

# Chronic pelvic pain in women: common etiologies and management approach recommendations

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## Practice points

- Chronic pelvic pain is defined as noncyclical pain below the umbilicus present for at least 6 months and severe enough to cause functional impairment or require treatment.
- Pelvic floor dysfunction may be the common pathophysiologic denominator in women with chronic pelvic pain. When the muscles that make up the pelvic floor are not functioning appropriately, visceral symptoms such as bladder and bowel dysfunction, nerve pain leading to vulvodynia, and somatic pain may occur.
- Physical therapy is an underutilized treatment modality for pelvic pain patients. Both external and internal techniques should be performed and physical therapists treating these patients should have specialized training in the recognition and treatment of pelvic floor dysfunction.
- Pathologic conditions, such as urinary tract infections, pelvic organ prolapse, stones and cancer, should be ruled out in patients with risk factors. However, in low-risk patients, excessive testing and surgical procedures should be avoided.
- Bladder pain syndrome/interstitial cystitis (IC) is a diagnosis of exclusion but is often overdiagnosed. Ulcerative IC likely represents true bladder pathology; however, nonulcerative IC is more complex and will rarely improve with bladder-centric treatments.
- Vulvodynia is often comorbid with pelvic pain and dyspareunia and is characterized by 'burning pain' in the vulvovaginal area.
- Psychosocial factors should be addressed in women with chronic pelvic pain. Patients often have a poor quality of life, which may impact relationships or employment. A history of abuse may be reported in a higher percentage of these women compared with the general population.

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### Practice points (cont.)

- Narcotics as a form of treatment rarely helps chronic pelvic pain and should be discouraged. Also, use may lead to addictions owing to inappropriate prescribing and/or drug-seeking behaviors.
- Trigger-point injections with steroids and local anesthetics can treat pelvic floor muscle problems and provide some relief of chronic pain.
- Sacral and pudendalneuromodulation has also been shown to be beneficial in reducing pain scores and narcotic use.
- Multidisciplinary teams provide the best treatment option for these patients. Clinicians collaborating with pelvic floor physical therapists and psychologists are key components of the treatment team. Integrative medical therapists specializing in guided imagery, acupuncture, medical massage and Reiki therapy may provide additional benefit.

**SUMMARY** Chronic pelvic pain (CPP) affects 15% of women in the USA. These women typically have complex medical and psychosocial histories. They often have other comorbid conditions, making diagnosis and treatment a challenge. In the urologic community, CPP is often labeled as bladder pain syndrome/interstitial cystitis. Other diagnoses, such as vulvodynia and pelvic floor dysfunction, are less commonly recognized. Pelvic floor dysfunction probably plays a greater role than visceral abnormalities and should be diagnosed during the initial evaluation and subsequently treated. Evidence supporting the use of a multidisciplinary care team to optimize outcomes in CPP patients is growing. In this article, the common etiologies of CPP are discussed and the multidisciplinary treatment center the present authors developed to treat patients with chronic pelvic pain is described.

Chronic pelvic pain (CPP) is a common and often debilitating problem among women. In the literature, the definition is often variable but a useful clinical definition is pelvic pain that is noncyclical and of at least 6 months duration [1]. CPP occurs below the umbilicus and is severe enough to cause functional impairment or require treatment. One of the challenges of treating women with CPP is that a single etiological cause is often lacking. Rather, CPP manifests as a syndrome of symptoms involving gynecologic, gastrointestinal, urologic and musculoskeletal symptoms, as well as psychosocial issues.

The healthcare burden of CPP is substantial. However, due to the multitude of etiologies, different specialties involved and the lack of a standard definition, the exact prevalence is difficult to determine. CPP affects approximately 15% of women, with the direct cost of

physician/clinician visits estimated to be over US\$880 million and the indirect costs owing to lost work being US\$555 million [2]. A more recent study in 2011 projected that between 3.3 and 7.9 million women aged 18 years or older in the USA have CPP and other symptoms, such as urinary urgency or frequency that are consistent with a possible diagnosis of bladder pain syndrome/interstitial cystitis (BPS/IC) [3]. In 2008, Clemens *et al.* estimated the yearly cost of an IC patient to be US\$7100 compared with US\$2994 in control patients [4].

