

Musculoskeletal Causes of Chronic Pelvic Pain

What a Gynecologist Should Know

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Ten percent of all gynecologic consultations are for chronic pelvic pain, and 20% of patients require a laparoscopy. Chronic pelvic pain affects 15% of all women annually in the United States, with medical costs and loss of productivity estimated at \$2.8 billion and \$15 billion per year, respectively. Chronic pelvic pain in women may have multifactorial etiology, but 22% have pain associated with musculoskeletal causes. Unfortunately, pelvic musculoskeletal dysfunction is not routinely evaluated as a cause of pelvic pain by gynecologists. A pelvic musculoskeletal examination is simple to perform, is not time-consuming, and is one of the most important components to investigate in all chronic pelvic pain patients. This article describes common musculoskeletal causes of chronic pelvic pain and explains how to perform a simple musculoskeletal examination that can be easily incorporated into the gynecologist physical examination.

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Chronic pelvic pain affects 15% of all women annually in the United States, with medical costs and loss of productivity estimated at \$2.8 billion and \$15 billion per year, respectively.^{1,2} Chronic pelvic pain is defined as the presence of pain in the pelvic region for more than a 6-month period that can originate from the gynecologic, urologic, gastrointestinal, and musculoskeletal systems. Fifteen percent of women will experience pelvic pain at some time in

their lives, with yearly direct medical costs estimated at approximately \$2.8 billion.² Of the estimated 10 million women with chronic pelvic pain, less than 70% will receive proper diagnosis and treatment plans and 61% of patients will remain undiagnosed.³ Many patients with pelvic pain will go on to have development of chronic pain syndrome with depression, pain out of proportion to pathology, and changing roles in marriage, family, and career.³

The location of pain may be vague and difficult for patients to define, or it may include specific symptoms of dyspareunia, voiding dysfunction, constipation, and low back, buttock, vaginal, vulvar, and lower abdominal pain.⁴ In 1991, Reiter et al reported the prevalence of musculoskeletal disorders to be 8% in the United States; however, a study by Frank Tu et al in 2006 estimated the prevalence to be in a much higher range of 14%–22%.^{5,6} Therefore, in addition to gynecologic causes, it is important to evaluate other potential etiologies including the pelvic musculoskeletal system. Unrecognized musculoskeletal pain may result in unnecessary surgery and also may be important in the development and maintenance of other pain syndromes such as painful bladder syndrome.⁷

The purpose of this article is to describe common musculoskeletal causes of chronic pelvic pain and to explain how to perform a simple musculoskeletal examination that can be easily incorporated into the gynecologist physical examination.

ANATOMY

To understand how musculoskeletal dysfunction causes chronic pelvic pain, we must first have a clear understanding of the anatomy of the pelvis. The pelvic floor muscles consist of deep, superficial layers and their fascia providing support for the pelvic organs. The deep levator ani layer, which consists of the pubococcygeus, puborectalis, iliococcygeus, and coccygeus muscles, have their origin from the arcus

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tendineus that extends anteriorly from the pubic bone to the spine of the ischium posteriorly and inserts into the perineal body, coccyx, anococcygeal ligament, vaginal walls, rectum, and anal canal.^{2,8} The superficial layer includes the urogenital diaphragm of the ischiocavernosus, bulbocavernosus, superficial transverse perineal muscles, and the external urethral and anal sphincter muscles² (Fig. 1).

The female pelvis is innervated by motor fibers radiating from the spinal cord that innervate the skeletal muscles of the pelvic walls, pelvic floor, perineum and sensory fibers that transmit sensations from these musculoskeletal organs and parietal peritoneum to the spinal cord.⁹ The sacral plexus of nerves innervates the levator ani, obturator internus, coccygeus, piriformis, gemellus and quadratus femoris muscles.⁹ Visceral and somatic structures in the pelvis are connected (by a phenomenon of viscerosomatic convergence) and both relay back to the spine.⁹

Painful pelvic floor muscles may occur as a result of primary dysfunction in the pelvic floor or abdominal muscles, ligaments, tendons, and nerves, or as a functional adaptation to other disorders within the pelvis hip or spine. Skeletal pathologies that can cause pelvic pain include sacroiliac dysfunction, symphysis pubis inflammation or injury, and coccyx injury or malposition.

