTRACT

Objective: Radiation therapy (RT) for gynecological cancers has significant effects on patients' quality of life regarding sexual dysfunction, urinary incontinence (UI), fecal incontinence (FI), and psychological distress. There is a scarcity in literature for the inclusive therapeutic approaches of pelvic health physical therapy (PHPT) for cancer survivors. Therefore, this case describes a comprehensive PHPT program to address the complexity of pelvic floor dysfunctions due to RT.

Case description: A 54-year-old female was diagnosed with high-grade neuroendocrine carcinoma of the vagina. After a one-year treatment of chemotherapy and RT, the patient presented with overall fatigue, psychological distress, dyspareunia, mixed UI, fecal urgency and FI, and bilateral vulvar lymphedema. The PHPT exam revealed vaginal dryness, vulvovaginal fibrosis, and pelvic floor muscle (PFM) weakness.

A comprehensive treatment approach included referrals to multidisciplinary specialists. PHPT incorporated motor learning, strengthening and stretching of PFM, internal and external fascia mobilization for PFM and vulvar tissues, lymphatic drainage, vaginal dilators, pain neuroscience education and nutrition recommendations. After seven sessions, the patient demonstrated improved PFM strength, improved psychosocial measures, no UI or FI, as well as reduced discomfort during intercourse.

Conclusions: Symptoms were clinically improved with a multidisciplinary approach and comprehensive PHPT. However, considering the consistency and time required for physiological and psychological recovery for gynecological cancer survivors, it was recommended to continue the plan of care and home program developed to address the patient's goals.

Impact statement: Treatment utilized a holistic and interdisciplinary approach to address the multifactorial nature of vaginal cancer and side effects of RT. PHPT, which promptly maximized improvement, included manual therapy, exercises, education, and motivational interviewing strategies that prioritized the patient's goals and built a nurturing clinician-patient relationship. Health care providers are strongly encouraged to refer to PHPT as interventions may significantly improve the patient's quality of life.

This case report follows the CARE Guidelines (Riley et al., 2017).

1. Introduction

Radiation therapy (RT) for pelvic cancer treatment can cause significant adverse effects on patients' quality of life, e.g., multifactorial sexual dysfunction, fertility concerns, and gastrointestinal toxicity (Riley et al., 2017). Pelvic RT may cause up to 22 symptoms, reported in >45 % of patients, including fecal incontinence (FI) and urinary incontinence (UI) (Fuccio et al., 2015; Dilalla et al., 2020). Vaginal stenosis, experienced by >80 % of patients, and dryness are early

manifestations of pelvic RT. Later changes can evolve including scarring, fibrosis, and dyspareunia (pain during intercourse) (Damast et al., 2019; Berkey, 2010). The combined adverse effects of the RT and fatigue have a multi-dimensional clinical impact, such as limited internal pelvic examination, psychological distress or traumatic memories (Stinesen Kollberg et al., 2015).

Pelvic health physical therapy (PHPT) could be the first-line of treatment for conservative management of pelvic floor dysfunctions (PFD; e.g., pelvic organ prolapse, UI, FI, and chronic pelvic pain,

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| Timeline | Cancer treatment, PHPT Assessments and Referrals |
|---------------------------------------|--|
| End of 2020 | Diagnosed with High Grade Neuroendocrine Carcinoma |
| 7 consecutive days (Feb 2021) | Radiation Therapy Treatment and Dosages Patient was treated with concurrent chemoradiation with 6 cycles of concurrent cisplatin and etoposide as well as 54 Gray of external beam radiation therapy with 4 fractions of vaginal brachytherapy with iridium 192. Nodal disease was sequentially boosted to a total dose of 63.4 Gray with a final 3.6 Gray fraction boost to residual left inguinal disease. |
| 1 st PHPT visit (Nov 2022) | Pelvic Floor Consent for Evaluation and Treatment: chart review, history, outcome measures. |
| 2 nd PHPT visit (+1 week) | All remaining initial evaluation sections were completed. Referrals: Oncology-focused Psychologist |
| 3 rd PHPT visit (+2 weeks) | CT scan: New bilateral sacral insufficiency fractures and additional fracture deformity of the right L5 transverse process; No abdominopelvic lymphadenopathy; No evidence of cancer recurrence. |
| 4 th PHPT visit (+1 week) | |
| 5 th PHPT visit (+1 week) | Referral: Radiation Oncology Physician |
| 6 th PHPT visit (+2 weeks) | |
| 7 th PHPT visit (+2 weeks) | Re-evaluation Referrals: Gynecology Physician and Mental Health Sex Therapist |

