Chronic Pelvic Pain

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Learning Objectives

1. Define chronic pelvic pain (CPP), including its complex and multifactorial dimensions.
2. Develop a systems-based approach for developing a differential diagnosis of CPP, recognizing that a single diagnosis is often not possible.
3. Describe how to perform a focused history and physical exam in a patient presenting with CPP.
4. Provide examples of initial tests to perform when evaluating a patient with CPP.
5. Discuss treatment options for the multidisciplinary management of CPP.

Sally is a 35-year-old G1P1 woman who presents with pelvic pain. Her menses are regular and last 7–8 days. Her pain started several months after the birth of her daughter 3 years ago. Initially, the pain would only last a couple days at a time and occurred once every few months. Over the last month, the pain has been increasing in intensity and frequency and now is occurring on a daily basis. She is having difficulty concentrating at work due to her pain.

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Background

Chronic pelvic pain (CPP) is a prevalent and debilitating condition that impacts women worldwide. It is estimated that CPP affects up to 15% of reproductive age women in the United States [1]. Globally, the prevalence of chronic pelvic pain ranges from 2.1% to 26.6% [2, 3]. CPP is generally defined as noncyclical pain of at least 3–6 months' duration that appears in locations such as the pelvis, anterior abdominal wall, lower back, or buttocks and that is serious enough to cause disability or lead to medical or surgical care [4, 5]. Chronic pelvic pain places a significant burden on the affected individual and on society through economic and healthcare-related costs. In a study by Mathias et al., 15% of women with chronic pelvic pain reported missing paid work. In 1996, this correlated with an estimated cost of $555.3 million dollars due to time lost from work [1]. Women suffering from CPP have significant associated comorbidities and a diminished quality of life. A large study of women with CPP found that 98% met DSM-IV criteria for at least one mental health disorder, 50.5% suffered from a mood disorder, and 38.6% suffered from an anxiety disorder [6]. The large percentage of mental health comorbidities among women with CPP underscores the importance of accurate diagnosis and multidisciplinary care of CPP patients.

There are entire chapters in this book dedicated to a few of the most common causes of chronic pelvic pain including Endometriosis (Chap. 10), Irritable Bowel Syndrome (Chap. 27), Interstitial Cystitis/Bladder Pain Syndrome (Chap. 30), Vulvar Conditions (in Chap. 12), as well as other contributors to pelvic pain such as Depressive and Anxiety Disorders (Chap. 33) and Intimate Partner Violence and Sexual Trauma (Chap. 35). Details of the diagnosis and management of these conditions are outside the scope of this chapter. This chapter will provide a general approach to the patient who presents with pelvic pain and focus on localized causes of CPP such as abdominal wall pain, pelvic floor dysfunction, myofascial pain syndrome, vaginismus, and adhesive disease.

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Neuroanatomy of the Pelvis

There are numerous potential etiologies for female chronic pelvic pain, which will be reviewed in further detail within this chapter through a systems-based approach. To best understand the sources and pathophysiology of female chronic pelvic pain, it is imperative to become familiar with the neuroanatomy of visceral and somatic pain pathways within the abdominopelvic region.

The innervation of the pelvis is complex. An intricate relationship exists between the somatic, sympathetic, and parasympathetic nervous systems to allow for appropriate sensation and coordination of dual voluntary and involuntary bodily functions, such as micturition, defecation, and parturition.

The somatic nervous system innervates the skeletal muscles of the pelvis, the abdominal wall, and the skin overlying the external genitalia. The anterior cutaneous branch of the tenth intercostal nerve transmits pain at the level of the umbilicus. The skin overlying the suprapubic region is innervated by cutaneous branches of the iliohypogastric nerve, which is derived from the L1 nerve root [7]. The pelvic floor, which is predominantly made up of the levator ani muscle group (puborectalis, pubococcygeus, and iliococcygeus), is innervated by the S3–S5 nerve roots. The pudendal nerve is the primary sensory and motor nerve of the perineum, which is derived from the S2–S4 nerve roots. Branches of the pudendal nerve provide sensory innervation to the skin of the posterior labia and the clitoris, the urethral and anal sphincters, and the muscles that coordinate orgasm [6–8]. The anterior cutaneous innervation to the labia is supplied by the ilioinguinal nerve (nerve root L1) [8]. Injury to the sacral nerve roots or their branches can result in acute or chronic pain and dysfunction of the innervated tissues. The somatic nervous system most often plays a role in vulvar disease (vulvodynia), vaginismus, myofascial pain syndrome, pelvic floor spasm, and abdominal wall pain.

Visceral pain is unique in that it is poorly localized, can occur without injury (e.g., stretching of the bladder), can be referred to other parts of the body, and is associated with autonomic responses such as nausea, vomiting, and sweating [9]. Visceral pain from the uterus, bladder, and rectum is predominantly transmitted through sympathetic nervous system fibers via the hypogastric plexus [8]. The nerves of the hypogastric plexus return to the spinal cord through the lumbar splanchnics and eventually reach the processing centers in the brain. Conversely, pain signals from the ovary and distal fallopian tubes, which are lateral pelvic structures, and travels through the parasympathetic system through the ovarian plexus to the vagus nerve [8]. Patients with chronic pain can perceive any visceral sensation as pain due to complex dysregulation of pain processing. This may include "central sensitization," where the central nervous system is primed to interpret any pain stimulus in an exaggerated way, and "visceral cross sensitization," where a healthy pelvic organ is influenced by an adjacent diseased organ to perceive pain [6] (Fig. 31.1).

> *Sally states that her pain is sharp and constant in the lower abdomen. The pain shoots down toward her groin and is aggravated by intercourse. The pain is so intense that she cannot tolerate using tampons. She denies any history of pain with menses (dysmenorrhea), bowel movements (dyschezia), or urination (dysuria).*

History

Every woman who presents with chronic pelvic pain will describe her chief complaint and the location and quality of her pain differently. Therefore, a systematic and thorough history is necessary to understand the full scope of the patient's symptoms and concerns. When obtaining the history, it is important to keep the differential diagnoses in mind in order to prevent missing a potential diagnosis. Women may have many different types of pain, and the details of each should be recorded separately. It is important to create