Muscular etiologies include levator ani and piriformis syndromes that are often characterized by

pelvic pain associated with certain movements such as sitting or standing. Muscular pathology can result from trauma, repetitive use, or underuse of these structures. Musculoskeletal pain also can develop secondary to the presence of other pain syndromes such as painful bladder syndrome, irritable bowel syndrome, and neuropathies such as pudendal neuropathy. Examples of painful pelvic musculoskeletal conditions are listed in Box 1.

HISTORY

Women with pelvic pain from musculoskeletal disorders describe symptoms of low back pain, gluteal, groin, or leg pain, but they may not offer their symptoms of vaginal, rectal, or lower abdominal pain. Symptoms are usually vague and poorly localized. In a significant number of patients the pain is unilateral and is most often described as aching, throbbing, heaviness, or as pelvic pressure.¹⁰

The pain may be quite severe and in some patients it is accompanied by acute attacks that awaken the patient.¹⁰ Low back pain and radiation of pain to the sacrum at the area of insertion of the levator ani is also common. Radiation to the hip and down the back of the thigh like sciatica is characteristic of a neuropathy or piriformis muscle spasm. Hypertonicity of the pelvic floor muscles also can lead to dyspareunia. Musculoskeletal pain can be

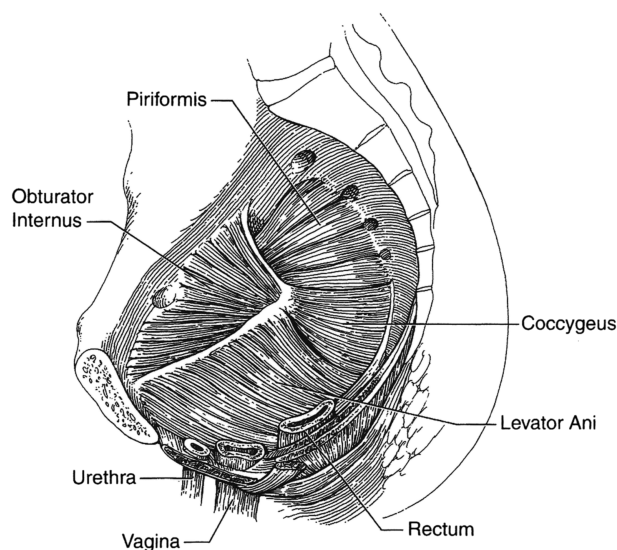


Fig. 1. Illustration of the muscles of the pelvic floor and side wall. Reprinted with permission from Howard FM et al. *Pelvic pain diagnosis and management*. Philadelphia (PA): Lippincott Williams & Wilkins; 2000. p. 36.

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Box 1. Painful Musculoskeletal Conditions

Muscular

- Pelvic floor muscle spasm
- Abdominal wall myofascial pain (trigger point)
- Muscular strains and sprains
- Rectus tendon strain
- Faulty or poor posture

Skeletal

- Compression of lumbar vertebrae
- Early articular hip disorders
- Acetabular labral tears
- Developmental hip dysplasia
- Hip osteoarthritis
- Low back pain
- Neoplasia of the spinal cord or sacral nerve
- Spondylosis
- Degenerative joint disease
- Fibromyalgia
- Chronic coccygeal pain
- Femoral acetabular impingement

Others

- Hernias: ventral, inguinal, femoral, spigelian
- Neuralgia of iliohypogastric, ilioinguinal, or genitofemoral



worsened by prolonged sitting or standing, anxiety, bowel movements, physical activity, or sexual intercourse.¹⁰ Pain that starts in the afternoon and becomes progressively worse throughout the day is characteristic of musculoskeletal dysfunction such as levator ani syndrome. Pain flares are common and may be constant for days at a time.¹⁰ Alternatively, the pain sometimes occurs suddenly with a short duration.

