Chronic pelvic floor dysfunction

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The successful treatment of women with vestibulodynia and its associated chronic pelvic floor dysfunctions requires interventions that address a broad field of possible pain contributors. Pelvic floor muscle hypertonicity was implicated in the mid-1990s as a trigger of major chronic vulvar pain. Painful bladder syndrome, irritable bowel syndrome, fibromyalgia, and temporomandibular jaw disorder are known common comorbidities that can cause a host of associated muscular, visceral, bony, and fascial dysfunctions. It appears that normalizing all of those disorders plays a pivotal role in reducing complaints of chronic vulvar pain and sexual dysfunction. Though the studies have yet to prove a specific protocol, physical therapists trained in pelvic dysfunction are reporting success with restoring tissue normalcy and reducing vulvar and sexual pain. A review of pelvic anatomy and common findings are presented along with suggested physical therapy management.

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Introduction

Chronic pelvic pain (CPP), pelvic floor dysfunction (PFD), and sexual pain are among the most common yet challenging medical conditions that physicians and allied health-care providers face in clinical practice. Provoked vestibulodynia (PVD), a chronic vulvar pain disorder, straddles them all — it is often considered a symptom of CPP (though not related to pelvic organ pathology), it has been correlated with chronic pelvic floor muscle dysfunction (PFMD) [1–4], and it occurs (but not solely)
with sexual contact [5–7]. The prevalence of female sexual dysfunction resulting from concomitant chronic pelvic and sexual pain was estimated in 2006 to be 26% (range 7–58%) [8].

Unfortunately, many clinicians are not well equipped to assess and diagnose women plagued by the comorbid disorders [9]. Vulvologists, looking primarily at the vulva, work to accurately diagnose and treat PVD, which, by definition according to the International Society for the Study of Vulvovaginal Diseases, has no definable disease or diagnosable cause associated with it [5–7]. Physicians have historically been taught to investigate the pelvic viscera (e.g., bladder, urethra, uterus, ovaries, and bowel) as pain generators when attempting to identify the possible causation of pain [10], yet 28–55% of exploratory laparoscopic surgeries report negative findings [11–14]. When treating women with chronic pain, physicians and other health-care providers (those outside of the psychosexual counseling realm) have struggled to deal with their patients’ comorbid sexual dysfunction, with 38% of patients thinking that the problem “will just go away” [15].

Pelvic floor muscle (PFM) disorders are major contributors to a multitude of dysfunctions, with one recent study suggesting that the increase in the demand for care of PFMD (inclusive of all disorders, including incontinence) is predicted to increase by 35% in the next 17 years, with >1.6 million patient visits predicted for the year 2030 [16]. Beginning in the mid-1990s, PFMD was identified as a contributing factor to the pain of vulvodynia and PVD. Hypertonic PFMs were identified and successfully treated using surface electromyography or biofeedback, and complaints of vulvar pain and sexual dysfunction were decreased [2–4,17,18].

Physical therapists, by nature of their training, bring a much broader approach to the management of chronic vulvar and pelvic pain. As specialists, women’s health physical therapists (WHPTs) have received extensive education in the treatment of chronic pelvic dysfunction. They have utilized a variety of manual therapy techniques to treat comorbid conditions of PFD, including biofeedback. WHPTs utilize interventions that restore normal function to all systems (musculoskeletal, fascial, and visceral) throughout the body. They have played an integral role in the multidisciplinary team working to decrease pain associated with CPP, PFD, and PVD [1–4,19–39].

A recent multisite, randomized, and blinded trial compared a specific PFM myofascial therapy treatment protocol to nonspecific therapeutic massage in 81 women with interstitial cystitis/painful bladder syndrome (IC/PBS). The results suggested that, of the 78 who completed the 3-month, 10-treatment trial, 59% of those who received myofascial treatment reported improvement (moderate or marked) versus 26% of the massage-only group [32]. Though there is some thought that IC/PBS and PVD may coexist more than reported — though there was no mention of the vulvar pain in the previous study — it may be surmised that the therapy provided might also benefit those with PVD.