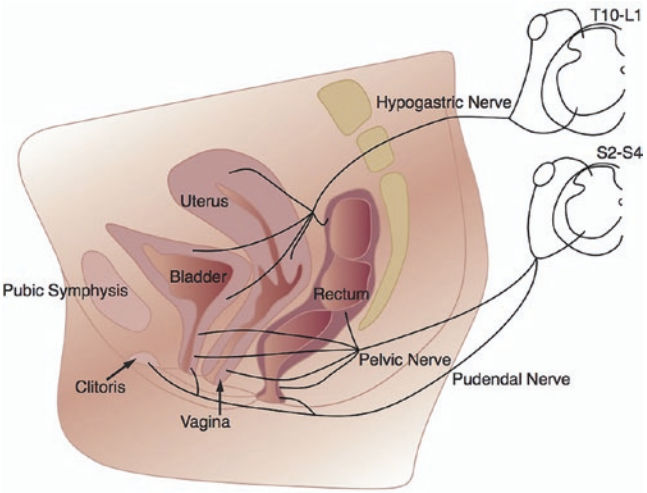

Fig. 31.1 Innervation of the pelvic organs. Sensory axons innervating the vagina reach the spinal cord via pelvic nerves and terminate in sacral spinal cord segments (S2–S4). Axons innervating the uterus travel in the hypogastric nerves and terminate in the thoracolumbar spinal cord segments (T10–L2). The region surrounding the cervix represents a transitional zone and is innervated by fibers that travel in both nerves. Sensory axons from the clitoris and vulva follow the pudendal nerves to sacral spinal cord. Note that sensory information from all pelvic organs may converge onto the same spinal cord neural circuits, DRG (dorsal root ganglia) [10]. (Image reprinted from Jobling et al. [10]: article 17. Special thanks also to Kelly Smith)

a safe, comfortable, and judgment-free space for patients with CPP, as with all patients. The patient should feel that the provider is listening and taking her symptoms seriously. *Whenever possible, history-taking should be performed in the office while the patient is fully clothed.*

A detailed pain history is critical and should include information about the pain characterization: onset, location, duration, timing, what the pain feels like, aggravating and alleviating factors, and prior treatments of each type of pain. Care should be taken to determine the impact of the chronic pain on the patient's quality of life, relationships, and employability. While keeping the differential diagnosis in mind, a complete neurologic, gastrointestinal, urologic, musculoskeletal, gynecologic, and psychiatric review of systems should be obtained. Past medical and surgical history should include any history of chronic pain disorders, psychiatric conditions, and prior abdominal or pelvic surgeries. A detailed obstetric and gynecologic history should include information regarding prior pregnancies and deliveries, menstrual history, sexual history, and any prior diagnoses of endometriosis, fibroids, or sexually transmitted diseases. Pertinent aspects of the patient's social history include occupation, employment disability, support system, screening for history of trauma, and past or present intimate partner violence (see Chap. 35 on Intimate Partner Violence and Sexual Trauma) and drug use (see Chap. 32 on Opioid Use Disorder in Women). Family history should focus on history of chronic pain disorders, substance use, trauma, or psychiatric illnesses.

Physical Exam

The physical exam for a patient with pelvic pain can be a very uncomfortable experience. Prior to beginning the physical exam, it is crucial that the provider create a safe environment for the patient. All components and indications for the different aspects of the physical exam should be explained and verbal consent obtained prior to proceeding with each part of the exam. The patient should also understand that she is in control and that she may pause or stop the exam at any point. Additionally, the patient should be offered a chaperone and/or allowed to have a support person in the room with her if that makes her feel more comfortable with the physical exam.

The focused physical exam should start with a visual assessment of the patient's abdomen while she is lying in the supine position. The abdominal wall should be assessed for any visible masses, areas of asymmetry, skin changes from chronic heat pad usage, and scarring from prior surgical procedures. Next, auscultation for bowel sounds should be performed in all four quadrants. Palpation of the abdomen should proceed from superficial structures down to deep structures. The Carnett's test, in which the examiner palpates each quadrant of the abdomen at rest and then with contraction of the abdominal wall by having the patient raise her head off the bed without using her arms, can be performed to assess for abdominal wall musculoskeletal pain [11]. The Carnett's test is reported to be "positive" if the patient reports reproduction of her pain with palpation of a contracted abdominal wall (as opposed to the relaxed state) and has a diagnostic accuracy of 97% for abdominal wall pain [12]. In contrast, this physical exam finding is positive in less than 10% of patients with a visceral etiology of their chronic pain. When palpating the abdomen at rest, each quadrant should be gently palpated at a superficial and deep level to evaluate for masses, organomegaly, or focal areas of tenderness. Additionally, the patient should be assessed for any signs or symptoms of an acute surgical abdomen: involuntary guarding (tensing of abdominal wall muscles in anticipation of pain with palpation) or rebound tenderness (tenderness when quickly releasing pressure off of the abdominal wall). Patients with evidence of an acute surgical abdomen require immediate evaluation in an emergency room.

The gynecologic exam begins with a visual inspection of the perineum and vulva while the patient is in the dorsal lithotomy position. The external genitalia should be carefully examined for any signs of skin changes, trauma, excoriations, swelling, scarring, pelvic organ prolapse, cystic lesions, and unusual discharge or odor [13]. Next, a Q-tip test should be performed to assess for vulvodynia [14]. This is performed by assessing for reproduction of pain around the introitus when lightly swabbing at the 3 o'clock, 6 o'clock, and 9 o'clock locations. The patient's baseline pain should be assessed on scale from "0" (no pain) to "10" (worst possible pain) and can be used to assess degree of pain improvement following treatment [13].

Assessment of the pelvic floor muscles should also proceed from superficial to deep. The perineal body can be assessed by gently depressing with a single digit just outside the introitus at the 6 o'clock location. The bulbospongiosus muscles can be palpated just deep to the labia majora from 1 o'clock to 5 o'clock on the left and 7 o'clock to 11 o'clock on the right. Next, the deep muscles of the pelvic floor (levator ani, obturator internus, piriformis muscles) should be evaluated. The levator ani muscles can be assessed by placing a single digit within the introitus and gently palpating from 3 to 5 o'clock and 7 to 9 o'clock toward the ischial spines. The obturator internus muscles can be palpated superior to the ischial spines at the 3 o'clock and 9 o'clock positions [13]. The location of any focal areas of muscular tenderness or tight bands should be documented as these may be indicators of pelvic muscle spasm. Muscle testing should also be performed by first palpating the resting tone of the pelvic floor digitally and then asking the patient to maximally contract her pelvic floor muscles (also known as

a Kegel). The strength of the muscle contraction should be rated from "0" (no palpable contraction) to "5" (strong muscle contraction) on a modified Oxford scale [15]. The strength of the Kegel can be determined by the degree of squeeze around the examiner's digit as well as the degree of upward lift of the pelvic floor. A weak pelvic floor contraction may be an indication of pelvic floor laxity or uncoordinated pelvic floor muscle movement. The ability to voluntarily relax the pelvic floor is important and can be evaluated by asking the patient to Valsalva or bear down similar to a bowel movement. Pelvic floor relaxation can be determined by degree of relaxation around the examiner's digit as well as visualization of descent of the perineal body. If the patient is unable to do this, pelvic floor dysfunction may be playing a role in the patient's symptoms (Fig. 31.2).

