

# CHRONIC PELVIC PAIN & PELVIC FLOOR MYALGIA

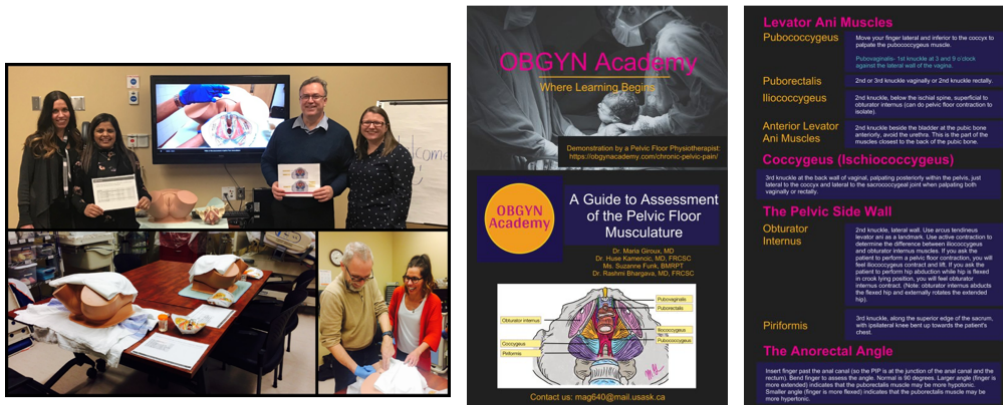
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Welcome to the chronic pelvic pain and pelvic floor myalgia lecture. My name is Dr. Maria Giroux. I am an Obstetrics and Gynecology resident interested in urogynecology. This lecture was created with Dr. Rashmi Bhargava and Dr. Huse Kamencic, who are gynecologists, and Suzanne Funk, a pelvic floor physiotherapist in Regina, Saskatchewan, Canada.

# Multidisciplinary Training Program



<https://obgynacademy.com/chronic-pelvic-pain/>

SEARCH

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We designed a multidisciplinary training program for teaching the assessment of the pelvic floor musculature to identify a possible muscular cause or contribution to chronic pelvic pain and provide early referral for appropriate treatment.

We then performed a randomized trial to compare the effectiveness of hands-on vs video-based training methods. The results of this research study will be presented at the AUGS/IUGA Joint Scientific Meeting in Nashville in September 2019. We found both hands-on and video-based training methods are effective. There was no difference in the degree of improvement in assessment scores between the 2 methods. Participants found the training program to be useful for clinical practice. For both versions, we have designed a "Guide to the Assessment of the Pelvic Floor Musculature," which are cards with the anatomy of the pelvic floor and step-by-step instructions of how to perform the assessment.

In this lecture, we present the video-based training program. We have also created a workshop for the hands-on version. For more information about our research and workshop, please visit the website below.

## Objectives

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1. To identify pelvic floor myalgia as a possible cause or contributor to chronic pelvic pain
2. To recognize that patients with pelvic floor myalgia may present with urological, gynecological, and/or colorectal symptoms
3. To explain the importance of incorporating a musculoskeletal examination of the pelvic floor into the physical examination for patients presenting with chronic pelvic pain
4. To describe the steps of a comprehensive musculoskeletal examination of the pelvic floor

This lecture is designed for residents, fellows, general gynecologists, urogynecologists, and allied health professionals.

The objectives of this lecture include:

- 1.To identify pelvic floor myalgia as a possible cause or contributor to chronic pelvic pain
- 2.To recognize that patients with pelvic floor myalgia may present with urological, gynecological, and/or colorectal symptoms
- 3.To explain the importance of incorporating a musculoskeletal examination of the pelvic floor into the physical examination for patients presenting with chronic pelvic pain
- 4.To describe the steps of a comprehensive musculoskeletal examination of the pelvic floor

## Disclosure

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- There are no conflicts of interest to disclose

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## Importance of This Lecture

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- Pelvic pain is common
- 15-20% of women have chronic pelvic pain for >1 year
  - The cause is unknown in 61% of these patients
- There is a significant overlap between pelvic pain and lower urinary tract symptoms (LUTS)

Chronic pelvic pain is a complex multi-faceted problem that places a substantial burden on the healthcare resources. It is common and affects women of all ages and backgrounds. 10–15% of gynecological consultations are for chronic pelvic pain and 15–20% of women have chronic pelvic pain lasting for more than 1 year. The cause of pelvic pain is unknown in 61% of these patients.