Women with CPP symptoms have often been to several healthcare providers, undergone extensive testing or even surgical treatment and still suffer from CPP. From the clinician's perspective, these patients can be difficult to treat because they do not fit the normal mold of identifiable pathology and successful treatment

techniques. A definitive diagnosis may be lacking in up to 60% of patients seeking treatment for CPP [5]. One of the problems can be the narrow lens through which healthcare providers see their patients. A gynecologist may only look for conditions related to the uterus or ovaries, or for endometriosis, while urologists may only look for bladder pathology, ignoring the surrounding structures. The diagnosis and treatment of CPP, however, has made considerable advances in the last 5–10 years. With the improved understanding of the multifactorial nature of CPP, clinicians are more able to characterize the condition, offering improved treatment options. One of the most important advances in the treatment of CPP is the recognition of the need for multidisciplinary management of these patients [6]. Patients with urologic and pelvic pain symptoms need to have their history, including traumatic stress events, comorbidities, coping mechanisms, attitudes and current health practices, integrated into their plan of care. The present authors believe a multidisciplinary approach to the management of CPP is needed. In this article, they will briefly review the incidence and pathophysiology of the common etiologies of chronic pelvic pain in women and describe their multidisciplinary treatment center developed to treat CPP conditions with a multimodal approach, integrating mind–body therapies.

#### BPS/IC in women

In urology, BPS/IC is often the scapegoat diagnosis for CPP. The central urinary symptoms include urgency, frequency and pelvic pain. BPS/IC was first described almost 90 years ago as an ulcer seen in the bladder during cystoscopy [7]. Since then, the definition, the diagnosis and the awareness have expanded greatly, challenging clinicians and symptomatic patients to continually update their knowledge or belief system regarding BPS/IC and its treatments [8]. Patients would often go undiagnosed for years and see many different healthcare providers before getting a diagnosis of BPS/IC [9,10]. Many patients report that they were told that the symptoms were 'in their head' and may have been referred for psychiatric counseling. They may have lost their job as a result of missed work days or inability to function appropriately owing to urinary or pain symptoms. Their quality of life is diminished and their relationships with loved

ones are often damaged [11,12]. With a diagnosis, these women may feel validated and understand that there is a medical and physiological reason for the way they have been feeling.

On the other hand, many women with BPS/IC had their pain managed with narcotic or opioid medications for years and developed dependency or tolerance to those medications [13,14]. It is now known that misdiagnosis of BPS/IC often occurs, which starts the patient down a path of medicines and testing that may not be needed [15]. In reality, however, there are likely to be other issues that are not being addressed. This may delay appropriate treatment and recovery. As the name implies, BPS/IC is a bladder-centric diagnosis. It suggests that when the bladder is treated, the patient gets better. This is often not the case. In the present authors' evaluation of women with BPS/IC, 93% had pelvic pain, 70% had dyspareunia, 60% had vulvodynia, 52% had constipation, 49% had irritable bowel syndrome, 41% had stress urinary incontinence and 17% had fibromyalgia [6]. Patients often have several other nonbladder syndromes such as chronic fatigue syndrome, irritable bowel syndrome, sicca syndrome, migraine, depression, panic disorder, allergies and asthma [16,17]. Clemens *et al.* found in a case–control study that there were 23 diagnostic codes reported significantly more in patients with BPS/IC compared with controls, including gastritis, child abuse, fibromyalgia, anxiety disorder, headache and depression. There were twice as many cases of depression (25%) and almost three-times as many cases with anxiety (19.2%) than in the control group [18]. A total of 27% of women in the USA have a history of childhood sexual abuse, yet women with BPS/IC have increased rates of sexual abuse and physical traumatization histories compared with control women in their sample [19,20]. This finding is supported by a survey population of diagnosed BPS/IC patients and healthy controls. Those with BPS/IC reported abuse significantly more than controls (37 vs 22%;  $p < 0.001$ ). The same group also studied their clinical population with diagnosed BPS/IC and found that in a one-to-one interview of 49 patients, 49% reported some type of abuse history. Of those, 68% reported sexual abuse, 49% reported domestic violence, 78% reported physical abuse and 92% reported emotional abuse [21]. Importantly, BPS/IC patients with a history of abuse tend to have more bothersome voiding symptoms

and greater pain levels compared with BPS/IC patients without an abuse history [19]. In these patients, controlling their bladder symptoms may not necessarily manage their CPP.

There have been two subtypes of BPS/IC identified, ulcerative and nonulcerative IC [22]. Approximately 15% of young patients have ulcerative IC with Hunner's ulcers seen on cystoscopy. However, up to 42% of middle age and older patients may have this finding [23]. These patients typically have more severe bladder symptoms than nonulcerative BPS/IC patients. When Hunner's ulcers are seen they should be biopsied and cauterized, which helps to rule out carcinoma *in situ* of the bladder and can also provide symptom relief. It is important to distinguish between ulcerative and nonulcerative BPS/IC, as research notes different characteristics in both symptoms and comorbidities (worse in nonulcerative IC) and voiding parameters (worse in ulcerative IC) between the two subtypes [24]. In 2011, the American Urological Association came out with specific guidelines regarding the diagnosis and treatment of interstitial cystitis (Figure 1) [25]. They provide a specific step-by-step approach to the evaluation and treatment of these patients, recognizing that multiple, simultaneous treatments may be indicated in certain patients [25].