Following assessment of the pelvic floor muscles, a bimanual exam should be performed to assess the uterus, cervix, and adnexa for structural abnormalities. This portion of the exam may be particularly uncomfortable physically or emotionally for women with chronic pelvic pain, and the patient should again be reassured that she can stop or pause the exam at any point. Although a speculum exam is often performed before the bimanual exam in most routine gynecologic assessments, the speculum exam may significantly aggravate chronic pelvic pain symptoms, which can make it more difficult to localize the patient's pain on bimanual exam. Clinical judgment should be used when deciding the order of performing the bimanual and speculum exam.

The bimanual exam is performed by placing one lubricated, gloved digit from the dominant hand vaginally until the

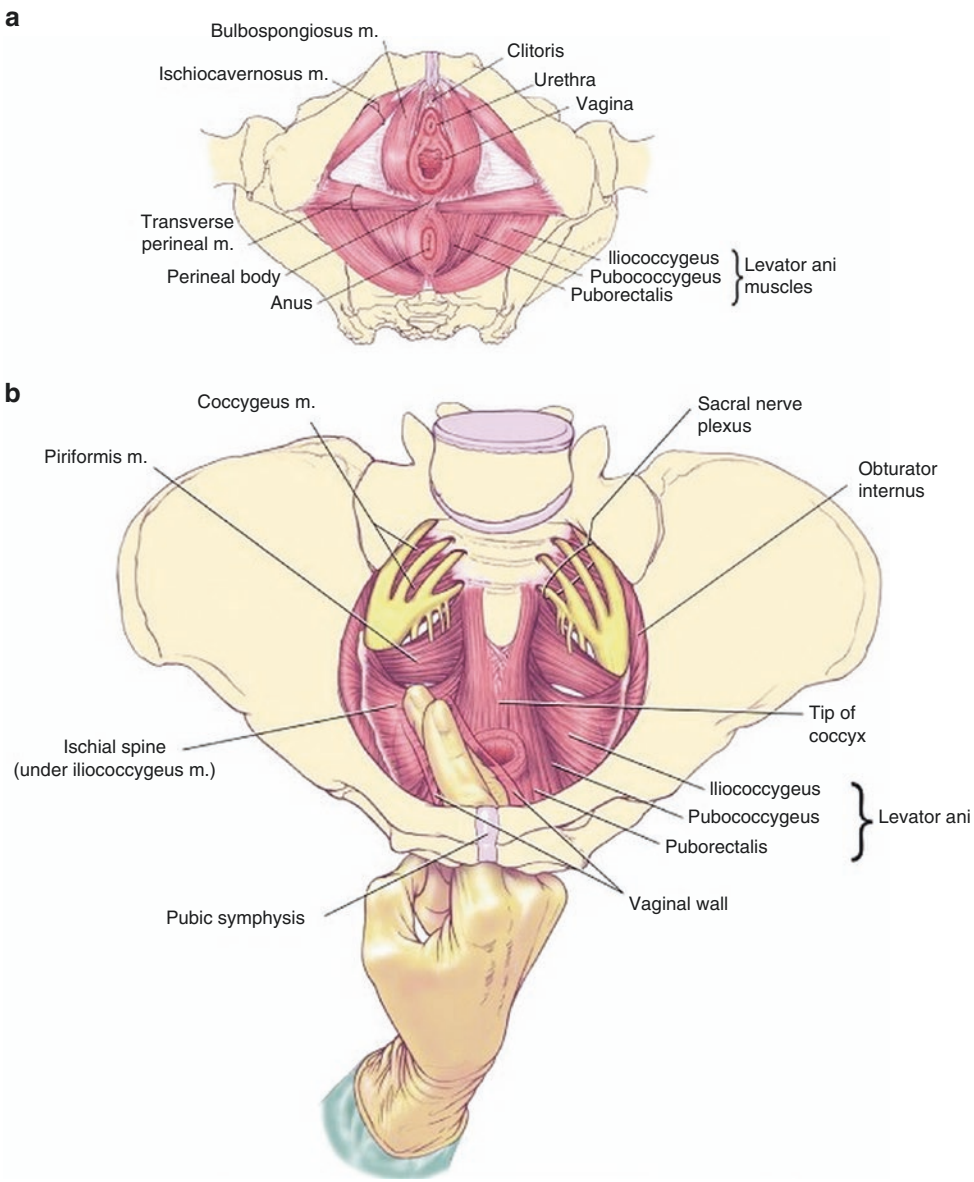

Fig. 31.2 (**a**) Muscles of the pelvic floor. (**b**) Digital palpation of deep pelvic floor muscles. m muscle [16]. (Reprinted from Mayo Clinic Proceedings, Faubion et al. [16], © 2012, with permission from Elsevier)

cervix is palpated. The finger can be lubricated with water or a water-based lubricant. Two vaginal digits may be needed in order to adequately palpate the uterus and cervix; however, this should only be performed if it is tolerated by the patient. Following identification of the cervix, the cervix should be gently pushed laterally or superiorly/inferiorly to assess for cervical motion tenderness. Significant cervical tenderness with minimal palpation may be concerning for acute cervicitis. Next, while placing the nondominant hand on the patient's lower abdomen, the uterine fundus should be palpated while elevating the uterus out of the pelvis with the internal digit(s). The size, shape, mobility, and tenderness of the uterus should be assessed. A uterus that is enlarged and irregularly shaped may indicate adenomyosis or uterine fibroids. Next, the internal digits should be moved to the anterior vaginal fornix at 10 o'clock. With steady pressure, the external hand should sweep the right adnexa into the internal hand from the right anterior superior iliac spine toward the pubic symphysis. An identical assessment should be performed of the left adnexa at the 2 o'clock position within the anterior vaginal fornix. The adnexa should be assessed for size, fullness, mobility, and tenderness. In patients with symptoms concerning for possible endometriosis (dysmenorrhea, deep dyspareunia, infertility), careful palpation retrocervically and along bilateral uterosacral ligaments should be performed to assess for any tenderness or nodularity that may represent deep infiltrating endometriosis.

Next, a vaginal speculum exam should be performed to visually evaluate the cervix and vaginal walls. The cervix should be evaluated for any masses, nodules, erythema, lesions, or purulent discharge. The vaginal walls should be assessed for loss of rugae, which may be consistent with atrophic vaginitis. Additionally, the vaginal vault should be carefully inspected for unusual vaginal discharge. During the speculum exam, cervical swabs for chlamydia, gonorrhea, and trichomoniasis should be obtained routinely, as not all patients with sexually transmitted diseases are symptomatic. Additional samples should be obtained if unusual vaginal discharge is present.

A rectal exam should not be performed routinely for all women presenting with chronic pelvic pain. However, if the patient indicates a history significant for painful or bloody stools or if the bimanual exam is abnormal, then a rectal exam may be warranted to assess for hemorrhoids, rectal lesions, or pelvic masses.