Gentilcore-Saulnier et al. compared PFM behavior in women with and without PVD and how those with PVD responded to a physical therapy treatment. The study included eight patient visits with a protocol that included patient education, intervaginal manual therapy, biofeedback, electrical stimulation, use of vaginal dilators, and instruction in a home exercise program that prescribed the use of daily PFM exercises. Their prospective, cross-sectional study suggested that the presence of PVD alters PFM responsiveness to pain, with increased muscle activity (greater in the superficial PFMs than in the deep PFMs) following painful stimuli at the posterior vulvar vestibule. Pelvic floor (PF) physical therapy normalized the overall PFM tone, flexibility, strength, and ability to relax following active contraction. Following WHPT, there was decreased pain responsiveness in the PFM, reduced pressure sensitivity at the vaginal opening with reduced pain at the vulva, and improved tolerance to vaginal penetration [31].

In two retrospective reviews of physical therapy treatment of women with vulvodynia, Bergeron et al. reported a 71% success rate of moderate or great improvement in vulvar pain, as well as decreased pain with intercourse and gynecological exam, and increased intercourse frequency, desire, and arousal [37]. Hartmann reported that 71% of those receiving physical therapy for vulvar pain reported decreased vulvar pain symptoms and 62% reported improved sexual function [42]. Bergeron’s protocol included patient education on PFM response to vulvar pain and the importance of muscle control (e.g., relaxation during vaginal insertion), internal and external manual therapy (including myofascial release, trigger-point pressures, and massage), biofeedback, electrical stimulation, and home exercises including use of vaginal dilators, manual stretching of the vaginal tissue, and PFM exercises [37]. Hartmann’s protocol included internal and external manual therapy (soft tissue mobilization, myofascial release, and visceral manipulation), internal and external therapeutic exercise, electrical
stimulation, biofeedback, and a home exercise program including twice-daily PFM exercises [42]. In a 10-year follow-up survey, Hartmann found 13 of the original 24 women and asked about their current symptoms. Ninety-two percent suggested mild to no current or intermittent symptoms, and 85% reported vulvar pain symptoms completely or greatly resolved with no further physical therapy intervention. When comparing symptomology in 2007 to 1997, continued symptom reduction had occurred in 89% versus 71% of those responding 10 years earlier, quality-of-life issues improved in 79% versus 50%, and improved sexual function improved in 75% versus 62%. Sixty-seven percent reported continued daily PFM exercises as prescribed during their treatment 10 years previously [43].

The purpose of this article is to describe and review the normal and abnormal functional anatomy of the pelvis, to discuss common problems caused by PFD, and to summarize suggested assessment and intervention modalities that might be utilized by WHPTs when dealing with patients with chronic PFD. No specific treatment protocols for women with PVD have been studied and/or validated. Some portions of the material presented in this article are solely the views of the individual authors as a result of their independent years of clinical experience.

**Functional anatomy of the pelvis**

To understand the functional anatomy of the pelvis, it is essential to appreciate the integration of the static support provided by the bony pelvis along with several additional anatomical systems — the musculoskeletal, the fascial, and the visceral systems. To better define pelvic function, Wei and Delancey suggest that the descriptor “pelvic floor” (PF) should be used to refer to all the structures of support within the pelvic cavity, including the musculature. PF support begins with the abdominal peritoneum cranially and continues inferiorly through the viscera (bladder, urethra, uterus, and rectum), the endopelvic fascia, the deep PFMs, and the perineal membrane before ending caudally in the superficial portion of the PFMs [44,45] (Fig. 1). Together, the levator ani (pubococcygeus, puborectalis, and iliococcygeus muscles) and coccygeus form the PFMs. The total sum of the muscular
attachments of the PFMs, the fascial attachments of the viscera (e.g., pubocervical and uterosacral ligaments), and the static support of bony pelvis combines to form the functional and structural support for the pelvic contents.

The normal function of the PFMs (i.e., the ability to actively and fully contract and relax) contributes to the most inferior support of the pelvic viscera, control of continence via input to the urethral and anal sphincters, maintenance of normal sexual function and orgasmic activity, and core stability at the base of the trunk. The quality of the pelvic support can be altered by abnormalities in any of the supportive systems, be it in the PFMs (e.g., PFM spasm or laxity), the fascia (e.g., uterine or bladder prolapse), or the viscera (e.g., urethral or rectal spasm).