Chronic pelvic pain may arise from gynecological, urological, gastrointestinal, and musculoskeletal systems. It is often associated with lower urinary tract symptoms (LUTS).

## Importance of This Lecture

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- Pelvic floor myalgia is common in general gynecology and urogynecology, yet it is frequently an unrecognized and under-treated component of chronic pelvic pain
- Pelvic floor myalgia is an important contributor to chronic pelvic pain and has a significant impact on the patient's quality of life

**2013 retrospective cross-sectional study (Adams et al.):**

24% of 5,618 patients referred to a community-based urogynecology practice were found to have pelvic floor myalgia on physical examination.

**2011 prospective cross-sectional study (Fitzgerald et al.):**

63% of patients with self-reported chronic pelvic pain examined by a physician and 73.7% of patients examined by a physiotherapist were found to have pelvic floor myalgia.

Pelvic floor myalgia is a common condition encountered in general gynecology and urogynecology, but it is frequently an unrecognized and under-treated component of chronic pelvic pain. A 2013 large retrospective cross-sectional study by Adams et al. examined patients who were referred to a urogynecologist for an assessment of various pelvic floor conditions. These included pelvic organ prolapse, urinary incontinence, overactive bladder, recurrent cystitis, interstitial cystitis, and pelvic pain. 24% of the 5,618 patients referred to a community-based urogynecology practice were found to have pelvic floor myalgia on physical examination.

Pelvic floor myalgia is an important contributor to chronic pelvic pain. In a 2011 prospective cross-sectional study by Fitzgerald et al., 63% of patients with self-reported chronic pelvic pain examined by a physician and 73.7% of patients examined by a physiotherapist were found to have pelvic floor myalgia.

Pelvic floor myalgia has a significant impact on the patient's quality of life. Patients with pelvic floor myalgia score 50% higher on the Pelvic Floor Distress Inventory (PFDI) and Pelvic Floor Impact Questionnaire (PFIQ) compared to patients without pelvic floor myalgia.

## Importance of This Lecture

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- Few gynecologists perform assessment of the pelvic floor muscles for the presence of myofascial pelvic pain and trigger points
- It is important for gynecologists to examine the pelvic floor musculature for possible contribution to chronic pelvic pain

A 2011 literature review of 69 articles by Kavvadias et al. revealed that few gynecologists perform the assessment of pelvic floor musculature for the presence of myofascial pelvic pain and trigger points.

It is important for gynecologists to examine the pelvic floor musculature not only for strength, but also for a possible muscular cause or contribution to chronic pelvic pain. Failure of gynecologists to examine the musculoskeletal component and refer patients for appropriate treatment may result in persistent symptoms, subsequent patient visits to numerous health care providers, and unnecessary laparoscopic surgery. Persistent chronic pain may result in patient's anxiety, low mood, depression, sleep disturbances, feeling of hopelessness and helplessness, frustration, psychological distress, and impaired quality of life.

## Outline

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1. Overview of chronic pelvic pain
2. Pelvic floor myalgia
3. Assessment of the pelvic floor musculature

This training program consists of 3 parts. The first part presents an overview of chronic pelvic pain. The second part presents an overview of pelvic floor myalgia. The third part is a teaching demonstration of a comprehensive assessment of the pelvic floor musculature by a physiotherapist.



# PART 1: CHRONIC PELVIC PAIN

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We will first begin with a general overview of chronic pelvic pain.

## Terminology

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- **Pain**
  - “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”

The International Association For the Study of Pain defines pain as a subjective experience that is described as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”

## Terminology

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- **Chronic pelvic pain**
  - Persistent pain for  $\geq 6$  months
  - Or “recurrent episodes of abdominal/pelvic pain, hypersensitivity, or discomfort, often associated with elimination changes and sexual dysfunction without an organic etiology”
- **Chronic pelvic pain syndrome (CPSS)**
  - “persistent pain perceived in structures related to the pelvis, in the absence of proven infection or other obvious local pathology that may account for the pain”

Chronic pelvic pain is defined as either persistent pain for at least 6 months or “recurrent episodes of abdominal/pelvic pain, hypersensitivity, or discomfort, often associated with elimination changes and sexual dysfunction without an organic etiology.”

The 2014 European Association of Urology (EAU) Guidelines on Chronic Pelvic Pain define chronic pelvic pain syndrome (CPSS) as persistent pain that is perceived in the structures related to the pelvis in the absence of proven infection or other obvious local pathology that may account for the pain.