Differential Diagnosis

Providers must keep a broad differential in mind while evaluating for potential etiologies of chronic pelvic pain. A systematic approach enables the primary care provider to more easily organize information. An overview of the common differential diagnoses is outlined in Table 31.1. The following section highlights some of the more common etiologies of chronic pelvic pain, but the authors acknowledge that the differential is very broad and the cause is most often multifactorial.

Table 31.1 Differential diagnosis of conditions contributing to chronic pelvic pain

System	Differential diagnosis of conditions contributing to chronic pelvic pain
Gastrointestinal	Irritable bowel syndrome Constipation Inflammatory bowel disease
Urologic	Painful bladder syndrome/interstitial cystitis Cystitis and urethritis
Musculoskeletal	Abdominal wall pain/myofascial pain syndrome Vaginismus Pelvic floor muscle spasm Levator ani muscle Piriformis muscle Obturator internus muscle
Gynecologic	Endometriosis Adhesions Vulvovaginitis Vulvodynia Vulvar vestibulitis Vulvovaginal atrophy Leiyomyomas Adenomyosis Pelvic inflammatory disease Adnexal masses
Psychiatric	Depression and anxiety Intimate partner violence and sexual abuse Trauma and post-traumatic stress disorder (PTSD) Drug dependency Somatization

Gastrointestinal Contributors

Gender differences in the gastrointestinal system are well documented. Women exhibit delayed gastrointestinal transit within the stomach and colon when compared to male counterparts [8, 9]. Gastrointestinal disorders including irritable bowel syndrome, chronic constipation, and inflammatory bowel diseases may cause chronic abdominopelvic pain.

Irritable bowel syndrome (IBS) is a functional bowel disorder characterized by chronic abdominal pain related to defecation and frequent changes in baseline stool frequency or appearance [17, 18]. Patients experience visceral pain from alteration in bowels habits, abdominal distention, and cramping. The prevalence is between 10% and 15% in North America and is equally distributed between subtypes: constipation predominant (IBS-C), diarrhea predominant (IBS-D), mixed type (IBS-M), and un-subtyped [19]. Female sex is the best-documented risk factor for IBS;

women are twice as likely to be affected by IBS compared to men [17]. Women often experience exacerbations of IBS-associated abdominal pain during their menses when serum estrogen levels are low, and therefore IBS may be difficult to differentiate from dysmenorrhea (see Chap. 27 on Irritable Bowel Syndrome) [17]. Symptoms change over time and the diagnosis is often made by history and exclusion of other diseases.

Chronic constipation is a characterized by infrequent, painful passage of stools [20]. The global prevalence of constipation is 16% with a greater predisposition among the elderly, women, chronic narcotic users, and individuals who eat low-fiber diets [20]. It is particularly important for clinicians to ask questions regarding regularity and consistency of stools, chronic history of ignoring the urge to defecate, or incomplete evacuation requiring digital assistance [21].

About 3 million Americans carry a diagnosis of ulcerative colitis or Crohn's disease, which together are referred to as inflammatory bowel disease (IBD) [22]. IBD is characterized by potentially severe intestinal inflammation leading to diarrhea, weight loss, nausea, vomiting, and abdominal and pelvic pain. Pain can be acute or chronic, a result of damage to the enteric nervous system from ongoing inflammation or from underlying structural disease, adhesions, or fistulas that are characteristic of Crohn's [23]. Patients can also display extra-intestinal manifestations of IBD such as joint pain, rashes, and ocular disease. IBD can go undiagnosed for years when symptoms are mild and diarrhea is absent and should be considered in all patients presenting with chronic abdominopelvic pain.

Urologic Contributors

Localizing complaints of urinary dysfunction or dysuria on review of systems may indicate a urinary contribution to chronic pelvic pain. Interstitial cystitis or bladder pain syndrome is a common cause of CPP and is diagnosed in patients with pelvic pain for greater than 6 weeks with at least one urinary symptom, such as urgency or frequency (see Chap. 30 on Interstitial Cystitis/Bladder Pain Syndrome). Similar to other chronic pain disorders, bladder pain syndrome is five times more likely to occur in women when compared to men [24]. In patients with more acute urinary discomfort, urinary tract infection (cystitis or urethritis) or urolithiasis may be a more likely diagnosis.

Urinary tract infection is the most common bacterial infection and is more common in women due to the shorter distance between the urethral orifice and the rectum [25]. Patients suffering from acute or recurrent urinary tract infections will often complain of dysuria, hematuria, urinary urgency/frequency, and/or suprapubic pain [25].

Musculoskeletal Contributors

History and physical exam can easily lead to the diagnosis of musculoskeletal or myofascial causes of pain and avoidance of an expensive workup of visceral causes [12]. Chronic abdominal wall pain is typically characterized by focal, superficial tenderness along the abdominal wall [12]. In a study of 2709 patients referred to a gastroenterologist over a 5-year period, 137 patients were diagnosed with chronic abdominal wall pain with 27% experiencing predominantly lower abdominal tenderness [12]. Women were four times more likely than men to present with chronic abdominal wall pain, highlighting the importance of considering the musculoskeletal system in the differential for chronic pelvic pain.

Myofascial pain syndrome is a complex pain disorder where tender bands of hyperirritable skeletal muscle and fascia called "trigger points" cause exquisite local pain and autonomic symptoms. Pain from trigger point presence or manipulation can also cause symptoms at predictable remote sites called "targets" [26]. In women, myofascial pelvic pain is often characterized by dyspareunia, dysuria, and/or dyschezia and may be due to muscle laxity or hypertonicity [27]. Myofascial pain can be triggered by trauma, poor posture, stress on the pelvic floor from obesity and pregnancy, surgery, overuse, underuse, and atrophy [28]. It is estimated that 13.2% of women suffer from pain associated with myofascial pelvic pain [28] with the prevalence as high as 58% in women who suffer from chronic pelvic pain. The most commonly affected pelvic floor muscles include the levator ani, piriformis, and obturator internus [28].

Vaginismus, now known as genito-pelvic pain/penetration disorder, causes chronic pelvic pain with any form of vaginal penetration and can be very distressing for patients and their partners. It includes difficulties with one or more of the following dimensions that are persistent or recurrent: (1) tightening of the pelvic floor muscle when vaginal penetration is attempted; (2) pain, burning, or tension during or when vaginal penetration is attempted; (3) decrease in or no desire for intercourse; and (4) anxiety or fear of pain, pelvic or vulvovaginal, as a result of, during penetration, or in anticipation of penetration [29]. It has long been postulated that vaginismus is caused by spasm of the pelvic floor muscles, occluding the vaginal opening and preventing penetration, but there are few studies documenting differences in pelvic floor tonicity, strength, and presence of spasm between patients diagnosed with vaginismus and those that are not [30]. Risk factors for vaginismus include physical and sexual trauma, relationship issues, pelvic floor dysfunction, anatomical congenital abnormalities, untreated vulvar disease, vaginal atrophy, endometriosis, pelvic infections, and surgical intervention [30].