From an anatomical perspective, the sling-like support of the PFMs attaches anteriorly at the inferior pubic rim and travels posteriorly to attach at the coccyx and sacrum. Normal contraction of the PFMs shortens the length of the muscles, creating a lift to the perineal body, pulling it up and in toward the pelvic cavity. Normal relaxation returns the muscles to their original length, allowing the perineal body to drop to its original position. In supine and with normal PFM function, the position of the perineal body should be above the plane of the ischial tuberosities. Hypotonic (i.e., laxity or decreased tone) PFMs allow the perineal body to drop below the plane of the tuberosities whereas hypertonic (i.e., elevated tension or spasm) PFMs cause a pull upward of the perineal body, keeping it more superior to the ischial tuberosities than in normal function. When hypertonicity is present, the resting position of the perineal body is further upward into the pelvis, similar to where it would be at the end of a full, voluntary contraction of normal functioning PFMs. The presence of chronic hypertonicity leaves the PFMs unable to release and return the perineal body to a normal position. This chronic hypertonicity can be visualized easily during an external clinical exam of the perineum.

Other major components within the anterior compartment are the paired obturator internus muscles. They are fan-shaped and originate from a broad section of the anterolateral wall of the pelvis at the inner surface of the obturator foramen, the ischiopubic ramus, and the inner surface of the femur. Their fibers narrow and become band-like as they traverse inferior, running posterior to the ischial tuberosities where they make a 120° turn upward to insert at the greater trochanters of each femur (Figs. 2 and 3). Their function is to externally or laterally rotate the hip with extension (i.e., to turn the toes and knee outward in standing) and to abduct the hip when flexed (i.e., drop the knee out to the side when the knees and hips are flexed while in the supine position).

**Pelvic floor dysfunction**

Chronic PFD, CPP, PFMD, and PVD usually, but not always, coexist. There are rare clinical cases who present with no physical findings; however, those cases are, by far, not the norm. The complexity is elucidated by the European Association of Urology in their “Guidelines on Chronic Pelvic Pain." They list 15 definitions relating to female pelvic pain, implicating involvement of PFMs, bladder, urethra, uterus, vagina, vulva, clitoris, pudendal nerve, rectum, and perineum [46]. Visceral disorders within the pelvis that are known to contribute to pain include PBS/IC, irritable bowel syndrome (IBS), dysmenorrhea, and endometriosis. Chronic, abnormal stimuli that are present with these visceral pain disorders can slowly upregulate the spinal cord, disrupting sacral reflexes that regulate sensation and pain [47]. Fascial laxity and resulting organ prolapse may contribute to the pain puzzle as can bony irregularities (e.g., sacroiliac joint dysfunction and hip pain).

**Pelvic floor muscle dysfunction**

Understanding pain related only to PFMD can be equally confusing as it has received multiple labels over time — coccydynia, levator (spasm) syndrome, tension myalgia of the PF, PF spasticity, urethral/anal sphincter dyssynergia, vaginismus, and shortened PF [39]. The progression of PFMD occurs in two stages: the first, neuromuscular, and the second, musculodystrophic. Following some injury or insult (e.g., coccygeal injury with a fall, chronic hip pain, or recurrent yeast or urinary tract infections), free calcium is released, disturbing the sarcoplasmic reticulum and causing hypertonicity within the muscle. In the presence of ATP, calcium ions stimulate the actin/myosin activity, increasing metabolic activity. The release of various neurotransmitters, including serotonin, histamine, kinins, and
Fig. 2. Medial view of the pelvic floor muscles. PFM: pelvic floor muscles. Modified from Primal Pictures with labels added (images copyright Primal Pictures, http://www.primalpictures.com).

Fig. 3. Inferior view for pelvic floor muscles with associated muscles and structures. PFM: pelvic floor muscles. Modified from Primal Pictures with labels added (images copyright Primal Pictures, http://www.primalpictures.com).
prostaglandins, stimulate muscle nociceptors and set up a neural circuit between the central nervous system, nociceptors, and motor units [27].

Over time, the hypertonic muscles enter the musculodystrophic phase while attempting to adjust to the overall increase in metabolic activity. When that adjustment fails, localized fibrosis begins and atrophied muscle tissue is replaced by less metabolically active and extensible connective tissue [48]. An example of this phenomenon can be seen when bladder and urethral function are impacted by PFMD. Once PFM hypertonicity becomes chronic and full range of motion is reduced, the tension may obstruct voiding or make it impossible, with severe cases requiring intermittent self-catheterization. Not only will the PFMD cause restriction in the urethra but it can also inhibit the detrusor during bladder filling and emptying, resulting in urinary urgency, frequency, and hesitation [19]. Patients will involuntarily contract their PMFs for extended periods in response to the urgency, reflexively inhibiting bladder filling and emptying. With time, the PMFs lose their flexibility and are unable to normally relax. It then becomes impossible to separate the visceral from the muscular dysfunction as each drives the other — more muscular tension creates more urgency and increased urgency creates more PFM tension. The vicious cycle begins (Table 1).