Fig. 1. Timelines of cancer treatment and pelvic health physical therapy (PHPT) assessments.

involving peripartum and postpartum periods) from various diseases, trauma or RT side-effects (Bo et al., 2017). Physical therapists with specialty in PHPT can significantly improve these dysfunctions by applying a variety of intervention approaches tailored to the individual patient, including manual therapy to pelvic floor muscle(s) (PFM), electrical stimulation, biofeedback, behavioral techniques, and home exercise programs (Wallace et al., 2019). Even with the growing body of evidence highlighting the benefits of PHPT for gynecological cancer dysfunctions, there is a scarcity of evidence about rehabilitation approaches and best practices to address RT related symptoms. Therefore, this case presents a comprehensive physical therapy management program for a female patient with highly complex pelvic floor dysfunction (PFD) after receiving RT for an infrequent vaginal cancer. This case report follows the CARE Guidelines (Riley et al., 2017).

2. Narrative

2.1. Patient information

Patient provided written informed consent to publish her case. The patient was a 54-year-old, Caucasian, married female with history of two vaginal deliveries and hysterectomy. She was diagnosed with high-grade neuroendocrine carcinoma of the vagina with metastases to pelvic lymph nodes. Treatment included chemotherapy consisting of 6 cycles of concurrent cisplatin and etoposide and external beam radiation therapy (54 Gray; then nodal and inguinal boosts) with 4 fractions of vaginal brachytherapy (Fig. 1); she did not have surgical removal of the tumor. After completing the cancer treatment, she experienced pelvic pain, dyspareunia, mixed UI, fecal urgency and FI, bilateral vulvar lymphedema, psychological distress, and fatigue. She was referred to a PHPT clinic for a rehabilitation program to address her PFD.

Table 1
Outcome measures pre- and post-pelvic physical therapy interventions.

| Assessment | Initial Evaluation | Post-interventions | Reference Values |
|--|---|--|---|
| Patient Specific Functional Scale (PSFS) | 100 % impairment | 32 % impairment | Sum of the activity scores/number of activities, with a scale of 0–10 for each activity. Moderate to excellent reliability, validity, and sensitivity (Stratford et al., 1995) |
| Internal examination of pelvic floor muscles: strength and coordination: Modified Oxford Scale (specific to PFM) | 2/5 PFM strength via rectal and vaginal assessments Endurance 1 sec Vaginally: difficulty releasing contraction; unable to elongate. | 4/5; had full coordination (contract, release, elongate) | Six-point scale: 0 = no contraction, 1 = flicker, 2 = weak, 3 = moderate, 4 = good (with lift) and 5 = strong High inter-rater reliability for vaginal palpation (Ferreira et al., 2011) |
| Lower Limb and Genital Lymphedema Questionnaire for Women | 8 % limited; Impacts her sexual function, feels different, discomfort in genitals, swelling in genitals. | 2 % | Self-reported questionnaire with no reference value (Noble-Jones et al., 2014) |
| Female Sexual Function Index (FSFI) | 9.6 | 18.6 | Below 26.55 indicates female sexual dysfunction. High test–retest reliability, internal consistency, and psychometric and clinical validity (Rosen et al., 2000). |
| Pelvic Floor Impact Questionnaire-7 (PFIQ-7) | 129/300 | 24/300 | Range 0–100 for each scale, with total range of 0–300 for all scales. Higher scores means more impact. |
| Subscales: | | | A clinically meaningful change: 36 points (12 %) or more in the summary score. |
| UIQ-7 | 48/100 | 0/100 | |
| CRAIQ-7 | 52/100 | 24/100 | |
| POPIQ-7 | 29/100 | 0/100 | |
| Pelvic Floor Distress Inventory-20 (PFDI-20) | 39 % | | |
| Subscales: | | | |
| POPDI-6 | 0 % | 0 % | The test–retest reliability of each scale was good to excellent (intraclass correlation coefficient 0.70–0.93, $P < 0.001$ for all scales) – moderate to excellent responsiveness 3–6 months after surgery (Barber et al., 2005). |
| CRAD-8 | 66 % | 34 % | |
| UDI-6 | 50 % | 21 % | |

Italicized scores demonstrate clinically important improvement.

UIQ: Urinary Impact Questionnaire; CRAIQ: Colorectal-Anal Impact Questionnaire; POPIQ: Pelvic Organ Prolapse Impact Questionnaire; UDI: Urinary Distress Inventory; CRAD: Colorectal-Anal Distress Inventory; POPDI: Pelvic Organ Prolapse Distress Inventory.

