Case Rationale:

Rather than choosing a case study that is seen on a regular basis in my women's health practice and well supported with research such as urinary incontinence, I chose vaginismus specifically because it is not as prevalent. Researching this case and writing about it has helped me better understand the condition and treatment approach for future cases that I will encounter.

Further rationale for choosing this case study was based on the encompassing knowledge required of a women's health physical therapist consistent with the ABPTS Women's Health DSP including but not limited to the reproductive and urinary systems, behavioral sciences (social psychology), pelvic floor examination and treatment including vaginal dilators, patient education, and bladder retraining. It is the understanding of the aforementioned knowledge, as well as anatomy and physiology and other body systems, that is expected of a Women's Health Physical Therapist and a perfect example of the specialty.

Pelvic Floor Dysfunctions encompass a range of diagnoses, symptoms, and conditions that in some way relate to the pelvic floor, or pelvic organ anatomy and physiology (9). The American Physical Therapy Association's (APTA's) Section on Women's Health (SOWH) categorize pelvic floor dysfunctions as supportive, hypertonus/pain, incoordination, visceral, and chronic pelvic pain. These categories are based on common symptoms and functional presentations. There are multiple etiologies and overlapping symptoms in regards to the different pelvic floor dysfunctions, for example, associated symptoms of interstitial cystitis (IC), dyspareunia, and vaginismus may include voiding dysfunctions (i.e. urinary frequency, incontinence), anorectal dysfunction (i.e. difficulty with defecation, constipation) and sexual dysfunctions (pain with intercourse). These overlapping signs and symptoms may be contributed to the common sign of hypertonic pelvic floor muscles (10, 1, 15). It is the expertise of the Women's Health Specialist that will determine the differential diagnosis and treatment based on each individual presentation and condition. What sets vaginismus apart from IC or dyspareunia is the conditioned muscle spasm response to a real or imagined painful stimulation making penetration difficult or impossible (9).

A recent consensus defined vaginismus as "The persistent or recurrent difficulties of the woman to allow vaginal entry of a penis, finger, and or any object, despite the woman's expressed wish to do so"(1). Typically these women will avoid intercourse, pelvic exams, and have involuntary pelvic floor muscle contractions anticipating fear, anxiety, and pain. However, it is important to note that pain is not necessary for the diagnosis of vaginismus and the ability to experience pleasure through stimulation is not always impaired.

In this particular case, the female subject had been married 4 years and had not consummated the marriage due to the severity of her vaginismus and pain. The patient presents with hypertonic pelvic floor muscles, and urinary and bowel dysfunctions that overlap with diagnosis of IC and dyspareunia, however, the condition and response of her pelvic floor muscles (spasm and guarding) during the examination as well as patient's history allow for the differential diagnoses of

vaginismus. Even though bowel and bladder dysfunctions were addressed and treated, the emphasis on treatment was based on relaxing the pelvic floor muscles and educating the patient on trust and comfort with herself and partner in order to not elicit the reflexive muscle spasm response. The quality of pain may not differ between dyspareunia and vaginismus, however, the degree of avoidance of vaginal penetration may be the crucial differentiating factor between the two (1).
Physical therapy intervention was designed for this patient based on previous clinical experience and evidence based practice regarding pelvic floor dysfunctions. Caution was taken to gain the trust of the patient as this therapy is extremely personal and often the patient feels vulnerable on the examination table eliciting involuntary muscle guarding which inhibits internal treatment.

Examination:
Patient History:
31 year old Hispanic female was referred to physical therapy by a pelvic pain specialist with complaints of painful intercourse and urinary leakage with exercise. Her gynecologist referred her to a pelvic specialist after he was unable to insert the speculum due to vaginal spasms and pain. Patient reports she would like to get pregnant but is unable to have intercourse. Her gynecologist would like to perform a transvaginal ultrasound to check fertility but is unable to insert ultrasound wand.

Current Condition/Chief Complaint: Patient complains of inability to have intercourse, insert tampons, or gynecological exams due to pain. Patient describes pain as "an open wound that is ripping" with attempt at any vaginal penetration. Pain can last up to 10-15 minutes afterwards and is described as throbbing and vaginal spasms. Patient complains of leaking urine with exercise, urinary frequency of 10-15x daily and feeling of incomplete bladder emptying, nighttime voids x2, and constipation. Patient denies back, sacrum, hip or any other daily pain, stating she only has pain with attempted vaginal insertion, and occasional low back soreness if she sits too long at work but it goes away once she gets up.