**Physical therapy assessment**

**Medical history**

The intake interview includes a traditional physical therapist’s review of biomechanical systems but adds additional questions related to bowel and bladder function (including intake of fluids), menstrual and vaginal health, and a full history of sexual function, including questions on desire, arousal, and

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Possible causes of pelvic floor muscle dysfunction (PFMD).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty biomechanics</td>
<td>1. Dysfunction of the lumbosacral spine or pelvic girdle — hips, pelvis, pubic symphysis, sacroliliac joints, sacrococcygeal joint</td>
</tr>
<tr>
<td>Postural and structural dysfunction</td>
<td>2. Lower kinetic chain irregularities — knees, feet, subtalar joints</td>
</tr>
<tr>
<td>3. Hypermobility throughout the pelvic cavity</td>
<td></td>
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<tr>
<td>Injury to the pelvic floor muscles</td>
<td>1. Scoliosis</td>
</tr>
<tr>
<td>2. Short leg syndrome</td>
<td></td>
</tr>
<tr>
<td>3. Small hemi-pelvis</td>
<td>4. Perpetuation of typical pelvic pain posture — anterior pelvic tilt, increased thoracic kyphosis, lumbar lordosis</td>
</tr>
<tr>
<td>Faulty cumulative behaviors of the pelvic floor muscles</td>
<td>1. Childbirth</td>
</tr>
<tr>
<td>2. Pelvic surgery</td>
<td>3. Falls with landing on sacrum or coccyx, uncontrolled “slip” or stepping unexpectedly off a curb, creating a shear force at the pubic symphysis</td>
</tr>
<tr>
<td>4. Repetitive movement injuries seen with high-velocity sports with altered postures (e.g., gymnastics, dance)</td>
<td></td>
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<tr>
<td>Inflammatory pain disorders involving pelvic viscera</td>
<td>1. Irritable bowel syndrome (diarrhea, constipation)</td>
</tr>
<tr>
<td>2. Endometriosis</td>
<td>3. Chronic cystitis, painful bladder syndrome</td>
</tr>
<tr>
<td>4. Dysmenorrhea</td>
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</tbody>
</table>
orgasm (Table 2). Because of the coexistence of PFM and visceral dysfunction, it is imperative to get a full and comprehensive history that includes a pelvic organ system review. It is often impossible to ascertain which came first — the PFMD that caused the pelvic organ functional complaints (e.g., PFM hypertonicity compromising the ease of bowel movements resulting in a complaint of constipation) or the chronic visceral dysfunction that was driving the PFM tension (e.g., chronic diarrhea that caused PFM hypertonicity). Regardless of the initiating trigger, both must be treated to reach maximum success with treatment.

Table 2  
Functional history questions. Examples given are for average function typically found in women without complaints of pain and possible responses for women with abnormal function and a history of pain.