2.2. Clinical findings and diagnostic measures

Initial examination included review of clinical record, patient interview, physical examination, and applicable standard questionnaires. PFD was examined by Pelvic Floor Impact Questionnaire-7 (PFIQ-7), Pelvic Floor Distress Inventory-20 (PFDI-20) (Barber et al., 2005), and Female Sexual Function Index (FSFI) (Rosen et al., 2000). These reliable and valid measures are commonly used in PHPT settings to determine impact of the condition on various domains of daily function and quality of life. PFIQ-7 assesses the impact of symptoms on quality of life and their ability to participate in daily activities. PFDI-20 measures bowel, bladder, and prolapse symptoms. FSFI measures sexual function in women across six domains: desire, arousal, lubrication, orgasm, satisfaction, and pain. For lymphedema, the Lower Limb and Genital Lymphedema Questionnaire for Women assesses impact and subjective severity of lymphedema (Noble-Jones et al., 2014). The Patient Specific Functional Scale (PSFS) evaluates self-reported activities of daily living (ADLs) that are important to the patient (Stratford et al., 1995). Additional assessments included internal examination of PFM coordination, resting tone, vaginal tissue health and use of Modified Oxford Scale for PFM strength testing (Ferreira et al., 2011). All pre- and post-treatment outcomes are listed in Table 1.

- PHPT examination revealed complex impairments related to radiation including lymphedema, scarring, and fibrosis of internal and external tissues of the pelvis. Intermittent spotting of blood was noticed during internal vaginal assessments and during subsequent treatments due to friable vaginal tissues. She presented with weakness and impaired coordination of PFM.
- Her sexual ability was significantly impacted due to vaginal dryness and genital lymphedema, resulting in deep and superficial dyspareunia.
- Bladder and bowel functional assessment revealed mixed UI, nocturia, incomplete emptying of bowels, bloating sensation, variable stool consistency, fecal urgency, and FI.
- Fatigue and weakness from cancer treatment reduced her ability to complete ADLs and limited social outings due to fear of UI and FI.

Finally, a review of CT scan revealed bilateral sacral insufficiency fractures and fracture deformity of the right L5 transverse process; the patient did not have acute symptoms related to L5 fracture.

2.3. Therapeutic interventions

Seven treatment sessions, each one-hour in duration, were implemented. Initially one session per week was provided for five consecutive weeks (Fig. 2). The last two sessions were provided two weeks apart to accommodate the patient's schedule and to minimize frequent driving time for each session.

Table 2 represents educational topics and communication strategies throughout the PHPT sessions. After education of PFM anatomy and function followed by confirmation during the internal assessment, neuromotor learning was demonstrated when she was able to coordinate her PFM movements by contracting, releasing, and elongating. Real-time biofeedback via rehabilitative ultrasound imaging was utilized for transverse abdominis (TA) and PFM activation and coordination.

Education regarding typical bladder frequency and volumes when voiding along with urinary urge suppression techniques reduced her urinary urgency. Common bowel and bladder irritants were identified in her diet, and she removed most of those items from her diet. She increased intake of foods that facilitated formed stool rather than looser stools to reduce occurrence of fecal urgency and incontinence. By adjusting seated position on the toilet and adding a sound such as 'Ooooo' or 'Shhhh' to encourage accurate movement and coordination of PFM and abdominal muscles, she increased bowel and bladder emptying.







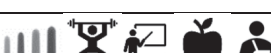




| Timeline | Pelvic Health Physical Therapy Interventions |
|---|---|
| 1 st PHPT visit (Nov 2022) |  |
| 2 nd PHPT visit (+1 week) |  |
| 3 rd PHPT visit (+2 weeks) |  |
| 4 th PHPT visit(+1 week) |  |
| 5 th PHPT visit(+1 week) |  |
| 6 th PHPT visit(+2 weeks) |  |
| 7 th PHPT visit(+2 weeks) |  |
| Legend: | |
|  | Vaginal dilators with recommendation to use estrogen cream vaginally. Applied daily for 10-20 minutes for 2 weeks, then reduced to 3-4 times per week.[9] |
|  | Patient Education, handouts and home program, and modification according to patient's feedback |
|  | Motor learning, strengthening, and stretching exercises for Pelvic Floor Muscles (PFM). |
|  | (a) Fascia mobilization: Internal and external manual therapy: one digit internally able to move PFM/tissue caudally alternating with hand externally providing cranial movement; |

Fig. 2. Timelines and types of pelvic health physical therapy interventions.