Medications:
Medications include Levothyroxine for Hypothroidism, Netformin for insulin resistance, Estrace, and a vaginal suppository composed of Baclofen/Diazepam for pain.

Medical/Surgical History: Patient reports her bowel and bladder problems have been consistent since she was 2 years old when her appendix burst from holding in bowel movements resulting in an appendectomy in 1985. Further history included a horse back riding accident when she was 15 where she landed on the saddle forcefully causing vaginal bleeding. No history of other surgeries, prior physical therapy, or other injuries.

Social History/Employment/Work:

The patient and her husband both work full time in an office environment. Patient reports her husband is patient and supportive regarding sexual intercourse. The couple have a strong Hispanic-Catholic upbringing. Patient reports she feels pressure from her "culture" to get pregnant and has been told several times by family and friends to "just relax and it'll happen".

Systems Review:
All systems appear intact and well. Patient is being treated for hypothyroidism with "success" as she has recently lost weight. Her exercise regimen includes spin class 3x a week and interval training 4x weekly.

Cardiovascular and Pulmonary System: BP: 123/75 HR: 60 bpm
Integumentary system: no impairments or disruptions
Musculoskeletal: Height 5'8, Weight 150. See Tests and Measurements

Communication/Cognition/Learning Style:
The patient is well educated and motivated to participate in physical therapy. She has a strong Spanish accent but speaks fluent English. There was no language barrier or limitations with communication.

Tests and Measures: Informed consent was given prior to objective testing and internal exam.

Internal Palpation: insertion of digit to DIP joint of examiner. Unable to insert further due to muscle guarding (patient would posteriorly tilt her pelvis and contract her of pelvic floor muscles as a protective mechanism in anticipation to practitioner's touch/insertion). Due to patient response, no stretch or pressure was further applied.
External palpation: no pain or reproduction of symptoms with palpation to lumbar, sacrum, hips, or pelvis.
Introitus: tight and appeared closed off due to shortened position of pelvic floor muscles
Vulva: hypersensitive to touch.
Resting Position: nulliparous, taught/pulled in
Bearing Down: negative for prolapse in supine
Cough: no pre-contraction of pelvic floor muscles observed during cough
MMT: pelvic floor contractions were not fully assessed due to hypertonicity of pelvic floor muscles and inability to insert digit for accurate grading. However, patient was able to contract, relax, and bulge with no clitoral nod or anal wink present with contraction based on observation.
ROM: lumbar and hip range of motion was within normal limits with no pain reported during passive or active movements.
DRA: negative
Pelvis: posterior tilt with sitting

Pelvic/Urinary Disorder Questionaire (PFIQ-7): 19/100 in Bladder category, 0/100 in Bowel category, and 33/100 in the Vagina/Pelvis category. Total: 52/300

Reflection:

The most important findings that guide decision making by the physical therapist are based on the categories of: observation, palpation, muscle strength, muscle length, and motor control/coordination of the pelvic floor muscles (11). Upon observation and palpation, this patient could not tolerate further digit insertion internally therefore all the pelvic floor muscles were not truly assessed. As stated, insertion of digit to DIP elicited muscle guarding and spasm of the pelvic floor muscles, therefore, further internal examination was contraindicated. Orthopedic special tests were not performed as they were not indicated based on normal hip and lumbar range of motion, absence of pain with palpation externally, history, and presentation. The patient was able to voluntarily contract, relax, and lengthen the pelvic floor muscles indicating good motor control (11). Manual muscle testing is based on the modified Oxford grading scale as it is considered reproducible and reliable to be incorporated into clinical practice when performed by a trained practitioner (12). Vaginal squeeze pressure is necessary in assessing contraction and the rationale for using the scale is due to the higher intra-rater reliability versus inter-rater reliability (13). However, since manual muscle testing was unable to be assessed due to pain with insertion during initial evaluation, assessing baseline function of the pelvic floor muscles was based on observation while the patient was asked to contract, relax, and lengthen. Upon contraction there was a slight drawing in of the perineum indicating an understanding and awareness of the muscles and the ability to voluntarily activate them on command, again demonstrating good motor control. The patient was able to return the pelvic floor muscles to their initial resting position, as well as bulge or gently push (lengthening of muscles) with no pelvic prolapse noted. However, a true test for pelvic prolapse was not performed nor indicated based on presentation and history of patient (i.e. pain, nulliparous). Although there was a drawing in of the perineum, there was no visible clitoral nod or anal wink; this is likely due to the hypertonicity and spastic state of the muscles inhibiting full shortening and lengthening through their entire range of motion. MMT is revisiting during the proceeding weeks as the hypertonicity decreases and full digit insertion is performed to achieve an accurate grade. The PFIQ-7 was chosen due to patient's urinary, bowel, and vaginal complaints and is considered valid and reliable for women with pelvic floor dysfunctions (3). Rationale for the PFIQ-7 is its comprehensive assessment of the pelvic floor rather than just focusing on one aspect, such as pain or incontinence. It assesses how a variety of pelvic floor disorders affect quality of life, social and physical activity, entertainment, travel, and activities of daily living (3). The higher the score indicates the greater symptom distress as with this patient who scored 33/100 in the vagina/pelvis category. However, reflecting back, in addition to the PFIQ-7, the Female Sexual Function Index (FSFI) would've been a better resource to measure the patient's improvement regarding her sexual dysfunction more specifically as it has been shown to be clinically valid (14).