<table>
<thead>
<tr>
<th>Question</th>
<th>Average function</th>
<th>Possible abnormal function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you empty your bladder?</td>
<td>6–8×/day, including 1×/night or every 3.5–4 h</td>
<td>Every hour or so; up multiple times/night</td>
</tr>
<tr>
<td>How much and what do you drink?</td>
<td>1/2 my body weight in ounces</td>
<td>Not a lot, don’t want to have to empty</td>
</tr>
<tr>
<td>Do you have pain when you empty?</td>
<td>No, not even after intercourse</td>
<td>Yes, very often after intercourse and into the next day</td>
</tr>
<tr>
<td>Do you feel empty afterwards?</td>
<td>Yes</td>
<td>No, often have to go again quickly</td>
</tr>
<tr>
<td>Do you have to go to start or does the urine just come out?</td>
<td>No, flow just starts after I sit down to go</td>
<td>Yes, often have to think about it and push a little to get it started</td>
</tr>
<tr>
<td>Do you ever lose urine?</td>
<td>No, not even with exercise</td>
<td>Yes, often with laughing, lifting, etc.</td>
</tr>
<tr>
<td>Do you have a history of chronic urinary tract infections?</td>
<td>No</td>
<td>Yes, often treated with antibiotics, even with no culture or testing</td>
</tr>
<tr>
<td>Bowel function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you have a BM?</td>
<td>3×/day to 3×/week</td>
<td>Often less or more than average</td>
</tr>
<tr>
<td>Do you have a history of IBS?</td>
<td>No</td>
<td>Yes (with constipation and/or diarrhea)</td>
</tr>
<tr>
<td>Do you need to strain to empty</td>
<td>No</td>
<td>Yes, often even when it’s soft</td>
</tr>
<tr>
<td>What consistency are your stools?</td>
<td>Formed, soft, easy to expel</td>
<td>1) Large and hard (problem with diet) or 2) Soft and pencil thin but hard to get out</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(non-relaxing anal sphincters)</td>
</tr>
<tr>
<td>Do you feel empty after a BM?</td>
<td>Yes</td>
<td>No, still feel like there is more there</td>
</tr>
<tr>
<td>Do you ever have pain with BM?</td>
<td>No</td>
<td>Yes (tailbone, abdomen, or low back)</td>
</tr>
<tr>
<td>Menstrual history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you have a history of painful periods?</td>
<td>No</td>
<td>Yes, with a lot of cramping with long, heavy bleeding; often have used oral contraceptive with help</td>
</tr>
<tr>
<td>Vaginal history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you use tampons?</td>
<td>Yes with no trouble</td>
<td>No, it hurt when I tried it for the first time or it hurts now</td>
</tr>
<tr>
<td>Sexual history</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you currently sexually active?</td>
<td>Yes</td>
<td>Yes, often with no resolution even with, treatment; lots of burning pain</td>
</tr>
<tr>
<td>Do you have pain with sex?</td>
<td>No</td>
<td>No, it hurts too much and I don’t want it</td>
</tr>
<tr>
<td>Do you have any sexual desire?</td>
<td>Yes</td>
<td>Yes, it’s been too long; it hurts too much</td>
</tr>
<tr>
<td>Did you always have pain with sex?</td>
<td>No</td>
<td>1) Yes, it hurt the first time I tried (primary vestibulodynia/dyspareunia)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) No, it was fine before but now it hurts (secondary vestibulodynia/dyspareunia)</td>
</tr>
<tr>
<td>Can you have an orgasm?</td>
<td>Yes, with clitoral stimulation and/or intercourse</td>
<td>Yes, with clitoral stimulation only but it’s harder to have and it isn’t as intense</td>
</tr>
<tr>
<td>When you are intimate, do you get wet (arousal)?</td>
<td>Yes</td>
<td>Sometimes but often need to use a lubricant or perhaps not at all</td>
</tr>
<tr>
<td>Where does it hurt when you try to have sex?</td>
<td>NA</td>
<td>Mostly at the bottom of the vaginal opening</td>
</tr>
<tr>
<td>How long does the pain last?</td>
<td>NA</td>
<td>Ranges from a few minutes to days</td>
</tr>
<tr>
<td>Is there anything you can do to make the pain go away?</td>
<td>NA</td>
<td>Sit in a hot tub, ice, go to sleep</td>
</tr>
<tr>
<td>Even though you don’t have sex, are you still hugging, kissing, and touching?</td>
<td>NA</td>
<td>Yes, I try to do what I can</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No, I don’t want to lead him on</td>
</tr>
</tbody>
</table>
Education

Every patient receives a brief education in PF anatomy. A plastic pelvic model with removable PFMs is used to describe and visualize the anatomy of the pelvis. Viewing the PFM orientation allows patients to see the anatomy in three dimensions, helps them to understand the intimate relationship between the muscles and organs, and seems to assist patients with voluntary PFM activation during the physical exam. The model is shown in Fig. 4.

![Fig. 4. Digital assessment of vulvar pain with testing at 3, 6, and 9 o’clock around the introital opening. Hand positioning used at 3 and 9 o’clock can be used for insertion into the vagina with severe pelvic muscle spasm to avoid pressure on the urethra. A) 3 o’clock position on the introitus on the patient’s left; B) 6 o’clock position on the introitus at the midline (posterior fourchette), superior to the anus; and C) 9 o’clock position on the introitus on the patient’s right. Published previously and with permission. Hartmann D. Chronic vulvar pain from a physical therapy perspective. Dermatol Ther. 2010;23(5):505–13.](image)
Physical assessment

1. Traditional physical therapy evaluation: The assessment begins with evaluation and gross assessment of posture, gait, and generalized strength and mobility. Common physical findings in those with chronic pain are shown in Table 3.