Visualization and mental priming techniques allowed practice with and building confidence in maintaining continence of bowel and bladder and helped reduce anxiety and apprehension about the use of dilation (Stoykov and Madhavan, 2015). Urge suppression with visualization was utilized by the therapist with emphasis on visualizing a successful urge suppression for bowel or bladder without incontinence, using positive statements such as “I have strong muscles, I can stay dry”.

For dyspareunia, pain neuroscience education and vaginal dilators were introduced (Bakker et al., 2014). Recommendations vary per provider for dilator use; the therapist recommended that the patient dilate up to 7 times per week, though recognized the patient's mental and physical barriers to such frequency of dilation. After discussion, the therapist recommended that the patient aims for 3 times per week of dilation at times when she had the physical space and privacy to dilate.

The patient was educated on the impact of her cancer treatment and PFD regarding sexual intimacy and intercourse, and how to discuss these topics with her husband.

Utilization of pain neuroscience education allowed her to view the sensations from her pelvis as non-threatening, which reduced angst and guarding during manual therapy, dilation, and intercourse. The therapist emphasized use of words with minimal to no emotion such as 'sensation' or 'awareness' rather than 'pain' or 'stabbing' or 'tearing' that lead to a guarded, threat response.

While a common approach for manual therapy is Thiel's massage (Thiele, 1963), the therapist determined that the repetitive sweeping across the radiated vaginal tissues would be contraindicated and could be detrimental. Thus, the therapist developed a unique, specialized manual therapy treatment with one digit internally providing caudal

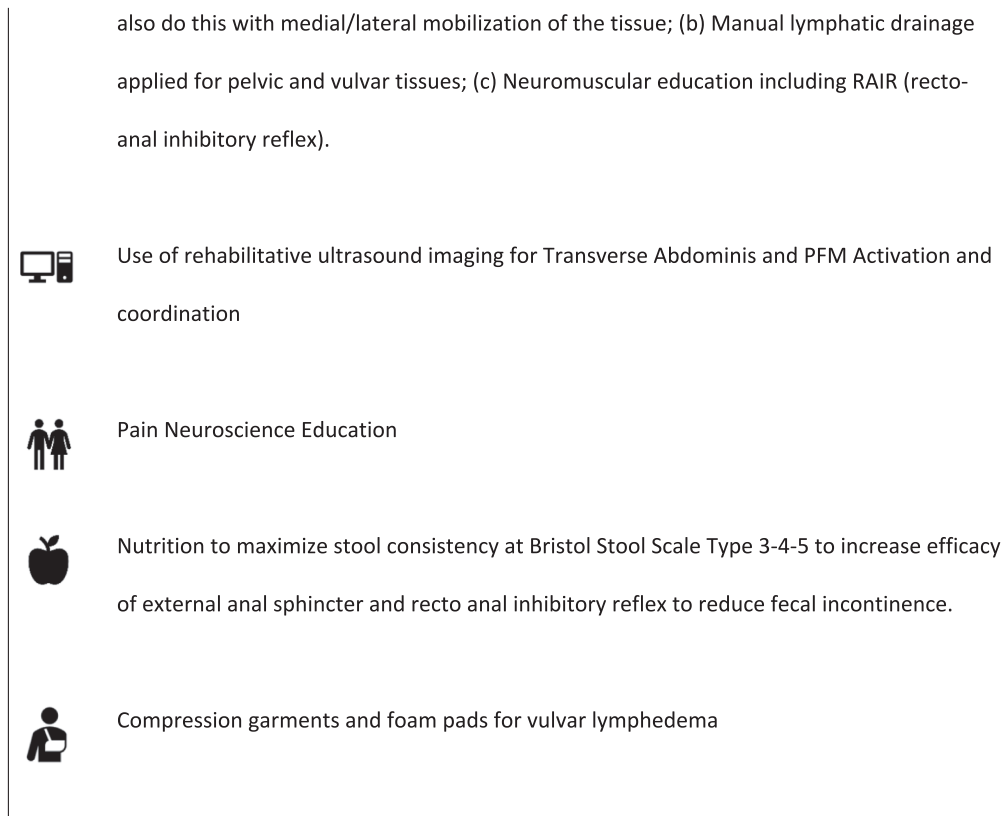


Fig. 2. (continued).

pressure on PFM, alternating cranial pressure with one hand externally. This increased tissue mobility in multiple directions rather than the traditional Thiele's massage providing only caudal pressure. Manual lymphatic drainage (MLD) reduced her vulvar discomfort and pressure from lymphedema. She showed proficiency to complete self-MLD as part of her home program, along with diaphragmatic breathing. To consolidate her home program, she completed this during her use of vaginal dilators.