### Vulvodynia

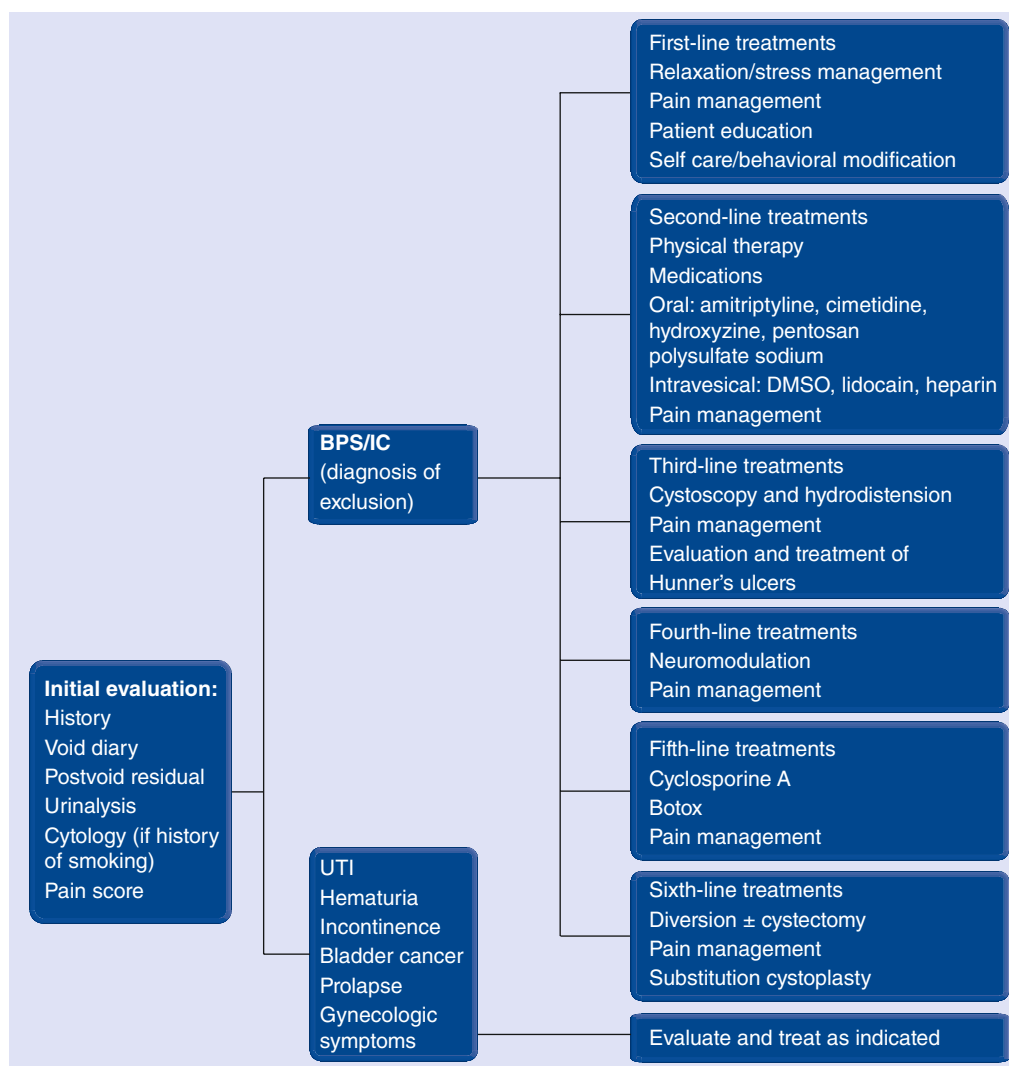
Dyspareunia is a common symptom in women with CPP; however, vulvar pain contributing to dyspareunia is often overlooked. This vulvar pain can either be generalized or localized, and both kinds of pain can be provoked, unprovoked or mixed [26]. Typically the 'burning' vulvovaginal pain is the most prominent complaint in patients with any of the subtypes of vulvodynia compared with the voiding complaints of urgency and frequency reported by patients with BPS/IC or pelvic floor dysfunction [27].

The most accepted definition of vulvodynia is vulvar discomfort in the absence of gross anatomical or neurological findings [26]. Vulvodynia has been shown to affect 16% of the female population and is commonly identified in younger females (<25 years of age); however, it can be present into the menopausal years [28,29]. It is characterized by feelings of burning, stinging, irritation or rawness to the vulva [30]. Women with vulvodynia frequently complain of dyspareunia and may have problems with sexual

response due to an increased awareness for and fear of resulting pain [31,32].