2. Abdominal and hip assessment: Women are asked to undress from the waist down and lay supine and covered on a treatment table. The initial exam continues with gentle palpation of the abdomen, assessing for visceral tone and connective tissue health in the abdominal musculature. Passive hip mobility is assessed bilaterally as is the tone in the hip musculoskeletal complexes (e.g., psoas, iliacus, and deep external rotator muscles). Elevated tension throughout the abdomen, decreased hip mobility, and increased tension in the hips are common findings in those with a history of pain and dysfunction.

3. Visual exam of the perineum and vulva: The goal is to screen for any abnormal findings (Table 4). If disease is suspected, the appropriate referral is made. Gross PFM function can be reviewed visually with a request for active contract and release of the PFM, “like trying to hold back urine or gas and then relaxing.” Perineal body mobility can be recorded, noting any change in resting position following the contraction/relaxation of the PFM. It is not uncommon following active mobility of the PFM for the perineal body to return to a more relaxed, inferior position. For more details, see the section covering internal exam.

4. Vulvar sensitivity assessment: The Q-tip test, which assesses pain levels by touching various points around the introitus with a cotton swab, has become the gold standard for diagnosing vestibulodynia [49–51]. Patient pain perception is graded during the test using an 11-point numeric pain rating scale of 0–10, with 0 representing “no pain at all” and 10 suggesting the “worst possible pain.” Changes in the scale over the course of treatment are an accepted measure of progress, both clinically and with research. A study by Reed et al [51]. has suggested that deeper palpation into the hymenal remnant in the vestibule was highly correlated with an accurate diagnosis of vulvodynia and was also predictive of associated PFM involvement. The first author has found equal success using a modified Q-tip test. It is accomplished by assessing pain at three points on the opening using a gloved (non-latex) and lubricated (natural oil) single-digit palpation at 3, 6, and 9 o’clock (Fig. 4). The pressure used is often minimal and gauged by patient tolerance. The results of this modified Q-tip test might be recorded as “pain of 7/10 at 3 o’clock, 6/10 at 6, and 5/10 at 9 o’clock.” The technique has proven to be a reliable tool for measuring change in perceived vulvar pain before and after treatment sessions and over the duration of the treatment.

5. Internal examination: Intervaginal, single-digital assessment continues with particular attention paid to patient pain tolerance. With time, education, patience, and a gentle touch, internal exams are usually completed on the first visit. Digital palpation allows for differentiating the function and state of tension of the superficial PFM (bulbospongious, ischiocavernosus, and superficial transverse perineal muscles), the deep PFM (levator ani and coccygeus), the obturator internus muscles, and the crural muscles (Fig. 4).

Table 3

<table>
<thead>
<tr>
<th>Gross assessment</th>
<th>Specific findings</th>
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<tbody>
<tr>
<td>Pelvic pain posture</td>
<td>1. Increased lumbar lordosis (arched low back) or thoracic kyphosis (rounded shoulders, forward head)</td>
</tr>
<tr>
<td></td>
<td>2. Associated muscle tension — iliopsoas, piriformis, hip deep external rotators, abdominals, hip adductors, and/or quadratus lumborum</td>
</tr>
<tr>
<td>Pelvic innervation</td>
<td>Abnormalities in the distribution of the sciatic, pudendal, and/or obturator nerves</td>
</tr>
<tr>
<td>Deconditioned core muscle strength</td>
<td>Weakness in abdominals, hamstrings, hip flexors, trunk extensors (also includes the pelvic floor muscles)</td>
</tr>
<tr>
<td>Pain and tension with palpation of the abdominal cavity</td>
<td>Elevated abdominal visceral tension — most notably the colon, small intestines, rectum, uterus, urethra, and bladder</td>
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the pelvic viscera (urethra, bladder, uterus, and rectum), and the fascial support of the pelvis (arcus tendineus fascia pelvis [ATFP] and arcus tendineus of levator ani) [31].

Normal PFM tone creates a visible, mildly concave surface of the perineum in reference to the plane of the ischial tuberosities with the perineal body sitting slightly superior. A single digit is inserted into the introitus at the level of the perineal body and progresses above the hymenal ring to reach the PFMs. As insertion occurs, PFM resting tone can be evaluated by noting the relative size and position of the opening created by the PFMs. Normal PFM resting tone allows for easy, pain-free digital insertion. With normal tone, the opening in the PFMs sits just above the introitus and the perineal body. By contrast, elevated PFM resting tone causes the vaginal muscular opening to be smaller in circumference, further superior into the pelvic cavity with more distance between the perineal body at the surface of the perineum. The muscle tension pulls the perineal body inward, creating an increased concavity of the perineum. Conversely, with PFM laxity, there is little to no space between the PFMs and the perineal body. The lack of PFM tone causes the perineum to appear mildly convex, often falling inferior to the plane of the ischial tuberosities.