# Terminology of Chronic Pelvic Pain Syndromes (CPSS)

Neurourology and Urodynamics



## A Standard for Terminology in Chronic Pelvic Pain Syndromes: A Report From the Chronic Pelvic Pain Working Group of the International Continence Society

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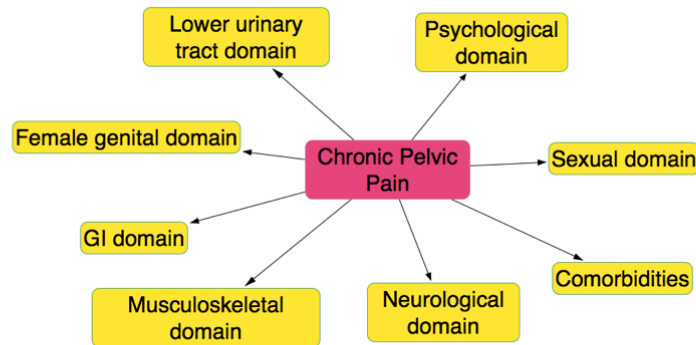
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The Chronic Pelvic Pain Working Group of the International Continence Society published a report in August 2016 describing a standard of terminology in chronic pelvic pain syndromes. This is the first report produced by the International Continence Society that presents global standardization of terminology and outlines clear definitions. Prior to this report, the terminology used in chronic pelvic pain was poorly defined. This report presents the preferred terms and definitions for signs, symptoms, and diagnostic work-up for patients presenting with chronic pelvic pain syndromes.



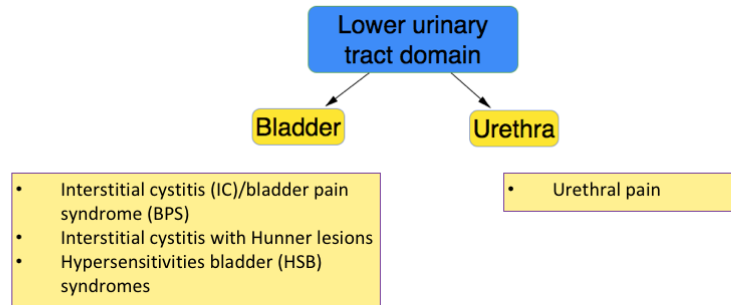
Chronic pelvic pain is a multisystem disorder. Symptoms may arise from the gynecologic, gastrointestinal, urologic, neurologic, musculoskeletal, and endocrine systems. Chronic pelvic pain is also affected by psychologic and behavioural factors.

The Chronic Pelvic Pain Working Group of the International Continence Society defined 9 domains that are involved in chronic pelvic pain syndromes, 8 of which pertain to female patients.

When assessing a patient with chronic pelvic pain, it is important to consider the lower urinary tract, female genital, gastrointestinal, musculoskeletal, neurological, psychological, and sexual domains, as well as comorbidities.

## 1. Lower Urinary Tract Domain

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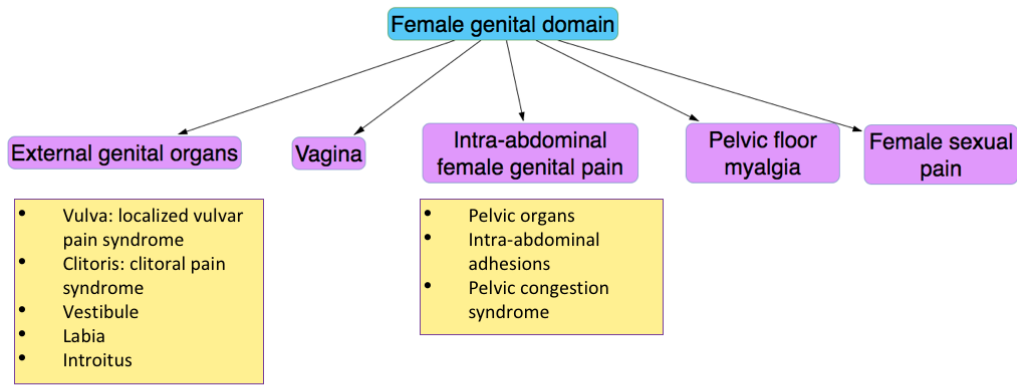


Chronic pelvic pain may arise from the lower urinary tract, which includes bladder and urethra.

Patients may present with urinary urgency, increased day- and night-time frequency, pain and pressure with filling, hesitancy, intermittent voiding, and feeling of incomplete emptying.

Pain may be due to interstitial cystitis/bladder pain syndrome, interstitial cystitis with Hunner lesions, hypersensitivities bladder syndromes, and urethral pain.