There are a number of historical risk factors that may predispose a woman to developing vulvodynia [33]. Women who had early menarche (~11 years of age) were more than twice as likely to report chronic lower genital tract discomfort than those who began their menses at ages 12 years or older [33]. Berglund *et al.* demonstrated that women who had intercourse before age 16 years was independently associated with increased risk of vulvar pain [34]. Harlow *et al.* reported a 30% increase in the risk of vulvodynia in patients with a history of oral contraceptive use, with the highest risk among women that began using them before age 18 years [35]. Women who experienced pain at their first use of tampons were two- to seven-times more likely to report chronic vulvar pain compared with those who experience no or little pain at first use [33,36,37].

Common physiologic features include abnormalities in pelvic floor musculature (e.g., increased tone and decreased contractile strength), increased numbers of small, terminal nerve branches in the vulva, and higher numbers of mast cells in the vulva compared with unaffected tissue. The condition may be triggered by pudendal nerve neuralgia or injury (e.g., from childbirth, previous surgery, horseback riding or other sports injuries) [38]. In addition, vulvodynia may result from referred pain from a ruptured disc or scarring around the sacral nerve roots after disc surgery or from sacral-meningeal (Tarlov) cysts. Other potential triggers include neuropathic viruses (e.g., herpes zoster resulting in postherpetic neuralgia) or neurological diseases, such as multiple sclerosis [39]. There are a number of theories that attempt to explain the cause of vulvodynia. One suggests that sympathetically maintained pain loops caused by repeated irritation and trauma may lead to continuous burning or pain in the vulva. Another theory is that inflammatory events release cytokines that sensitize nociceptors in nerve fibers of the vestibular epithelium. Studies have shown increased intraepithelial nerve endings in patients with vestibulitis [40-44]. Recent studies demonstrate central upregulation in women with various types of vulvar pain. This is manifested by lower pain thresholds locally, and in patients with chronic pain, this hypersensitivity can also occur systemically [45].



**Figure 1. American Urological Association guidelines summary for evaluation and treatment of the bladder pain syndrome/interstitial cystitis patient.**

BPS/IC: Bladder pain syndrome/interstitial cystitis; DMSO: Dimethyl sulfoxide; UTI: Urinary tract infection.

Data taken from [18].

As with other CPP conditions, vulvodynia is a diagnosis of exclusion. A thorough history should be obtained, including previous treatments, allergies, past medical and surgical history, sexual history and whether there is any history of abuse [39]. Patients with a history of chronic vulvar pain and a history of chronic yeast or vaginal infections should be suspected of having this condition, especially if a vaginal culture does not confirm growth of yeast or bacteria. A biopsy should be considered in the presence of abnormal skin findings (i.e., lichen sclerosis) but should be omitted in the absence of such findings [46].

As with other causes of CPP, psychological well-being can be affected in patients with vulvodynia [47]. A recent study suggests that there may be an additional psychological component, at least with regard to perceptions of pain among women with vulvodynia. In this study, 28 women with vulvar vestibulitis syndrome (VVS) and 50 healthy control subjects were assessed for nongenital pain perception. Women with VVS demonstrated a lower pain threshold and a greater magnitude of pain estimates, combined with greater trait anxiety, increased somatization and a poor body image [48]. Another study found that women with VVS

report hypervigilance for coital pain and also exhibit selective attentional bias towards pain stimuli compared with controls. This effect was predicted by state and trait anxiety, and fear of pain. The authors concluded that treatment strategies should target anxiety and fear, as well as physical symptoms [48–50].

#### Pelvic floor dysfunction—hypertonus

Whereas BPS/IC is the 'catch-all' for pelvic pain, hypertonic pelvic floor dysfunction is often a forgotten and overlooked etiology. The musculoskeletal system, as an unrecognized cause of pain, may be an important factor in CPP, specifically the persistent and refractory type [51]. Myofascial pain and hypertonic pelvic floor dysfunction are present in as many as 85% of patients with BPS/IC and/or chronic pain syndromes [52].

The pelvic floor muscles are arranged in deep and superficial layers and act as a sling to support the pelvic organs. The bones and ligaments of the pelvis provide support to the pelvic muscles. The deep levator ani muscles are the most important of the pelvic floor muscles and consist of the pubococcygeus, iliococcygeus, and the coccygeus, often referred to as the pelvic diaphragm. The levator muscle group was described in detail by Dickenson in 1889. Even then, he recognized the complexity of the muscle group and the role it played in pelvic pathology [53]. The main function of the muscles is in controlling continence and both bowel and urine elimination. The ischiocavernosus, bulbospongiosus and superficial transverse perineal muscles comprise the superficial layer of the pelvic floor.