Gynecologic Contributors

Intra-abdominal adhesions result from direct peritoneal trauma most commonly due to surgery, infections, or inflammation [31]. In normal wound healing, tissue trauma triggers mast cell degranulation and fibrin deposition, which is subsequently degraded within 72 hours [32]. However, adhesions form when fibrinolysis is delayed, resulting in fibroblast infiltration and vascularization [32]. Abdominal or pelvic surgery causes postoperative adhesions in up to 40% of patients [33]. Route of surgery may increase clinical suspicion as studies have demonstrated a higher rate of postoperative adhesions with open surgery when compared to minimally invasive approach (laparoscopic or robotic). Adhesions are an established cause of internal hernias and small bowel obstructions that may result in acute pain [31]. However, the data for chronic pain is not well established. Adhesions may restrict the mobility of affected organs, but it is unclear if adhesions themselves are a direct source of pelvic pain. At least one study demonstrated histologic evidence of nerve fibers in pelvic adhesions in women undergoing gynecologic surgery; however, the prevalence of adhesion innervation was no different between women with and without pelvic pain [34]. Additionally, a cluster analysis in 2018 revealed that the severity of adhesions did correlate with the severity of a patient's pain score [35].

Vulvovaginitis is a group of conditions affecting 15–39% of women and often presents with abnormal vaginal discharge and/or vulvovaginal irritation [36]. The most common causes of vulvovaginitis are bacterial vaginosis, vulvovaginal candidiasis, and trichomoniasis. Bacterial vaginosis results from a shift in the normal vaginal flora resulting in an overgrowth of predominantly anaerobic bacteria and malodorous discharge [36]. Vulvovaginal candidiasis results from a shift in the normal vaginal flora with an overgrowth of yeast species, most commonly *Candida albicans* [36]. Trichomoniasis is caused by a sexually transmitted protozoan *T. vaginalis* and requires treatment of the patient and her partner in order to prevent reinfection (see Chap. 12 on Vaginitis and Vulvar Conditions and Chap. 13 on Sexually Transmitted Infections). Chronic reinfection and irritation of the vaginal mucosa from vaginitis can result in an ongoing pain syndrome.

Vulvodynia is a chronic pain disorder defined as burning vulvar discomfort that occurs in the absence of "relevant visible findings or a specific clinically identifiable neurological disorder" [37]. This condition commonly results in dyspareunia, while in more extreme cases, the patient may be unable to wear certain clothing owing to irritation [38]. Vulvar vestibulitis is a subtype of vulvodynia specifically associated with localized, provoked vulvar pain or discomfort along the vestibule [39]. It is particularly important to exclude and/or treat other potential causes of vulvar pain, such as vulvovaginitis, prior to initiating treatment of vulvodynia.

Further discussion on the remainder of the gynecologic differential for pelvic pain can be found in Chap. 10 on Fibroids, Endometriosis, and Ovarian Cysts; Chap. 8 on Menopause, Atrophic Vaginitis section; Chap. 13 on Sexually Transmitted Infections, PID section; and Chap. 9 on Female Sexual Function and Dysfunction.

Psychiatric Contributors

Women who suffer from chronic pelvic pain are more likely to have a history of major depressive disorder, somatization symptoms, drug use or dependence, and childhood or adult sexual abuse [40]. A survey of 1931 women within a primary care practice found that the prevalence of pelvic pain was two times higher in patients with a history of childhood abuse [41]. Additionally, up to one in three women with pelvic pain will screen positive for post-traumatic stress disorder, which further emphasizes the high risk of psychological comorbidities in women suffering from chronic pelvic pain [42]. Therefore, screening and treatment for psychiatric comorbidities, history of abuse, drug dependency, and post-traumatic stress disorder are crucial during the evaluation and management of women with chronic pelvic pain [43].

Sally is wondering if her pain might be due to endometriosis. She recently heard an advertisement for an endometriosis medication on TV, and the description of the symptoms is similar to what she is experiencing. You explain that while endometriosis is a common cause of pelvic pain, there are many other causes (both gynecologic and non-gynecologic) of pelvic pain. You will need some more information to help determine the etiology of her pain.

Laboratory Testing

There are only a few laboratory tests that should routinely be performed during the assessment of a patient with chronic pelvic pain. All premenopausal women of reproductive age should undergo pregnancy testing for two main reasons: (1) up to 50% of pregnancies in the United States are unintended [44] and (2) a confirmed viable pregnancy will dictate treatment options. Next, a urinalysis or urine dip test should be performed to evaluate for a possible urinary tract infection. Testing for sexually transmitted diseases, specifically for

gonorrhea, chlamydia, and trichomoniasis, can either be performed vaginally at the time of the speculum exam or tested with a urine sample. Lastly, if microscopy is available, then a wet mount of the patient's vaginal discharge should be assessed with normal saline and potassium hydroxide to evaluate for yeast, bacterial vaginosis, or an abundance of white blood cells which could signal either acute or chronic abnormal inflammation.

Radiographic Imaging

A transvaginal pelvic ultrasound is the first-line imaging modality during the assessment of chronic pelvic pain [45]. Ultrasound provides a fast, cost-effective, and accurate method of evaluating the reproductive organs and is the imaging modality of choice when assessing pathology of the gynecologic structures [46]. Pelvic ultrasound can also facilitate the diagnosis of uterine leiomyoma, adenomyosis, pelvic inflammatory disease, and adnexal cysts/masses [47]. Ultrasound may have limitations due to variability of operator skill, patient tolerance of the exam, patient obesity, and obscuring bowel gas [47]. If pelvic ultrasound is not feasible or provides limited information, an abdominal/pelvic MRI may be useful in select patients to determine the extent of disease in cases of suspected deep infiltrating endometriosis or a large fibroid uterus [45]. Limitations of MRI include inability to perform in patients with certain metal implants or pacemakers, high cost, and patient tolerance of a small, enclosed space [47]. Abdominal/pelvic computed tomography is commonly used during the evaluation of acute abdominal pain; however, it has limited utility in the evaluation of chronic pelvic pain. Patients with a clinical history concerning for possible gastrointestinal etiology of their pain may benefit the most from additional imaging with CT, as the large and small intestines are not adequately visualized on pelvic ultrasound [45].