In order to optimize sleep to promote proper functioning and reduce fatigue, a handout with information regarding ways to promote sleep health was given and reviewed, with a priority on mindfulness and breathing strategies prior to bed. Visualization of going on a walk and having full control of her bowel and bladder increased her confidence in ability to complete longer walks. By increasing confidence and then completing the walks, she increased her overall endurance and had reduced fatigue.

The patient expressed significant anxiety regarding use of vaginal dilators and sexual intercourse; she agreed that meeting with a psychologist or counselor with specialized training in sexual health could be beneficial. She also expressed continued psychological distress regarding her cancer diagnosis and was referred to a psychologist specializing in patients with cancer.

The therapist communicated with the Radiation Oncologist regarding the patient's bleeding after internal assessment and use of vaginal dilators; the physician chose to do an assessment and determined no suspicion of cancer recurrence. Therapy proceeded with awareness of the friable, radiated tissue and adjusted manual therapy technique.

Due to significant vulvar tissue changes and dryness from radiation, she met with a Gynecology Physician with specialized training in vulvar tissue treatments. This physician prescribed vaginal estrogen cream, discussed that a vaginal laser treatment would not be indicated for use on radiated tissues, changed estradiol administration and encouraged

use of vaginal moisturizers and lubrication.

The patient was introduced to a hospital-sponsored online program for people and caregivers of people with cancer. This program emphasized the social, emotional, and psychological challenges that come along with a serious or chronic illness.

2.4. Follow-up and outcomes

Moderate improvement was expected due to the chronicity and complexity of the symptoms that affected multiple systems. During each session, the patient presented with a positive mental attitude, showed readiness for change, and reported no adverse events related to PHPT.

By the completion of the seventh session, the patient improved in all symptoms with clinically important differences in several pelvic floor function related questionnaires and sleep quality (Table 1). The patient reported significant improvement in UI and FI in the second visit, which continued and consequently reduced her fear and anxiety. She reported more confidence in returning to work, physical, and social activities. Additionally, sleep quality improved due to fewer urinary interruptions, resulting in improved level of energy and completion of ADLs.

The PHPT program was effective in reducing discomfort with intercourse. However, the patient did not achieve her goal of returning to pain-free intercourse by the time of discharge. Also, she reported feeling mentally blocked and anxious about progressing to a larger dilator size, to match the girth of her husband, which could have decreased pain during intercourse.

Recognizing that PFM hypertrophy takes consistency and time, continued PHPT intervention was recommended to maximize overall strength and endurance.

The patient was educated that she needed consistent internal vaginal tissue mobilization, via intercourse or dilation. She was also educated to monitor her lymphedema. If she experienced increased lymphedema, she would benefit from a course of Complete Decongestive Therapy

Table 2
Educational program and communication strategies.

| Educational Program | Interviewing and Communication Strategies |
|---|---|
| <p>Content:</p> <ul style="list-style-type: none"> Lifestyle changes included modifications to activities of daily living. List of common bladder irritants. Visualization urge suppression—visualization practice for urinary and fecal urge sensation. Comprehensive bowel information including toileting positioning and sounds, colon massage, foods to eat or avoid to reduce loose stools and thus fecal incontinence. Fecal incontinence (FI)—scheduling times on the toilet, skin care. Formal recommendations of dilator use and the patient understanding how to be in charge of adapting to her specific needs. Sexual positions with information for how to choose which position. Sensate focus—how to have intimacy without intercourse. Pain Neuroscience Education—changing words around pain signals, understanding pain signals. | <ul style="list-style-type: none"> Explaining physical therapist's clinical experiences and expertise in pelvic health. Informing the patient about her medical condition and encouraging her to talk about symptoms and how that impacted her physically, mentally, and emotionally. Using appropriate language that meets the patient's educational level on the related topics. Patient was asked goal-oriented questions for input into the trajectory of her treatment. Exercises demonstrated in clinic in variety of options and modifications. Pertinent information is verbally repeated. Navigating barriers that could be expected when trying to implement an aspect of the home program and help overcome those barriers. Complete neural regulation techniques as necessary during each appointment. Frequent and close contact with referring Radiation Oncologist. Connecting personally such as going on walks and encourage email communication in between appointments that further monitors patient's safety. |
| <p>Delivery Methods:</p> <ul style="list-style-type: none"> 3D pelvic model Hardcopy of pictures/handouts Online videos that demonstrate the structure and dynamics of PFM. Handouts given at initial evaluation then reviewed at subsequent visits and pertinent information emphasized. Verbal communication | |

including manual lymphatic drainage and garment ordering (Liao et al., 2003). After completing the PHPT sessions, the patient provided her perspective that is presented in Fig. 3.