Patients with musculoskeletal pain may report pain that varies with alteration in the menstrual cycle because of hormonal influences on the muscles, ligaments, and joints of the pelvis.¹⁰ Women presenting with pain should be asked specific questions regarding a history of any trauma to the pelvis from falls, auto accidents, sports, exercise, or childbirth instrumentation are important. These events are often the inciting cause of musculoskeletal pain. A history of physical and psychological abuse is a known possible association with the development of pelvic floor pain.^{11,12} Therefore, when appropriate, the provider should obtain this history from the patient.

Finally, a woman's work and lifestyle may be important in determining the cause of pain. Working in ergonomically undesirable positions may contribute to pain, as may sedentary lifestyle, frequent wearing of high heels, and constant driving with poor back support.¹⁰

PHYSICAL EXAMINATION

After obtaining the medical history, a comprehensive physical examination should be performed. In particular, the examination should include the following: observation of gait and seated posture; lumbar spine and pelvic joint assessment; visualization of the skin, muscle strength, sensation, and reflex testing; and an internal pelvic and rectal examination. The musculoskeletal examination outlined here is simple and time-efficient, allowing for effortless incorporation into the gynecologic physical examination.

The first step is observation of gait and sitting habits of the patient. The patient is observed walking slowly across the room while the examiner is looking for any limp or guarding. Next, the patient should be observed in a seated position. Note whether the patient leans to one side in an attempt to avoid the painful side or if she frequently adjusts her position in an attempt to reduce pain. Next, examine the lumbar spine to assess for curvature, asymmetry, and hyper-tonicity of the muscles or change in range of motion. Evaluate the sacro-iliac joints and pubic symphysis for tenderness to palpation and the anterior superior iliac spine joints for asymmetry, signifying a misalignment of the pelvis. It is also important to include range of motion testing of the lower extremities.

After verbal consent is obtained, move on to visualize the skin of the pelvis, inspecting for scarring, lesions, and skin changes. The examiner assesses skin integrity by looking for any atrophic or dermatologic changes that may contribute to the patient's discomfort.¹³ The use of a clock face to identify the location of anatomic structures is helpful in describing findings on examination. The pubic bone is referenced as 12 o'clock and the anus is at 6 o'clock¹⁴ (Fig. 2).

Next, visualize the lift and descent of the perineal body during pelvic floor muscle contraction and relaxation to evaluate resting muscle tone and voluntary control.¹⁴ This test may be useful to the examiner because women with pelvic floor muscle spasm may not have the ability to voluntarily contract and relax the pelvic floor musculature.¹⁴ Pelvic prolapse may contribute to chronic pelvic pain, and this should be ruled out by having the patient perform a Valsalva maneuver while observing for bulging of the pelvic floor. Pelvic floor reflex testing should be performed by gently gliding a cotton tip applicator across the perineum to observe for the presence or absence of the anal wink.

The internal pelvic musculature examination is performed next. While introducing a lubricated gloved index finger, pressure is applied that is firm but gentle, with the examiner paying close attention to the patient's pain sensation, which may indicate introital tenderness or spasm, inability of the muscle to relax, indicating increased muscle tone, and quality and coordination of contraction and relaxation. Muscle tone is defined as a continuous state of mild contraction of muscles, dependent on the integrity of nerves and their central connections, and the muscle properties of contractility, elasticity, ductility, and extensibility.¹⁵ For clinical purposes, increased pelvic floor muscle tone is an involuntary contraction of the muscles despite the patient's relaxation of the pelvic floor. Palpation of healthy pelvic floor muscles should not be painful unless the muscles are unhealthy with trigger points (pain scores of 3 or more out of 10) or the pressure applied is more than 2 kg/cm², which is approximately equivalent to the pressure induced by the index finger with the nail bed blanched. Trigger points, which are defined as spots of exquisite tenderness and hyperirritability in muscles or their fascia, localized in taut palpable bands that mediate a local twitch response of muscle fibers under a specific type of palpation called "snapping" and, if sufficiently hyperirritable, give rise to pain, tenderness, and autonomic phenomena as well as dysfunction in areas remote from their site, called "targets."¹⁶