Diagnostic Laparoscopy

Diagnostic laparoscopy should not be routinely offered as a first-line assessment for chronic pelvic pain. A detailed history and physical exam with indicated laboratory testing and radiographic imaging will often provide more diagnostic information without exposing the patient to an invasive surgical procedure [48]. Diagnostic laparoscopy is a reasonable next step in patients when the clinical history, physical exam, and noninvasive testing fail to provide a diagnosis. Patients should be counseled that diagnostic laparoscopy fails to find a diagnosis in up to 35% of patients with CPP [48]. Diagnostic laparoscopy may be offered to patients with suspected endometriosis to provide histologic diagnosis and surgical treatment of painful endometriotic implants. Laparoscopy for the evaluation and treatment of adhesive disease will be discussed in further detail below.

Sally's urinalysis and sexually transmitted infection testing are both negative. On exam it is noted that Sally has multiple tender spots along her levator ani, and you are concerned she may be experiencing levator muscle spasm. You recommend that she see a pelvic floor physical therapist for further evaluation and treatment.

Treatment of Chronic Pelvic Pain

Treatment for female chronic pelvic pain can be challenging for both the patient and the provider. As with any other disease, the treatment of chronic pelvic pain should be tailored to the etiological source. The origin of chronic pelvic pain is often complex and multifactorial. A systems-based approach ensures that the provider evaluates the patient in an organized and thorough manner. The optimal treatment of a patient with chronic pelvic pain often requires simultaneous treatments across multiple specialties. For this reason, studies have shown improved patient outcomes with the utilization of an interdisciplinary care team, wherein a team of specialists collaborate in order to achieve a common treatment goal [49]. Many interdisciplinary care teams include a primary care provider, gynecologist, chronic pain specialist, psychologist, and physical therapist [50]. Depending on that patient's specific clinical presentation, the care team may also include a gastroenterologist, urologist, urogynecologist, general surgeon, or psychiatrist. Additionally, it is critical that the provider and patient understand that complete resolution of the pain may not be realistic or a feasible treatment goal [50]. Rather, the goal of chronic pelvic pain management should be overall reduction in pain with associated improvement in quality of life and daily functionality [51]. An exhaustive review of the treatment options for all potential causes of chronic pelvic pain is beyond the scope of this chapter as there are other chapters in this book dedicated to diseases that commonly cause chronic pelvic pain. Please see Chap. 8 on Menopause, Atrophic Vaginitis section; Chap. 10 on Fibroids, Endometriosis, and Ovarian Cysts; Chap. 12 on Vaginitis and Vulvar Conditions; Chap. 13 on Sexually Transmitted Infections, PID section; Chap. 24 on Urinary Tract Infections; Chap. 27 on Irritable Bowel Syndrome; and Chap. 30 on Interstitial Cystitis/Bladder Pain Syndrome.

Musculoskeletal

Patients identified as having abdominal wall myofascial pain based on a positive Carnett's test often require a multimodal approach toward the management of their pain. Patients with evidence of abdominal wall scar tissue from prior trauma or surgery may benefit from manual scar release performed by a trained physical therapist. Additionally, a significant rectus diastasis may occur after pregnancy, which may warrant fitting for an abdominal binder to stabilize and support the abdominal wall muscles. Lifestyle modifications with stretching and exercise are critical as stretching lengthens taut muscles and exercise increases strength and stability. Patients should be screened for repetitive tasks that may be resulting in recurrent microtrauma to abdominal wall muscles. In cases refractory to initial lifestyle modifications, patients may benefit from complementary or alternative medicine treatments with acupuncture, massage, or electrotherapy [26]. Oral and topical nonsteroidal anti-inflammatory drugs are the first-line medical treatment options for chronic myofascial pain [26]. Muscle relaxants such as cyclobenzaprine and tizanidine have been shown to be effective in the treatment of chronic myofascial pain [26]. There is limited data on the utility of topical lidocaine patches, but may be beneficial in patients that demonstrate significant hypersensitivity [26].

Patients with evidence of myofascial pain syndrome of the pelvis and pelvic floor muscle dysfunction often require interdisciplinary management with a pelvic floor physical therapist, urogynecologist, primary care physician, and psychologist. In the acute setting, pharmacologic management of pain with nonsteroidal anti-inflammatory drugs may be helpful, but is unlikely to result in long-lasting pain improvement [52]. Other medications that have been shown to be effective for chronic pelvic pain include tricyclic antidepressants and gabapentin [53]. Muscle relaxants, such as cyclobenzaprine, should be used with caution as they are sedating, nonspecific for the pelvic muscles and may induce urinary retention [14]. Although data is limited to support its use as monotherapy, vaginal diazepam, 5–10 mg BID suppositories, in conjunction with pelvic floor physical therapy has been suggested to benefit patients with contracted or "high-tone" pelvic floor muscle dysfunction [54].

Massage, myofascial release, or directed therapeutic exercise by a trained pelvic floor physical therapist is a critical component of the treatment of pelvic floor dysfunction and pain [55]. Pelvic floor physical therapy is a distinct specialty within physical therapy that requires dedicated training and certification through the Woman's Health Section of the American Physical Therapy Association [14]. The specific therapeutic strategy should be tailored to the patient's symptoms. Hypertonicity may require stretching techniques, vaginal dilators, or manual massage to relax the chronically contracted pelvic muscles [55]. Inadequate muscle control may be treated with biofeedback training, which increases the patient's awareness of her pelvic floor muscles during a state of activation or relaxation [55]. Patients should be counseled that consistent follow-up and adherence with the physical therapy regimen is necessary for adequate treatment. Studies have shown that the pelvic pain improvement with physical therapy is directly correlated with the number of physical therapy visits completed by the patient [56].

In cases refractory to medical and physical therapy, pelvic floor needling or injections may be indicated, an intervention provided by urogynecologists or gynecologists specializing in chronic pelvic pain. Dry needling involves insertion of a needle into the affected myofascial trigger point to produce a local twitch response [26]. A trigger point injection differs such that a local anesthetic (lidocaine, bupivacaine, or ropivacaine) and a steroid (triamcinolone) are administered together at the site of maximum tenderness, often transvaginally into the levator ani muscles [57]. Trigger point injections often provide immediate pain relief and can help to confirm the diagnosis of a pelvic floor spasm [57]. The decision to perform dry needling versus trigger point injections requires clinical judgment as multiple studies and a Cochrane analysis have not shown a difference in effectiveness between the two needling options [58–60].

Like patients with pelvic floor dysfunction, patients suffering with vaginismus (genito-pelvic pain/penetration disorder) should also be treated using a multidisciplinary approach with a pelvic floor physical therapist, urogynecologist, primary care physician, psychologist, and sex therapist. It is important to advise patients to stop engaging in painful sexual activity and seek treatment, as continued painful experiences can increase situational anxiety and result in increased pelvic floor tension and pain [61]. Cognitive behavioral therapy, biofeedback, and mindfulness-based approaches have been shown to be helpful for addressing the pain associated with vaginismus [62–68]. Additional therapies with mixed results include topical lidocaine [69, 70], antidepressants such as tricyclic antidepressants [71], anticonvulsants such as gabapentin [72], or vestibulectomy (excision of the hymenal ring and superficial vulvar mucosa) [72–75], although the latter is reserved for women who have failed multiple less invasive treatments. For refractory cases, pelvic floor injections with botulinum toxin have also been shown to be effective for management of involuntary pelvic floor spasms [76].