The pelvic floor is controlled by both somatic and autonomic motor nerves and is particularly important to understand when evaluating patients for pelvic floor dysfunction [54]. Somatic nerves at S2–S4, referred to as Onuf's nucleus, provide innervation to the anal and urethral sphincter and pelvic floor muscles [55]. The somatic motor fibers leave the spinal cord and form the pudendal nerve, which travels through the greater sciatic foramen and travels into the ischioanal fossa, or Alcock's canal. The pudendal nerve branches into the dorsal nerve of the clitoris, the inferior rectal nerve and the perineal nerve. These provide sensory innervation to the clitoris, sensory and motor innervation to the anus, and sensory

innervation to the labia, distal urethra, bladder and lower vagina, respectively. The perianal nerve also provides sensory and motor supply to the pelvic floor muscles and external urinary sphincter. The main innervation to the levator ani muscles is from the pudendal nerve and direct S3–S5 branches. Spinal levels L4–S4 provide innervation to the skin of the vulva and the muscles of the pelvic floor [56,57].

The autonomic nervous system, along with higher brain centers, allows the precise coordination of events necessary for storage of stool and urine, voiding and defecation, and sexual function. Preganglionic parasympathetic nerves are located in the sacral parasympathetic nucleus in the spinal cord at the level of S2–S4. The axons pass through the pelvic nerves and synapse with the postganglionic nerves in either the pelvic plexus or directly on the end organ. The postganglionic nerves in the pelvic nerve mediate the excitatory input by releasing acetylcholine acting on muscarinic receptors. The sympathetic innervation of the pelvic floor originates from the intermediolateral nuclei in the T10–L2 region of the spinal cord. The axons leave the spinal cord via the splanchnic nerves and travel either through the inferior mesenteric ganglia and the hypogastric nerve, or pass through the paravertebral chain to the lumbosacral sympathetic chain ganglia and enter the pelvic nerve. The ganglionic sympathetic transmission is mediated by acetylcholine acting on nicotinic receptors.

An important concept to understand when treating pelvic pain is that of cross-system interactions or convergence. This is a loss of peripheral specificity when a stimulus arrives in the CNS, making it difficult to sort out the exact source of the stimulus [58]. In the case of pelvic floor dysfunction, the levator muscles may be stretched and irritated but the patient may perceive it as bladder pain or vaginal pain. This helps explain why patients with chronic pelvic pain have usually seen several different specialists. The exact site of the pain trigger can be difficult to localize.

Patients that present with pelvic floor dysfunction may have a history of prior surgery, abuse, complicated vaginal delivery or of intense exercise in which they held their core and pelvic floor muscles tight [59–61]. They may have a history of being a competitive dancer, gymnast, diver, cheerleader or equestrian. Interests in

pelvic floor muscle tension as a source of CPP have evolved over the last 15 years [62]. On physical examination, myofascial trigger points have been described. These hyperirritable bands of muscle can be palpated through the vaginal walls. They are often knot-like or taut and are painful on compression, reproducing the patient's pain symptoms [63,64].

Tu *et al.* demonstrated that women with CPP had more frequent musculoskeletal findings and had less control over their pelvic floor compared with control subjects [65]. When patients have significant pelvic floor tension and trigger points, an examination may be severely limited or patients may be very anxious with even the thought of a pelvic or vaginal examination. This reaction should alert the clinician to the possible diagnosis of hypertonic pelvic floor dysfunction.

### Current treatments

Important advances in the treatment of BPS/IC are evident in the American Urological Association guidelines [25]. Pain management is an essential component to each treatment option. First-line treatments involve a multidisciplinary approach and include general relaxation and stress management, patient education, self-care and behavioral medication, and pain management. Second-line agents include physical therapy (avoiding kegel exercises), and oral and intravesical agents. Cystoscopy with hydrodistension used to be higher in the treatment algorithm but is now third line. Hunner's ulcers should be biopsied and treated with fulguration if identified. Neuromodulation and advanced intravesical treatments are fourth- and fifth-line treatments, respectively.

Although neuromodulation is not US FDA-approved for pelvic pain, it is useful in patients that have failed other conservative therapies, and patients often get some relief from their pelvic pain. Marcelissen *et al.* performed a review of ten articles addressing the efficacy of sacral neuromodulation in patients with BPS/IC. The mean reduction in pain scores was between 40 and 72% with follow-up between 5 and 87 months. Two articles looked at miscellaneous urogenital pain syndromes with success rates ranging from 60 to 77%, with follow-up between 19 and 36 months [66]. The present authors previously reported on a cohort of 21 refractory IC patients and found that the requirement of narcotic pain medication decreased 36% after implantation

of the Interstim® device (Medtronic, Inc., MN, USA) [67]. Pudendal neuromodulation has also been studied and has been shown to provide even more benefits than sacral neuromodulation [68].

Urinary diversion, with or without cystectomy, is the last resort, although can be considered early on if patients have end-stage small bladders and the clinician and patient agree that it is a reasonable option. Patients with ulcerative BPS/IC have a much better response to surgical treatment compared with those with nonulcerative BPS/IC [69].