The examiner should palpate the pubococcygeus muscle from 7 o'clock to 11 o'clock on the left and



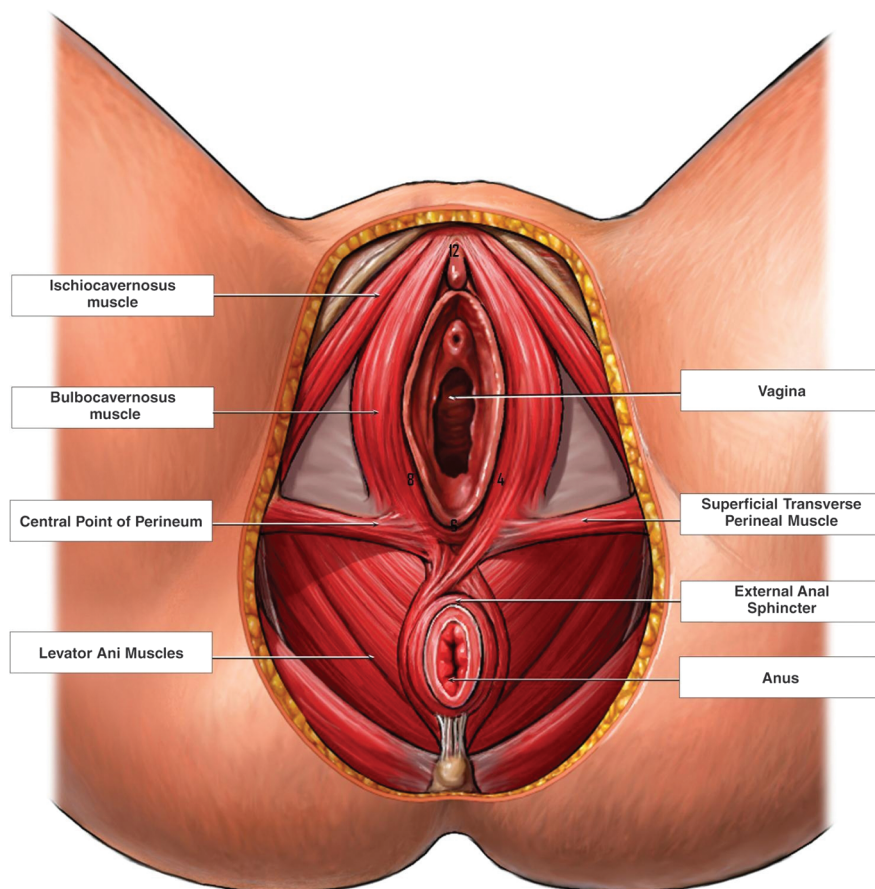


Fig. 2. Illustration of the pelvic floor muscles. Illustration copyright © 2012 Nucleus Medical Media. All rights reserved. www.nucleusinc.com.

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1 o'clock to 5 o'clock on the right by inserting the index finger approximately 1 inch into the introitus. Insertion of the examining finger further into the vaginal vault allows for palpation of the iliococcygeus, which can be felt from the 4 o'clock to 8 o'clock positions. With the examination finger still positioned in the vagina at approximately the second and third knuckles, evaluation of the obturator internus muscle can be performed by directing the index finger superiorly and laterally at the 10 o'clock and 2 o'clock positions. Insertion of the examination finger deeply into the vagina and directing it to 5 o'clock and 7 o'clock positions enable the examiner to evaluate the coccygeus muscles.¹³ Other areas that should be palpated include the bladder and urethra along with their fascial supports, and the rectum.