## 2. Female Genital Domain



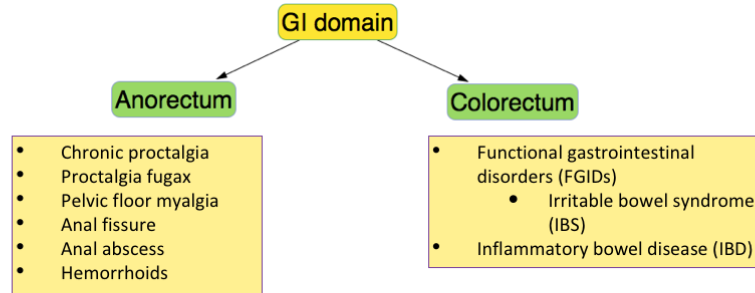
The female genital domain includes pain that originates from the external genital organs, vagina, intra-abdominal structures, and pelvic floor muscles.

Patients may present with dysmenorrhea, abnormal uterine bleeding, dyspareunia, vaginal discharge, burning/itching/stabbing pain, pain with voiding or defecation, and abdominal or pelvic pain. Pain may be unilateral or bilateral, constant, intermittent, or cyclic.

Pain may originate from the vulva (may be due to a localized vulvar pain syndrome), clitoris (may be due to clitoral pain syndrome), vestibule, labia, introitus, or vagina. Pain may also originate from the pelvic organs, intra-abdominal adhesions, or may be due to pelvic congestion syndrome. Pelvic floor muscle pain is also an important origin of chronic pelvic pain. It is also important to consider sexual pain, which will be discussed further in the sexual aspects domain.

### 3. GI Domain

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The gastrointestinal domain includes pain originating from the anorectum and colorectum.

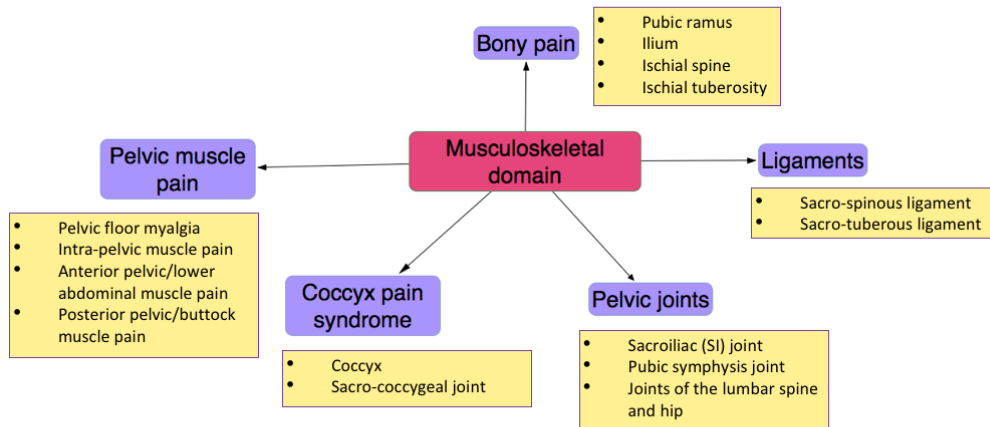
Patients may present with constipation, diarrhea, pain and/or bleeding with defecation, recurrent rectal pain/pressure/burning sensation, discharge, and cramping abdominal pain.

Pain originating from the anorectum may be due to chronic proctalgia, proctalgia fugax, pelvic floor myalgia, anal fissure, anal abscess, or hemorrhoids.

Pain originating from the colorectum may be due to functional gastrointestinal disorders, such as the irritable bowel syndrome. Pain may also be due to inflammatory bowel disease.



## 4. Musculoskeletal (MSK) Domain



The musculoskeletal domain includes pain originating from the pelvic floor muscles, fascia, pelvic joints, ligaments, and bones.

Pelvic floor myalgia is pain in the muscles of the pelvic floor, which include levator ani muscles.

Intra-pelvic muscle pain is pain originating from the pelvic side wall muscles, which include obturator internus and piriformis muscles.

Anterior pelvic or lower abdominal muscle pain is pain below umbilicus originating from the rectus abdominis, external and internal abdominal oblique, and transverse abdominis muscles.