Treatments for vulvodynia should start with topical and oral agents [70]. Oral gabapentin or pregabalin, antidepressants for pain, aqueous moisturizers, cold compresses or oil-based soothing topicals (i.e., emu oil) may be used. Many women have more pain with gel products or topicals with a propylene glycol base [71]. Electromyographic feedback of the pelvic floor musculature has been used with some success in women with vulvar vestibulitis. A small, tampon-like device is inserted into the vagina and performs pelvic floor muscle rehabilitation exercises. One study showed an 83% decrease in subjective pain. A total of 79% of patients, who had abstained from intercourse for an average of 13 months, resumed intercourse by the end of treatment and at a 6-month follow-up. Just over half of the woman studied reported pain-free intercourse at the 6-month follow-up [72,73]. Another off-label option is to use 2–10 mg diazepam intravaginally to address the pelvic floor hypertonus that often accompanies the vulvar pain. Clinicians have found improved pain levels and sexual function with minimal adverse effects [74,75]. In severe cases, women may undergo a surgical procedure known as a vestibulectomy [71]. This procedure should be done by specialists who frequently perform this procedure for vulvar pain conditions. There are some drawbacks to surgery, including the risks and costs, removal of glands necessary for sexual lubrication, scar tissue and potential recurrence of symptoms after 6 months [73].

Physical therapy plays a key role in the evaluation and management of chronic pelvic pain patients that have been diagnosed with pelvic floor dysfunction. There have been few studies in the literature evaluating the role of manual therapy in pelvic pain patients, but those that have been published have been promising [65,76,77]. In a recent NIH-funded multicenter

study, investigators found that 59% of patients receiving myofascial physical therapy reported moderate or marked improvement in their symptoms compared with 29% of the control group of patients receiving global therapeutic massage [78].

Trigger-point injections are another important component of pelvic pain therapy. Several studies have shown the benefit of levator ani trigger-point injections [79,80]. The present authors currently use a mixture of ropivacaine or lidocaine and triamcinolone for our trigger-point injections. Approximately 5 ml of the mixture is injected transvaginally directly into each of the taut bands or trigger points in the levator muscle. If the results are good but short-lived with standard trigger-point injections, injection with the botulinum toxin may provide further relief [81,82].

#### A multidisciplinary approach to chronic pelvic pain

Due to the complex nature of CPP, a synergistic approach may produce a greater effect in a shorter time period. Programs are needed that support mind–body healing and promote healthy living at multiple levels. At a tertiary center for BPS/IC and CPP (Beaumont, Royal Oak, MI, USA), patients with severe, long-term CPP symptoms who have been refractory to various treatments for years can be found. Their lives often seem ruled by their symptoms and they can no longer be the mother, wife, daughter, sister, aunt or employee that they once were. Numerous outpatient office visits and emergency room visits for pain lead to elevated healthcare costs, lost wages from work and time away from home and family [83]. These all contribute to increased stress for the patient. These challenging patients come to the center not only with their urologic and pain symptoms, but also expressing helplessness and hopelessness. In 2009, the present authors were given a generous philanthropic gift and the opportunity to create a center dedicated to women's urology issues. Thus, Beaumont Women's Urology Center was created with the specific vision and purpose to provide multidisciplinary, compassionate, holistic and comprehensive care to women with urologic conditions and their comorbidities. It's vision and commitment to these women is to provide quality care in a holistic 'one-stop' location that is private, woman-centered and conveniently

accessible. The center is eco-friendly, created in feminine colors with sustainable materials.

Each examination room has a lighted ceiling image to provide a relaxing focus during the examination. The examination tables and stirrups are cloth covered and the power tables adjust to wheelchair height. All furniture has extra padding and is water-resistant due to our specialty (Figure 2). Warm blankets, microwaveable heat packs, frozen ice packs, and filtered water for patients to drink are available as needed. Their philosophy is to welcome patients, help them to be as comfortable as possible and facilitate open communication, leading to better care. By creating a center specifically for women, patients know immediately that the care is for women just like them. For example, many urologist offices are decorated in a more masculine style and have no teaching aids focused on women. The center believes women who feel comfortable and are heard, will share their story more completely, so that a comprehensive plan of care can be developed.

New patient encounters begin with a mailed or downloaded extensive health history questionnaire and quality-of-life indices that women can complete in the comfort of her own home. This history asks the usual urologic and gynecologic health questions, but also specifically asks about abuse history, detailed sexual pain and psychiatric history. Space is left for the women to write additional information or questions. A typical first office visit usually lasts 1 h as the women's health nurse practitioner (WHNP) goes through the completed history with the patient and asks additional questions as needed. The patient's prescription medications, homeopathic remedies and supplements are reviewed. Chiropractic and complementary therapies used by the patient and their effect are also discussed. Furthermore, questions focus on trying to elicit the onset of the symptoms to determine if there was a specific trigger or event prior to developing the CPP symptoms. Symptoms such as frequency, urgency, urinary incontinence, dysuria, hematuria, dyspareunia, pelvic pain, vulvodynia and stress situations are discussed. For the question of abuse, the WHNP would say something such as: "many women who come to our center have often said that someone hurt them either as a child or as an adult. It could be physical, sexual, verbal or emotional – has anything like that ever