Documentation template provided by Herman and Wallace Pelvic Rehabilitation Institute for internal pelvic floor examinations and patient management.

A detailed history is taken during the interview session in order to understand the extent of the patient's condition, as well as time needed to build a rapport and trust before proceeding to the examination; also giving the specialist a basis for the intervention approach. No red flags were identified during the history taking process therefore examination followed. Due to the hypertonic state of pelvic floor muscles it was determined that Kegel (up-training) exercises would be contraindicated as the focus would be on down-training the pelvic floor muscles (2).

Evaluation/Physical Therapy Diagnosis:
Patient presents with signs and symptoms of pelvic floor dysfunction including vaginismus, urinary frequency, nocturia, constipation, and stress incontinence. The pelvic floor muscles appear to be in a state of hypertonicity as part of a reflexive muscle response likely from horse back riding accident. It was concluded that the bowel and bladder dysfunctions were also a result of the pelvic floor muscles increased tone and spasm interfering with coordination and timing and could relate back to poor habits as a child (2).
Reflection:
The hypertonic pelvic floor muscles are interfering with the timing and ability of the pelvic floor muscles to contract and relax appropriately in order to support bowel and bladder function, therefore, leading to patients incontinence and difficulty with defecation, as well as pain with attempted penetration (10).

Prognosis: It was determined physical therapy was an appropriate intervention for this patient based on supporting literature and clinical experience. It is predicted that optimal level of improvement in function will be reached in no less than the 8 weeks based on response of pelvic floor muscles. Initial plan of care included 30-45 minute physical therapy sessions twice a week for 8 weeks, however, at 8 weeks the duration was extended another 8 weeks. The patient completed all sessions totaling 30 visits. Goals included pain free intercourse, resolved stress incontinence, decreased urinary frequency and nocturia, and independence in her home exercise program. All aforementioned goals were met at or before discharge.
Reflection:
Rationale for prognosis and plan of care was based on prognostic indicators and time needed for treatment of hypertonic muscles. Prognostic indicators for a positive outcome included her education and understanding of her condition, no co-morbidities (i.e. depression), no history of sexual abuse, and having a supportive husband; however, negative indicators were also considered being that this is a chronic condition and the patient's intense muscle guarding, spasm, and pain may delay progression. It was predicted that two sessions a week would be appropriate to build trust and allow for slow but consistent manual therapy. The plan of care also allows for pelvic floor recovery time between sessions, and if needed due to any residual soreness or pain from the previous session, the second session is focused on external techniques and/or patient education. This leaves room to reduce to once weekly if needed as the tone and function of the muscles improve. Physical therapy

including manual therapy, behavioral techniques, and vaginal dilators is an appropriate intervention with high success rates for developing awareness, control, function, and mobility of the pelvic floor muscles and in overcoming vaginal penetration anxiety with women suffering from vaginismus (15, 17). Overall prognosis for attaining goals is good based on patient motivation and evidence supporting success with physical therapy in pelvic floor dysfunctions including vaginismus (16, 17).