MYOFASCIAL PAIN SYNDROME

Myofascial pain syndrome caused by trigger points is among the most frequent pain condition encountered in the general population.¹⁷ Musculoskeletal pain consists of all types of pain perceived at the muscular

level, whereas myofascial pain refers to pain caused by the presence of trigger points within the muscle and fascia, resulting in a complex of sensory, motor, and autonomic symptoms.^{16,17} The sine qua non of myofascial pain syndrome is the presence of trigger points that can be either active or latent. The mean prevalence of myofascial pain syndrome among adults 30–60 years old is reported to be 65%, and in the elderly older than 65 years old it reaches 85%.^{18,19} In a study of 177 patients with chronic pelvic pain, with 74% having abdominal wall trigger points, 71% of the patients had focal pain areas in the vaginal wall involving the levator ani, obturator internus, and piriformis muscles.^{20,21}

In the majority of cases, trigger points are a result of an acute muscle trauma or repetitive microtrauma.²² Myofascial pain syndrome usually presents with a dull ache that is continuous or intermittent, described as constrictive or cramp-like, fairly well-discriminated, and varying in intensity that is present at rest or only with activity.¹⁷ This pain is not felt at the site of the trigger point origin but at a remote site (referred pain).²³



The primary treatment of myofascial pain syndrome is to treat the trigger points and remove the causative or perpetuating factors. The gold standard of treatment is trigger point injection.¹⁸ For women who are unresponsive to trigger point injection with local anesthetics, injection with botulinum toxin A is an effective treatment option for reducing pelvic floor pressure and associated pain symptoms, with an acceptable adverse effect profile as reported by Abbott et al.²⁴

PELVIC FLOOR MUSCLE SPASM

Pelvic floor muscle spasm generally refers to disorders of laxity (hypotonus) or overactivity (hypertonicity). Pelvic floor muscle spasm is defined by a constellation of symptoms that include dyspareunia, low back pain, bowel symptoms of constipation, diarrhea, excessive flatus, painful defecation, or a sensation of incomplete evacuation, and urinary symptoms of frequency, urgency, or nocturia. Signs of pelvic floor muscle spasm include tenderness on palpation of the pelvic floor muscles (trigger points), which is defined by a pain score of 3 or more out of 10, and an increased pelvic floor muscle tone. The prevalence and etiology of pelvic floor muscle spasm are unknown. However, it is thought that pelvic floor muscle spasm may be primary or secondary, with secondary pelvic floor muscle spasm being a result of irritation of the pelvic floor muscles from overlying pelvic viscera. Whereas in myofascial pain syndrome the sine qua non is the presence of trigger points with associated referred pain to other muscular sites, pelvic floor muscle spasm is a disorder of muscular abnormality with or without areas of trigger point tenderness.

The treatment of pelvic floor muscle spasm involves a multimodal approach consisting of physical therapy, medication, and trigger point injections in pelvic muscles with trigger point tenderness. To be effective, pelvic floor muscle exercises require proper coordination, timing, and synergistic recruitment of the other core postural muscles, and the ability to relax.²⁵ In patients who are unresponsive to local anesthetic injections, botulinum toxin A may be considered.

CONCLUSION

When taking into consideration the differential diagnoses of chronic pelvic pain, it is important to remember the musculoskeletal causes of pain. Musculoskeletal etiologies are not well-recognized by gynecologists in the initial evaluation of women. However, this can be easily changed by incorporating a brief musculoskeletal examination into the

gynecologic evaluation and can better-treat potential causes of pelvic pain. We recommend that musculoskeletal evaluation should be routinely incorporated into the assessment of patients with pelvic or abdominal pain.

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