The digital grading of PFM function is completed using the modified Oxford scale of 0–5, with 0 being indicative of no perceptible active PFM contraction and 5 suggestive of normal PFM contractility [52]. The active range of motion of the PFMs is quantified numerically using a plus/minus system such that reporting might be recorded as “PFM function /C0 3/5.” Many clinicians suggest that someone with elevated PFM tension and resting tone has “weak PFMs.” In actuality, there is a decreased active range of motion that is caused by hypertonicity or reflexive splinting (unconscious contraction of the PFMs) which occurs prior to penetration (sexual or nonsexual). The poor contractile force of the hypotonic PFMs (e.g., perhaps recorded as /C0 2/5 on the modified Oxford scale) is followed by a slow, incomplete release of tension, returning the PFMs only to the level of the original, elevated resting tone. The reporting of PFM function therefore should include the digital measure of PFM function with the Oxford scale as well as a digital measure of PFM release and resting tone (e.g., “PFM function –2/5 with poor and incomplete release of elevated resting tone”).

In women with PVD, the more common anterior pelvic findings include some combination of the following: elevated PFM resting tone, taut bands and/or active trigger points in the PFM, elevated tone of both obturator internus muscles, increased tension in one or both tendinous arch(es) of the pelvic fascia and/or the levator ani, and increased tone or visceral spasm in the urethra, bladder, uterus, or rectum. Abnormal internal tension or tone is digitally sensed as a stiffness or bulkiness in the tissues being assessed. When palpating the urethra, for instance, the assessing digit would be at 12:00 in the vaginal canal where the urethra is supported by the periurethral fascia behind the pubic symphysis. With normal tone, the musculature of the urethra is relaxed on itself and feels like a soft, shallow mound of tissue running approximately 4 cm in length along the backside of the symphysis. When the
urethra has increased tone, it feels like a straw or a pencil that can be rolled over. Too much pressure on
the tense urethra can cause complaints of pain or urinary urgency. Likewise, the rectum, when
palpated vaginally at 6:00, has similar properties. Pressure on a tense, round bowel may create pain or
the sense of urgency common to passing gas or stool. Elevated rectal tension appears to increase
complaints of pressure and pain at the posterior fourchette (6:00). Following release of the tension via
physical therapy, the complaints of pain are typically reduced, often to zero.
It is not uncommon as part of the initial patient visit to also complete an assessment of the posterior
pelvis via the anus to identify abnormal tension in the anal sphincters, coccygeus muscles, posterior
pelvic ligaments (anococcygeal, sacrotuberous, and sacrospinous), and the fascial structures attaching
to and around the ischial spines (Figs. 2 and 3). Bimanual exams of the sacrococcygeal and sacroiliac
joints can be completed when dysfunction is suspected. Anterior and posterior PFM function and
resting states should not be assumed to be equal as very often they are not.

Physical therapy intervention

According to the American Physical Therapy Association, the overall goal of physical therapy
intervention is to restore normal function while working to reduce any negative psychological impact
associated with the disease, pain, or dysfunction being addressed [53]. It is incumbent on all health-
care providers who treat women with CPP to be aware of the pain’s overwhelming impact on the
patient’s quality of life. Physical dysfunctions may be more readily addressed and treated but the
psychology of pain cannot be ignored. Regular referrals to mental health providers may make the
difference between full and partial recovery. Without access to adjunctive care, all providers must do
what they can to address emotional issues associated with chronic pain, including sexual dysfunction.
Women’s health physical therapy will be much less successful if the treating therapist is unable or
unwilling to discuss sexual function as she goes through her chosen treatment protocol.

Intervention is driven by organ system dysfunction and physical findings. If urinary urgency and
frequency are noted in the intake, for example, it is necessary to review dietary as well as bladder habits
(Table 1). If bladder dysfunction is left unaddressed, it may cause the PFM to remain in a constant state
of excessive holding, thus contributing to additional PFM hypertonicity and possible vulvar pain and
sexual dysfunction. The same holds true for bowel dysfunction. Discussions around daily food intake
can often lead to suggestions for small changes (e.g., eliminating dairy and/or gluten intake, or
decreasing sugar consumption) that can impact overall pelvic function by correcting chronic con-
stipation or diarrhea. Abnormal physical findings throughout the body, discovered through the
assessment process, need to be addressed for full recovery of pelvic health.