3. Discussion

This case illustrates a rehabilitative approach by a specialized PHPT maximizing function and quality of life after RT for gynecological cancer. The patient presented with complex PFM dysfunction, psychological stress and overall fatigue. After seven PHPT sessions over nine weeks, she demonstrated clinical improvement in all of her symptoms and progression in vaginal dilator size. Furthermore, findings were consistent with the significant improvement of psychosexual measures found in recent studies, affirming the efficacy of multimodal physical therapy (Cyr et al., 2021; Cyr et al., 2020; Raj et al., 2020).

A holistic approach was applied to rehabilitation, focusing on motivational interviewing and patient-centered functional goals to account for the multifactorial nature of vaginal cancer and side effects of RT. PHPT has a known low attendance rate with only 15 % of patients completing rehabilitation regardless of referral provider specialty (Fullerton et al., 2022). Thus, engaging the patient's self-reported perception of progress and modifying the rehabilitation plan as needed was beneficial to the patient's attendance and improvement. For

example, the patient's highest priority due to negative impact on quality of life was FI and UI, and her secondary goal was decreasing dyspareunia. The use of motivational interviewing and educational handouts improved her understanding of how dilation would play a significant role in her progress, overcoming her initial wariness.

Another distinctive tool is utilizing real-time biofeedback via rehabilitative ultrasound imaging for TA and PFM activation and coordination. Additionally, the combined fascia mobilization concepts (Fig. 2) were less bothersome than the traditional Thiele's massage technique that involves longitudinal slides along each transvaginal muscle with a tolerable pressure (Fernández-Pérez et al., 2023). Thiele's may not be appropriate for radiated and friable tissue, while the combined technique used in the case was well tolerated.

The patient would have benefited from additional sessions. Out of 15 recommended visits, only seven were approved by health insurance coverage. Additionally, due to minimal privacy at home, she could not reach the recommended usage of the vaginal dilator. The emphasis in the clinic was on manual therapy as it directly impacted the improvement of soft tissue flexibility, and manual lymphatic drainage for the lymphedema and fibrosis. The patient was provided with a home educational program to address global muscle strength and overall functional activities. In the future, implementing an objective questionnaire to measure changes in cognitive and psychological status would improve the evaluation of the patient's progress. Considering the consistency and time requirement for physiological and psychological recovery for gynecological cancer survivors, a continued plan of care based on the patient's self-oriented goals was recommended.

The patient's complex dysfunctions following RT were challenging but resulted in clinical improvement with a multidisciplinary approach and comprehensive PHPT. The treatment strategies and multimodal approach of PHPT outlined in the case can be used by any trained physical therapy provider to address dysfunctions following pelvic RT.

4. Conclusion

While each person experiences their cancer diagnosis and treatment differently, including a PHPT prior to starting cancer treatment can provide baseline information for the patient and education regarding typical pelvic health function. The therapist can follow the patient throughout their treatment and provide immediate intervention and guidance as changes and challenges arise. For patients who have completed their treatment, this case is evidence toward the benefit of PHPT at any stage in their journey. Thus, a referral to PHPT and multidisciplinary team approach is encouraged to optimize function and quality of life of individuals diagnosed with cancer and undertaking cancer treatments.

Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Author contributions

All authors contributed to the study conception, design and writing the manuscript. Material preparation, data collection and analysis were performed by Eileen Coughenour. The first draft of the manuscript was written by Fatimah Alkhomeys and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Ethics approval

This is a case report with de-identifiable data. The University of Kansas Medical Center Research Ethics Committee has confirmed that no ethical approval is required.

Patient Perspectives on Pelvic Health Rehabilitation

During and after treatments in 2021, I experienced intense pain along with uncontrollable urination and diarrhea. Intercourse was very painful. Although the pain of going to the bathroom had subsided considerably, I was still experiencing lack of control. Intercourse remained highly sensitive.

In 2022 pelvic floor therapy was recommended. Upon starting therapy, I was given guidance for pelvic exercises and also monitoring my "bathroom activity". While recording my trips to the bathroom, it was suggested to use some of the new exercises provided. I learned I could start holding the frequency, to watch for triggers that promoted diarrhea and gradually feeling more confident that I could hold/control the numerous occurrences. I can't express enough the amount of anxiety I felt whenever going somewhere and immediately trying to find out where the nearest bathrooms were located, in hopes of preventing an embarrassing mishap.