happened to you?” Often, women who have marked 'no' on their questionnaire, actually report a history of abuse or domestic violence in a one-to-one private interview. The WHNP thanks the patient for sharing this information and asks how they think it is impacting their life now. With abuse victims, the response is: “it wasn't your fault; I am sorry that happened to you.” Many women have never heard that from anyone, including a healthcare provider. Seng suggests that a patient's health status can improve through acknowledgement of their trauma as a contributing factor to their health [84]. Through listening, discerning and dialog, followed by a physical examination, a plan and a working diagnosis can be developed with the patient.

The physical examination is usually a focused pelvic and vaginal examination. The goal is to attempt to reproduce the pain, identifying any pathology with the abdominal–pelvic examination. However, care must be taken as the pelvic pain patient may be hesitant to even allow an examination to be performed. Smaller Pederson's speculums are used, as well as microwave heat packs to the lower abdomen for women in pain. Lubrication is used on the speculums for additional patient comfort [85]. For those with vulvodynia and sensitivities to gels and lubricants, water or emu oil is used as the lubrication for the examination. The vaginal examination is much more thorough than what is normally carried out on nonpelvic pain patients. Vulvar pain, trigger points and bladder pain are all assessed. Vaginal pH should be assessed, as well as a Q-tip examination of the vulva to assess for hypersensitivity disorders, such as vulvodynia. The examination may reveal tenderness to the anterior wall at the level of the bladder and trigone. The vaginal examination should include evaluation of the levator muscles and may identify a component of pelvic floor dysfunction.

Laboratory studies include a urinalysis to rule out a urinary tract infection and urine cytology should be considered in patients that have a history of smoking or are otherwise at high risk of bladder cancer. Pelvic ultrasound or other imaging tests may be ordered as indicated by evaluation and examination. Anatomy and physiology is reviewed in depth, including the pelvic floor musculature and nerves. Women may be asked to complete a



Figure 2. Examination room at the Women's Urology Center (MI, USA).

voiding diary for the next visit, which can be helpful during the initial evaluation and can also help to monitor treatment response after therapy is initiated. Cystoscopy, urodynamics or laparoscopy are usually not necessary in most patients at this point. Medications/supplements may be adjusted and referrals given for pelvic floor physical therapy, integrative medicine (e.g., Reiki, guided imagery, medical massage, acupuncture or naturopathy), or psychologic evaluation. Treatment options are discussed and a follow-up appointment is made.

Following the visit with the WHNP, the patient may be seen by one of three physicians who are fellowship-trained in female urology and pelvic floor conditions. The physician will review the history, tests results and examination findings, and spend time talking with the patients

about their symptoms and their concerns. They will re-examine the patient and discuss options for care. At that time, they may do trigger-point injections, cystoscopy or another procedure if indicated.

In several medical practices dealing with CPP, if there has been no identifiable pathology following the evaluation by the clinician, treatment often comes to a halt. Often, narcotics or opioids are prescribed but the underlying cause of the problem is not addressed. Although the center is urology based, the need for other medical specialities in the evaluation and treatment of these patients are also considered. The center works closely with the gynecology department and will often refer patients depending on the nature of their complaints. Often patients have seen their gynecologists first who then refer them to the center for evaluation after their testing has been negative. Occasionally, patients will find the clinic on the internet or community adverts or will be referred by their primary care provider. If there are gynecologic or gastrointestinal concerns, patients will be referred.

The center could not function without an onsite team of specialized pelvic floor physical therapists treating disorders related to pelvic floor dysfunction, pelvic and urogenital pain and prolapse. This is a key component of the multidisciplinary management; however, it is not available in many areas of the country. These therapists must be highly specialized in recognizing and treating pelvic floor dysfunction. Intravaginal techniques are employed and when not performed (as in most nonspecialized centers), treatment results are less than optimal. Furthermore, additional research is needed to determine how best to treat these patients and what aspects of multimodal therapy are the most beneficial. Randomized trials with controls are the best way to accomplish this.

A key addition to the onsite team is a PhD psychologist who specializes in the needs of women with CPP issues and their comorbidities. As discussed above, many women with CPP have a history of abuse or depression. Therefore, psychiatric counseling is imperative to their recovery. In addition, patients without prior psychiatric issues may develop depression or anxiety as a result of living with chronic pain, so counseling and coping methods are also offered to those women [86]. Flexible treatment approaches include cognitive, behavioral and

psychodynamic methods. The psychologist previously provided care to patients at an offsite location, but the onsite collaboration has proven very effective in care management by the team.