Manual therapy is pivotal to successful treatment. Modalities like soft tissue mobilization, myo-
fascial release, joint manipulation, visceral mobilization, therapeutic exercise, and neural mobilization
can be used to correct musculoskeletal dysfunction throughout the body as well as within the pelvic
cavity. Any exercise prescription should include a home exercise program designed to improve core
stability and correction of any gait or postural imbalances as indicated.

The importance of proper PFM function is stressed regularly, beginning with the initial visit and
addressed during each successive treatment session. Before full PFM function can be restored through
active PFM exercise, however, any associated abnormalities within the pelvis also must be corrected.
Manual therapy techniques can be applied with good success — pelvic visceral tension can be eased,
obturator internus muscles spasm can be relaxed along with accessory hip muscle tension, and PFM
hypertonicity can be reduced. Once the tension in these tissues, muscles, and fascia is released in the
clinic — usually on the first visit for women with PVD — the palpated pain at the introitus is typically
reduced. When patients realize that the release of pelvic and associated myofascial tensions can impact
their complaints of vulvar pain, their compliance with their individualized home exercise program
improves.

Twenty-two years of clinical experience has shown the first author that renewal of motor function
and overcoming reflexive splinting of the PFM is pivotal in recovery for most, if not all, patients with
PFMD and PVD. The advantages of regular PFM exercise are increased blood flow, improved PF support,
decreased posterior fourchette fissuring, improved proprioception of the PFM position, and increased
intensity of orgasm [40]. Though the home exercise prescription is obviously dependent on individual
PFM function during initial evaluation, it typically involves working up to two 5-min sessions of PFM exercises a day (once in the morning and once in the evening). Both fast-twitch and slow-twitch muscle fibers are present in the PFM and are addressed separately in the exercise regime. For the majority of patients, the prescribed PFM exercise alternates a sustained PFM contraction of five counts, followed by a total muscle release, with five quick, successive PFM contractions followed by release. If during the first week of doing the PFM exercises the sensation of contraction or relaxation cannot be sensed, the exercises are to end for that session, with more time added as the muscles are able. Likewise, if there is ever an increase in any symptoms, the exercises are to be stopped until the next WHPT visit. It is suggested to the patient that the PFM exercises can be used any time that discomfort is felt, such as before and after a vaginal exam, with increased distress or anxiety, or if pain occurs while driving or sitting. Active contraction and relaxation of the PFM is suggested before, during, and after intercourse and can be helpful in the first few weeks of use.

**Summary**

Treating patients with chronic PFD is challenging for all those in the health-care arena. Chronic pelvic and vulvar pain are certainly no exception. It is incumbent on all those who deal with this difficult population of women to be compassionate, understanding, and thorough in their assessment and treatment approach. The unknown factors related to the causes of chronic pelvic and vulvar pain continue to stymie practitioners. However, therapy that is directed toward finding the comorbid physical abnormalities throughout the body and correcting them appears to be a logical and successful approach. Referral to a WHPT should occur routinely as part of the multidisciplinary approach for all women who present with any type of vulvovaginal pain. Research indicates that PF physical therapy is safe and effective, and can dramatically improve symptoms related to PVD and chronic PFD. Working together, the health-care team can make progress as each member contributes his or her expertise. Women, when given the correct tools, can learn to manage their bodies and recover the function they may have lost due to the pain and dysfunction.

**Practice points**

- Physical therapists trained in treating chronic pelvic dysfunctions take a whole-body approach to treating women with a history of vulvar and sexual pain.
- Multiple organ systems (muscular, fascial, visceral, and bony) can contribute to chronic pelvic floor muscle dysfunction and must be assessed and treated for the most complete recovery.
- Helping women to regain normal pelvic floor muscle function appears to be key in recovering normal vulvar sensitivity and sexual function.

**Research agenda**

- Analysis of physical findings throughout multiple organ systems in women with chronic pelvic floor muscle dysfunction needs to be completed.
- Various manual physical therapy treatment protocols need to be assessed and compared to each other as well as to controls with no treatment and to those undergoing other interventions (pharmacology, surgery, and psychotherapy).
- Long-term outcomes following physical therapy intervention need to be assessed.
Conflict of interest statement

Neither author has a conflict of interest to declare, financial or otherwise.

References


[53] Description of physical therapy — what is physical therapy? World Confederation for Physical Therapy www.WCPT.org.