In the few months of therapy, I almost felt "normal" regarding bathroom frequency. I have exercises to practice and feel so much better and calmer that I have the capability of controlling my trips to the bathroom.

I was also given information about purchasing swell pads and other compression apparel. These are things I didn't even know existed and have assisted with the prevention of swelling and hardness of my genitals. After walking, exercising, sex, etc., I could feel that area being tight, full and hard. These tools have helped tremendously.

Dilators-There is no other way to say this other than I absolutely hate them. I was barely using them. My radiation oncologist suggested I use them at least twice a week and intercourse would count as a replacement for them. Over time dilating dwindled down to pretty much nonexistent. They were/are painful, uncomfortable and somewhat humiliating. Having sex is a distressing experience for me and I try to avoid it when I can.

Fig. 3. Patient perspectives.

CRedit authorship contribution statement

Eileen Coughenour: Writing – review & editing, Visualization, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Fatimah Alkhameys:** Writing – original draft, Visualization, Project administration, Methodology. **Neena K. Sharma:** Writing – review & editing, Validation, Project administration.

Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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While in pelvic floor therapy, the use of dilators was recommended to use daily. Not what I wanted to hear, but I did start using them more. I was given a few suggestions that included ordering a dilator that was softer, flexible and wasn't so clinical in place of using a hard piece of plastic.

I have been using them much more. To be honest, I don't use them daily like recommended, but I do use them close to 5 times a week now. I was also told about a product to help with depth for intercourse. My main goal is to be able to have sex without being afraid and associate pain with it. I feel pelvic therapy has helped with many different aspects as there are so many things I didn't know about to aid in my ongoing recovery.

I do find for myself, that continued therapy is in my best interest. I have learned that exercises have helped improve the use of specific muscles that I have been struggling with. I have been given the tools and resources for understanding what my specific needs are and the hope of having a more normal sex life. This pelvic floor therapy has given me a sense of confidence I was lacking and also accountability for continued growth as long as I put in the work.

Fig. 3. (continued).