The center also works closely with pain specialists during the evaluation and treatment of patients. As mentioned, CPP patients have often been treated with narcotics and other types of addictive medications. They may need counseling and assistance with weaning off these medications or be placed on more appropriate medications. Clinicians need to change their paradigm from prescribing opioids and narcotics for CPP to addressing the underlying neuromuscular issues through pelvic floor physical therapy, muscle relaxants or targeted localized therapy. Specific trigger points associated with nerve pathology (pudendal, ilioinguinal and sacroiliac, among others) can be identified, and focused injections can be performed by the pain specialists with sedation if necessary.

The center's integrative medicine services onsite include medical massage, Reiki and guided imagery. For all patients, guided imagery compact discs (CDs) are offered, created specifically for women with BPS/IC and/or vulvodynia. The present authors' groundbreaking research on the use of guided imagery for BPS/IC symptoms showed that women with BPS/IC using the guided imagery CD twice a day had less urge and pain after just 2 months [87]. This therapy seemed to help counteract the symptoms associated with activation of the hypothalamic–pituitary–adrenal axis, as previously described, and is supported by other literature and research supporting the direct effect of hypnosis and mind–body therapies on areas in the brain linked to the pain experience, and the efficacy of self-hypnosis in reducing chronic pain [88–90]. Acupuncture, naturopathy, craniosacral therapy and reflexology are also available on the center's campus in a nearby building.

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### Conclusion & future perspective

The significant number of studies that have been performed over the last 15 years, and the recognition of the multitude of etiologies for CPP, have helped the condition mature from its infantile stages of one diagnosis and one treatment option. However, there is still confusion regarding how to diagnose BPS/IC,

pelvic floor dysfunction and other etiologies of CPP, and discerning what the difference really is. This is especially prominent in the nonspecialized centers where these patients often present first [91]. In a study evaluating the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) criteria for diagnosing BPS/IC in the UK, urologists with a special interest in female urology answered approximately 75% of the questionnaire correctly in contrast to less than 40% of general gynecologists [15].

Of course, not all of patients with CPP or those seen in the center with other concerns have histories of comorbid conditions, abuse or psychiatric diagnoses. The key point is that the center is cognizant of these issues contributing to the health status of the patients, which are explored. If there are no issues, the plan may not include psychologist intervention or guided-imagery intervention. However, since all patients are women, there may often be other stressors in their lives as caregivers for children or elderly parents, their careers, relationship issues, 'empty nest' syndrome, among others, that also necessitate a multidisciplinary approach. The center's approach in the office and through their interventions is to enhance the relaxation response, decrease muscle tension and pain, if present, and maximize wellness and coping skills. Tools such as the guided-imagery CD and psychological therapy are offered to patients to minimize catastrophizing, which often accompanies chronic conditions [12]. The center's psychologist performs a complete psychological assessment, followed by a treatment plan that is agreed upon by the patient. Treatment approaches are flexible to address the specific needs and problems of the individual and may include issues related to their symptoms, their current diagnosis or other concerns.

In the end, the goal is to address the health concerns of the CPP patient. This includes utilizing traditional medical interventions and research opportunities at the institution, nursing and educational interventions, psychosocial interventions, physical therapy interventions and integrative medicine interventions as required. Although not every clinician is a psychiatrist or therapist, it is the center's responsibility as healthcare providers to assess the whole person who is being cared for and make appropriate referrals. 'The bladder' can no longer be separate

from the body and mind of the patients. Patients express optimism, hope and more confidence in their care as they experience being part of this multidisciplinary team. As they implement new care therapies and coping strategies, many women can be seen returning to "living their lives" (their description).

It is the patients and their tenacity through life's struggles that continue to motivate the center's team. As a care provider team, the clinicians and therapists in the center have learned that they are dependent on each other's expertise and value what each team member has to offer in the care of their patients. Significant strides have been made in phenotyping patients with CPP; however, the next step is to determine what needs to be done to treat them in the most complete and holistic way in order to obtain the best chances for a successful outcome. CPP can be a very frustrating condition for both the patient and the clinician. At the present author's multidisciplinary site, however, they have become more efficient in knowing what resources are available, are more able to utilize these resources and have been able to provide patients with the care they need to overcome a diagnosis of CPP. When patients have successful results and feel good for the first time in 6 months (or longer in most cases), CPP can be an extremely rewarding condition to evaluate, diagnose and treat. For those who do not find long-term relief, clinicians must challenge themselves to think outside of the box and do more to meet their needs. Research funds need to be directed towards multidisciplinary efforts specific for CPP conditions and treatments. The synergistic effect of therapies needs to be examined. For now, it is hoped that clinicians will be inspired by the center and their multidisciplinary model of care and create similar multidisciplinary sites around the country to enhance the health and quality of life for all patients.

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*The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.*

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