Intervention:
The patient was educated on appropriate exercise guidelines for home and gym including discontinuing any spin class, high impact activities, attempts at intercourse, and abdominal exercises until otherwise instructed. A two-day log was assigned to record patient's bowel and bladder habits and was reviewed at the following session as the basis to her bowel and bladder retraining program. A home exercise program was designed including walking and/or elliptical daily, diaphragmatic breathing exercises to down-train pelvic floor muscles, neutral spine sitting mechanics, and back and hip mobility stretches to maintain ROM and improve blood flow to pelvic region. Education was given on constipation, proper toileting habits, and diet modifications to reduce irritation of bowel and bladder and improve the coordination with the pelvic floor muscles. Dilators were introduced to the patient during Week 3 once she was able to tolerate full insertion with a comprehensive review and demonstration of proper technique and protocol starting with the smallest size and progressing to largest size throughout treatment with guidance of the physical therapist. Dilators were assigned to her home exercise program with frequency of 2-3x a week but to not be used on the same days as physical therapy sessions allowing for recovery days.

Manual Therapy:
Week 2: Due to patient's muscle guarding only a static hold of digit inserted to PIP (by end session) was achieved with skilled cues given to patient for diaphragmatic breathing to release muscle tension during treatment.
Week 3-4: Full digit insertion with static holds and gentle stretching to layer 1 of pelvic floor muscles. Able to identify vaginal spasm coming from layer 1 bilaterally (ischiocavernosus, bulbocavernosus, and superficial transverse perineum). No pain was reported at layers 2 and 3 of pelvic floor muscles and tone was deemed normal at these deeper layers. However, patient was sensitive to transitional movements during treatment and reported feeling "rawness". During Week 4, patient was able to insert vaginal suppository without pain prior to treatment.
Week 5-6: Full digit insertion is tolerated proximal of PIP and soft tissue mobilizations are performed to release trigger points from layer 1 L > R at bulbocavernosus. Patient no longer experiences residual pain post treatments.
Weeks 7-16: Hypersensitivity with transitional movements have resolved, soft tissue mobilizations including strain-counter-strain techniques and trigger point release is performed primarily to layer 1. Tone of muscle has decreased significantly and patient is graded at 2/5 (no sustained contraction)

After Week 8, once manual therapy had been completed, patient would insert dilator 4 for static hold while muscles were relaxed to increase flexibility at introitus which continued to be the source of discomfort with penetration.
At time of discharge, the patient was able to return to spin class without pain or modification in sitting posture and continue interval training without incontinence. Patient remained compliant with retraining program to maintain coordination of pelvic floor with bowel and bladder. Patient continued with dilator therapy at home and sexual intercourse to maintain pelvic floor mobility. Patient was able to tolerate pain free intercourse in two positions with penis inserted at full length two times a week. Slight discomfort continued with penetration at introitus but subsided quickly.

Reflection:
Patient's gym routine was put on hold at the start of physical therapy due to the hypertonic state of her pelvic floor muscles inability to support and stabilize her pelvis contributing to pain and incontinence. High impact activity can contribute to urinary incontinence having adverse effects on the pelvic floor muscles (4). Intercourse and abdominal exercises recruit the pelvic floor muscles, increasing their tension and risking re-injury; this would be analogous to not running on a sprained ankle, rather allowing for recovery facilitated by physical therapy intervention. Through clinical experience, slowly reintroducing these exercises as the pelvic floor muscles have restored normal tone has shown most beneficial to prevent reoccurrence of symptoms. It is important to improve the mobility of the pelvic floor muscles and their ability to contract and relax through their designed range of motion prior to eliciting them in these activities.

Post-Case Reflection:
The patient's needs were met as her primary and secondary goals were achieved, however, there are a few areas regarding examination and treatment that could have been improved. One clue that was underweighted in my evaluation was lumbar pain with prolonged sitting. At the time it was not a goal or focal point, however, with further research and experience there is a correlation with stress incontinence and lumbar pain indicating this could have been a structural component involved and patient may have benefited from lumbar exercises (5). Another area I would have expanded on is the use of biofeedback to improve the ability of her pelvic floor muscles to contract, relax, and lengthen (6). However, these modalities were applied in cases proceeding this one with success. Another intervention to improve the overall health status of the patient would have been a recommendation to a psychologist or counselor as this condition has a profound effect mentally in regards to anxiety and trust. As I continued to treat this patient, my management technique changed throughout subsequent visits as I saw the importance in educating the patient on being able to trust herself and becoming more educated and aware of her pelvic floor. This led to the incorporation and self use of dilators at the end of the manual therapy sessions. Overall, the patient and myself were pleased with the results and we remain in contact today. As a side note, the patient was able to

complete a hysterosalpingogram, transvaginal ultrasound, and IUI without pain following discharge of physical therapy.

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