Gynecologic

As previously discussed, numerous studies have failed to find a definitive etiologic link between adhesions and chronic pelvic pain. Although there is limited data to guide management options, conservative treatment with non-opioid pain medications, such as nonsteroidal anti-inflammatory drugs

or acetaminophen, should be tried first. There is insufficient data to support the use of gabapentin or pregabalin specifically for adhesion-related pain [77]. Adhesive disease is not reliably diagnosed with any imaging modality and can only be confirmed with surgical exploration. Laparoscopy is the least invasive surgical option for the diagnosis and treatment of adhesions. Surgery should be reserved for patients in which other causes of their chronic pain have been ruled out and are at high risk of having adhesions based on a history of prior surgery or inflammatory/infectious processes. For pain relief, short-term success rates for laparoscopic excision of adhesions, or adhesiolysis, are variable between 38% and 87% [78]. However, at least one randomized controlled trial revealed that laparoscopic adhesiolysis resulted in comparable success rates to simple diagnostic laparoscopy [34]. Similarly, complete adhesiolysis does not necessarily correlate with better pain relief when compared to incomplete excision [79]. In contrast, extensive adhesiolysis increases the surgical time and may increase the risk of bleeding, bowel injury, or vascular injury. Patients with chronic pain and suspected intra-abdominal adhesions should be referred to a gynecologic or general surgeon for further evaluation and counseling to determine if laparoscopic evaluation and treatment is indicated. Preoperatively, patients must be counseled that adhesions may or may not be found at time of surgery. Additionally, although adhesiolysis may result in short-term pain improvement, patients must also be aware that recurrence rates may be as high as 26% [78].

Vulvodynia and vulvar vestibulitis are conditions characterized by chronic vulvar pain or discomfort. Initial management steps should include lifestyle modifications with avoidance of vulvar irritants. Such lifestyle modifications include wearing 100% cotton underwear and avoiding synthetic fabrics/tight-fitting pants, using fragrance-free soaps and detergents, using preservative-free emollients for barrier protection, sex counseling, and generally keeping the vulvar area clean and dry [80]. If there is no improvement with initial conservative measures then referral to a gynecologist should be considered for treatment with topical agents: anesthetics, estrogen cream, or compounded tricyclic antidepressants [80]. Additionally, oral tricyclic antidepressants and anticonvulsants have been shown to be effective in improving vulvar pain; however, care should be taken to confirm the patient's current medications to avoid potentially dangerous drug interactions [80]. In patients whose symptoms are refractory to medical management and with pain localization to vestibule, surgical intervention has been shown to be effective [81]. A vulvar vestibulectomy involves excision of the hymenal ring and superficial vulvar mucosa from 3 to 9 o'clock [81]. In addition to lifestyle modification, pharmacologic treatment, and surgical intervention, the patient should also be offered treatment for the psychological effects of vulvodynia. Vulvodynia can be physically and emotionally debilitating to the affected patient, but can also be challenging for her sexual partner and overall sexual health. Therefore, referral to a therapist specializing in sexual disorders is recommended for all women undergoing treatment for vulvodynia [81]. Psychological treatment and support may actually improve pain symptoms, and in fact, at least one study demonstrated that cognitive behavioral therapy resulted in greater long-term reduction in dyspareunia caused by vestibular pain, when compared to vestibulectomy alone [82].

Psychiatric

Psychiatric comorbidities are prevalent in women suffering from chronic pelvic pain. Due to the inherent complexity of chronic pelvic pain, it may be difficult to determine if the psychiatric conditions are precipitating factors, consequences of the chronic pain, or both. When approaching the psychiatric care of patients with chronic pelvic pain, it is crucial that the provider validates that he/she believes in the patient's pain symptoms as patients may become concerned that the provider believes "the pain is just all in her head." Therefore, acknowledgment and treatment of the psychological effects of chronic pelvic pain is just one component of the overall treatment plan. It is appropriate to refer patients with concerns for depression, anxiety, PTSD, and somatization to a behavioral health specialist for long-term management or co-management with their primary care provider. Patients with a history of interpersonal violence, sexual abuse, or drug dependency may need referral to a provider who has expertise in specialized therapy and treatment (see Chap. 33 on Depressive and Anxiety Disorders and Chap. 35 on Intimate Partner Violence and Sexual Trauma). Medications such as tricyclic antidepressants, gabapentin, SSRIs, and SNRIs are commonly used in patients with concomitant pelvic pain and psychiatric comorbidities under the supervision of primary providers comfortable managing these medications or psychiatrists as they harbor properties to treat both neuropathic pain and mood symptoms [83–86].

Following several months of pelvic floor physical therapy, Sally has some improvement in her pelvic pain and is now able to tolerate the use of tampons. She still has significant pain that prevents her from having intercourse, and she confides in you that she has a history of sexual abuse. After confirming that Sally is currently in a safe home situation, you gently recommend that speaking with a therapist may be beneficial. She plans to see a psychiatrist specializing in sexual abuse patients and will continue working with the pelvic floor physical therapist.

Summary Points

1. Chronic pelvic pain is defined as noncyclical pain in the pelvis, anterior abdomen, or lower back lasting for at least 3–6 months' duration.
2. The etiology of chronic pelvic pain is often multifactorial and complicated. In order to avoid misdiagnosis, a systems-based approach should be utilized focusing on gastrointestinal, urologic, neurologic, musculoskeletal, gynecologic, and psychiatric causes which contribute to chronic pelvic pain.
3. The evaluation of chronic pelvic pain includes a comprehensive history detailing the patient's pain symptoms and the effect on her quality of life, personal and family history of chronic pain disorders or psychiatric conditions, surgical history, gynecologic history, sexual history, and pregnancy history. Screening for a history of trauma, past or present intimate partner violence, and substance use is imperative.
4. The physical exam of the CPP patient should include a full abdominal exam, testing for abdominal wall pain, careful visual and Q-tip testing along the vulva, evaluation of the superficial and deep pelvic floor muscles, bimanual exam, and a speculum examination. Particular care should be taken to create a safe, supportive environment during the history and physical exam.
5. Initial testing for the evaluation of chronic pelvic pain should be guided by the patient's symptoms, history, and physical exam. Office laboratory testing, as applicable, should include pregnancy testing, urinalysis, screening for sexually transmitted diseases, and wet mount microscopy of vaginal discharge. Pelvic ultrasound should be considered the first-line imaging modality for chronic pelvic pain. Diagnostic laparoscopy should not routinely be offered for first-line assessment.
6. The treatment for chronic pelvic pain should target the most likely etiological source of the patient's pain, utilizing a patient-centered multidisciplinary team approach which includes a primary care provider, gynecologist, chronic pain specialist, psychologist, and physical therapist. Realistic treatment goals should be established focusing on improvement in quality of life in addition to reduction in pain symptoms.