References

- Bakker, R.M., ter Kuile, M.M., Vermeer, W.M., et al., 2014. Sexual rehabilitation after pelvic radiotherapy and vaginal dilator use: Consensus using the Delphi method. *Int. J. Gynecol. Cancer* 24, 1499–1506 (Canadian Cancer Society. Sex, Intimacy and Cancer. Toronto, ON: Canadian Cancer Society; 2018).
- Barber, M.D., Walters, M.D., Bump, R.C., 2005. Short forms of two condition-specific quality-of-life questionnaires for women with pelvic floor disorders (PFDI-20 and PFIQ-7). *Am. J. Obstet. Gynecol.* 193 (1), 103–113. <https://doi.org/10.1016/j.ajog.2004.12.025>.
- Berkey, F.J., 2010. Managing the adverse effects of radiation therapy. *Am. Fam. Physician* 82 (4), 381–394.
- Bo, K., Frawley, H.C., Haylen, B.T., Abramov, Y., Almeida, F.G., Berghmans, B., Wells, A., 2017. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for the conservative and nonpharmacological management of female pelvic floor dysfunction. *Int. Urogynecol. J.* 28, 191–213.
- Cyr, M.P., Dumoulin, C., Bessette, P., Pina, A., Gotlieb, W.H., Lapointe-Milot, K., Mayrand, M.H., Morin, M., 2020. Feasibility, acceptability and effects of multimodal pelvic floor physical therapy for gynecological cancer survivors suffering from painful sexual intercourse: A multicenter prospective interventional study. *Gynecol. Oncol.* 159 (3), 778–784. <https://doi.org/10.1016/j.ygyno.2020.09.001>.
- Cyr, M.P., Dumoulin, C., Bessette, P., Pina, A., Gotlieb, W.H., Lapointe-Milot, K., Mayrand, M.H., Morin, M., 2021. A prospective single-arm study evaluating the effects of a multimodal physical therapy intervention on psychosexual outcomes in women with dyspareunia after gynecological cancer. *J. Sex. Med.* 18 (5), 946–954. <https://doi.org/10.1016/j.jsxm.2021.02.014>.
- Damast, S., Jeffery, D.D., Son, C.H., Hasan, Y., Carter, J., Lindau, S.T., Jhingran, A., 2019. Literature review of vaginal stenosis and dilator use in radiation oncology. *Pract. Radiat. Oncol.* 9 (6), 479–491. <https://doi.org/10.1016/j.prro.2019.07.001>.
- Dilalla, V., Chaput, G., Williams, T., Sultanem, K., 2020. Radiotherapy side effects: integrating a survivorship clinical lens to better serve patients. *Curr. Oncol. (Toronto, Ont.)* 27 (2), 107–112. <https://doi.org/10.3747/co.27.6233>.
- Fernández-Pérez, P., Leirós-Rodríguez, R., Marqués-Sánchez, M.P., Martínez-Fernández, M.C., de Carvalho, F.O., Maciel, L.Y.S., 2023. Effectiveness of physical therapy interventions in women with dyspareunia: A systematic review and meta-analysis. *BMC Womens Health* 23 (1), 387. <https://doi.org/10.1186/s12905-023-02532-8>.
- Ferreira, C.H., Barbosa, P.B., de Oliveira Souza, F., Antônio, F.I., Franco, M.M., Bø, K., 2011. Inter-rater reliability study of the modified Oxford Grading Scale and the Peritron manometer. *Physiotherapy* 97 (2), 132–138. <https://doi.org/10.1016/j.physio.2010.06.007>.
- Fuccio, L., Frazzoni, L., Guido, A., 2015. Prevention of pelvic radiation disease. *World J. Gastrointest. Pharmacol. Therapeut.* 6 (1), 1–9. <https://doi.org/10.4292/wjgpt.v6.i1.1>.
- Fullerton, M.E., Mwesigwa, P.J., Tandel, M.D., Kwan, L., Grisales, T., Tarnay, C.M., 2022. Comparison of pelvic floor physical therapy attendance based on referring provider specialty. *Female Pelvic Med. Reconstr. Surg.* 28 (1), 57–63. <https://doi.org/10.1097/SPV.0000000000001061>.
- Liao, S.F., Huang, M.S., Chou, Y.H., Wei, T.S., 2003. Successful complex decongestive physiotherapy for lymphedema and lymphocutaneous reflux of the female external genitalia after radiation therapy. *J. Formosan Med. Assoc. = Taiwan Yi Zhi* 102 (6), 404–406.
- Noble-Jones, R., Fitzpatrick, B., Sneddon, M.C., Hendry, D.S., Leung, H.Y., 2014. Development of the lymphoedema genito-urinary cancer questionnaire. *Br. J. Nurs.* 23 (18), S14–S19.
- Raj, V.S., Pugh, T.M., Yaguda, S.I., Mitchell, C.H., Mullan, S.S., Garces, N.S., 2020. The who, what, why, when, where, and how of team-based interdisciplinary cancer rehabilitation. *Semin. Oncol. Nurs.* 36 (1), 150974. <https://doi.org/10.1016/j.soncn.2019.150974>.
- Riley, D.S., Barber, M.S., Kienle, G.S., et al., 2017. CARE explanation and elaborations: Reporting guidelines for case reports. *J. Clin. Epi.* 89, 218–235. <https://doi.org/10.1016/j.jclinepi.2017.04.026>.
- Rosen, R., Brown, C., Heiman, J., Leiblum, S., Meston, C., Shabsigh, R., Ferguson, D., D'Agostino Jr, R., 2000. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *J. Sex Marital Ther.* 26 (2), 191–208. <https://doi.org/10.1080/009262300278597>.
- Stinesen Kollberg, K., Waldenström, A.C., Bergmark, K., Dunberger, G., Rossander, A., Wilderäng, U., Åvall-Lundqvist, E., Steineck, G., 2015. Reduced vaginal elasticity, reduced lubrication, and deep and superficial dyspareunia in irradiated gynecological cancer survivors. *Acta Oncol. (Stockholm, Sweden)* 54 (5), 772–779. <https://doi.org/10.3109/0284186X.2014.1001036>.
- Stoykov, M.E., Madhavan, S., 2015. Motor priming in neurorehabilitation. *J. Neurol. Phys. Therapy: JNPT* 39 (1), 33–42. <https://doi.org/10.1097/NPT.0000000000000065>.

Stratford, P.W., Gill, C., Westaway, M.D., Binkley, J.M., 1995. Assessing disability and change on individual patients: A report of a patient specific measure. *Physiother. Can.* 47, 258–263.

Thiele, G.H., 1963. Coccygodynia: Cause and treatment. *Dis. Colon Rectum* 6, 422–436. <https://doi.org/10.1007/BF02633479>.

Wallace, S.L., Miller, L.D., Mishra, K., 2019. Pelvic floor physical therapy in the treatment of pelvic floor dysfunction in women. *Curr. Opin. Obstetr. Gynecol.* 31 (6), 485–493. <https://doi.org/10.1097/GCO.0000000000000584>.