Review Questions

1. A 30-year-old woman comes to your office reporting pelvic pain and vulvar irritation for the last 10 years that has been worsening over the last several weeks. She researched her symptoms online and took an over-the-counter antifungal for a presumed yeast infection. She is married and denies new sexual partners. She does report a long-standing history of burning pain with intercourse. There are no lesions on her external genitalia and bimanual exam is unremarkable. She reports severe pain from 4 o'clock to 7 o'clock along the posterior fourchette on cotton swab testing. Wet mount with 10% KOH of the vaginal discharge shows no evidence of candidal vaginitis. What is the first-line treatment of vulvodynia?

A. Nonsteroidal anti-inflammatory drugs
B. Vulvar care measures: wearing cotton underwear and avoiding vulvar irritants
C. Vestibulectomy
D. Topical lidocaine cream
E. Tricyclic antidepressants

The correct answer is B. Vulvodynia is a chronic pain disorder that is defined as burning vulvar pain in the absence of relevant visible findings or a specific clinically identifiable neurological disorder. This is a diagnosis of exclusion, and treatable causes of vulvar pain, such as candidal vaginitis, must be ruled out. Other chronic skin conditions, such as lichen sclerosus, lichen planus, and vulvovaginal atrophy, should be first ruled out by careful visual examination of the vulva and perineum. Vulvar lesions may warrant biopsy in order to obtain a tissue diagnosis. Cotton swab testing along the perineum allows for mapping of the location and severity of the patient's vulvodynia symptoms. First-line treatment for suspected vulvodynia includes lifestyle modifications with vulvar care measures that avoid vulvar irritants. Such measures include wearing 100% cotton underwear, avoiding perfumes/dyes in detergents or soaps, avoiding douching, cleaning the vulva with water only, keeping the vulvar area dry throughout the day and applying a preservative-free emollient daily, and rinsing and gently drying the vulva after urination. If lifestyle modifications do not result in improvements, then topical local anesthetics, estrogen cream, or topical tricyclic antidepressants may provide symptomatic relief. Oral tricyclic antidepressants or anticonvulsants may be incorporated as a third-line treatment. Nonsteroidal anti-inflammatory drugs usually provide minimal relief for chronic pain associated with vulvodynia. Surgical resection of the vestibule, or vestibulectomy, should be reserved for patients who have tried and failed medical management options [80, 87].

2. A 45-year-old multiparous woman presents to your office reporting pelvic pain since the birth of her last child 7 years ago. The pain is constant and sharp and radiates to her lower back. Her past medical history is significant for chronic constipation. She has not been sexually active for multiple years due to significant dyspareunia. Pelvic

exam is limited due to discomfort. She has point tenderness along her left and right levator ani muscles. Which of the following is the most appropriate next step in the management of this patient?

A. Recommend strict pelvic rest.
B. Initiation of oral muscle relaxants.
C. Initiation of low-dose long-acting narcotics.
D. Referral to pelvic floor physical therapy.

The correct answer is D. Pelvic floor muscle dysfunction or myofascial pain can often be diagnosed with history and physical exam. Often, the patient will report a history of painful intercourse, painful urination, and/or pain with defecation. Pelvic floor muscle dysfunction may result from either increased muscle tone (muscle spasms) or decreased muscle tone (myofascial laxity). The most commonly affected muscles are the levator ani, obturator, and piriformis muscles which are found deep within the pelvic floor. Patients with pelvic floor dysfunction may require an interdisciplinary team including a pelvic floor physical therapist, urogynecologist, primary care physician, and psychologist. The most important first step in the management of patients with suspected pelvic floor muscle dysfunction is referral of the patient to a certified pelvic floor physical therapist for confirmation of the diagnosis and treatment. Directed therapeutic exercise or myofascial release is recommended over strict pelvic rest, which may actually worsen the pelvic floor dysfunction. Oral muscle relaxants do not specifically target the pelvic floor muscles and are often associated with increased sedation; therefore, their use should be limited. Narcotics in general are unlikely to be effective in treating pelvic floor muscle dysfunction and may worsen the patient's chronic constipation. Patients with pelvic floor muscle spasms, who are refractory to physical therapy, may benefit from pelvic floor injections [27, 28, 55, 56].

3. A 34-year-old multiparous woman presents to your office with progressively worsening lower abdominal and pelvic pain over the past year. She has a medical history significant for fibromyalgia and irritable bowel syndrome. She states that although she experiences the pain daily, her symptoms are worst during her menses and with intercourse. She also reports a history of heavy menstrual bleeding that has been increasing in severity over the past year. On pelvic exam, her uterus is normal size/shape and non-tender. However, she has tenderness in the posterior cul-de-sac and you appreciate tender fullness along the right adnexal region. Her pregnancy test is negative. What imaging study should be ordered first to evaluate her chronic pelvic pain?

A. Transvaginal ultrasound
B. Computed tomography of the abdomen and pelvis
C. Magnetic resonance imaging of the pelvis
D. Abdominal x-ray

The correct answer is A. This patient's symptoms of dysmenorrhea and acute worsening of her chronic pelvic pain with cul-de-sac tenderness and adnexal fullness is concerning for endometriosis. The gold standard for diagnosis of endometriosis is histologic confirmation with tissue biopsy. Radiographic evaluation for pelvic pain should identify structural causes for patient's pain while minimizing unnecessary exposure to ionizing radiation. Transvaginal ultrasound is the optimal initial imaging modality for the evaluation of female pelvic pain because ultrasonography can delineate structural abnormalities within the uterus and adnexae without exposing the patient to radiation. Specifically, ultrasound can distinguish the characteristics of adnexal cysts as simple, complex, hemorrhagic, or endometrioma or exhibits features concerning for malignancy. Additionally, transvaginal ultrasound can be used to detect deep infiltrating endometriosis along the rectovaginal septum. Computed tomography (CT) rarely adds useful additional information to a pelvic ultrasound and exposes the patient to ionizing radiation and significantly increases cost. CT may be useful for further evaluation of patients with an adnexal mass with features concerning for malignancy. Magnetic resonance imaging (MRI) may provide better imaging of deep tissue structures; however, it is significantly more expensive than transvaginal ultrasound and unlikely to be an ideal first imaging study. None of the reproductive organs can be visualized with abdominal x-ray [88–90].

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