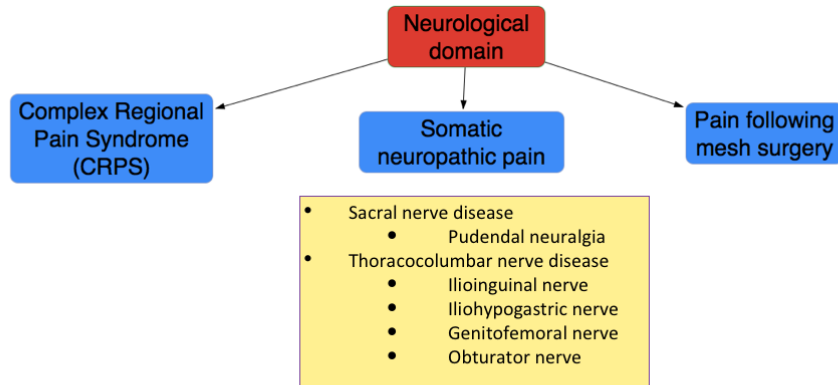
Posterior pelvic or buttock muscle pain is pain originating from the gluteal muscles.

Coccyx pain syndrome refers to pain originating from the coccyx or sacro-coccygeal joint.

Pain may also originate from the pelvic joints, which include the sacroiliac joint (or SI joint) and pubic symphysis joint as well as joints of the lumbar spine and hip. Ligaments may also produce pelvic pain. These include the sacro-spinous ligament and sacro-tuberous ligament. Bony pain may be present along the margins of the pubic ramus, ilium, ischial spines, or ischial tuberosity.

## 5. Neurological Domain

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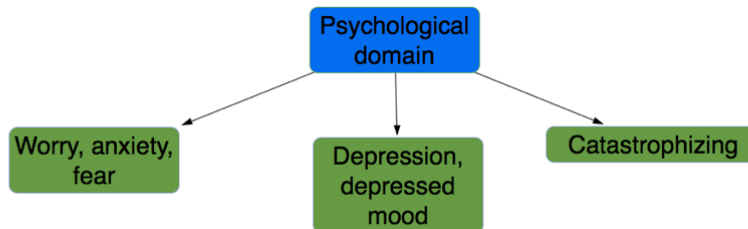
The neurological domain includes pain due to Complex Regional Pain Syndrome, somatic neuropathic pain, and pain following mesh surgery.

Patients may present with burning, throbbing, or stabbing pain, electric shock-like sensation, stinging, and paresthesias in the pelvis and/or perineum.

Somatic neuropathic pain may be due to disease with sacral nerves or thoracocolumbar nerves. Sacral nerve disease includes pudendal neuralgia. Thoracocolumbar nerve disease includes disease of the ilioinguinal, iliohypogastric, genitofemoral, or obturator nerves.

## 6. Psychological Domain

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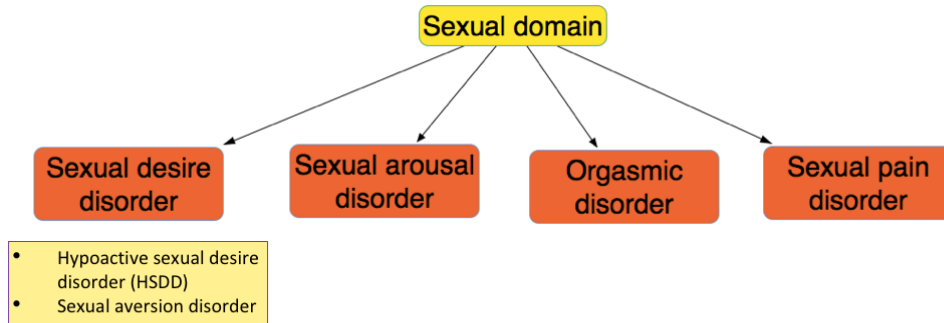
The psychological domain is very important when assessing chronic pelvic pain since pain is affected by cognitive factors, emotional experiences, memory, and attention. This domain includes worry, anxiety, and fear; depression and depressed mood; and catastrophizing.

Patients may present with low mood, anxiety, worry, frustration, sleep disturbances, feeling of helplessness or hopelessness, difficulty concentrating, and pain impairing the enjoyment of daily activities.

Patients with chronic pelvic pain may have a negative affective, cognitive, and psychological state. Patients may interpret pain as a signal that something is wrong with their body and may develop anxiety. Without a clear explanation for their pain, their anxiety may persist and patients may avoid activities which exacerbate their pain. Patients may also develop low mood and depression due to pain or not being able to perform activities of daily living. They may feel hopeless and helpless about finding a solution for their chronic pain and living an enjoyable life. Persistent pain may result in psychological distress, which may result in catastrophizing, which is a tendency to overestimate the magnitude of the experience of the pain and underestimate the capacity to deal with the pain.

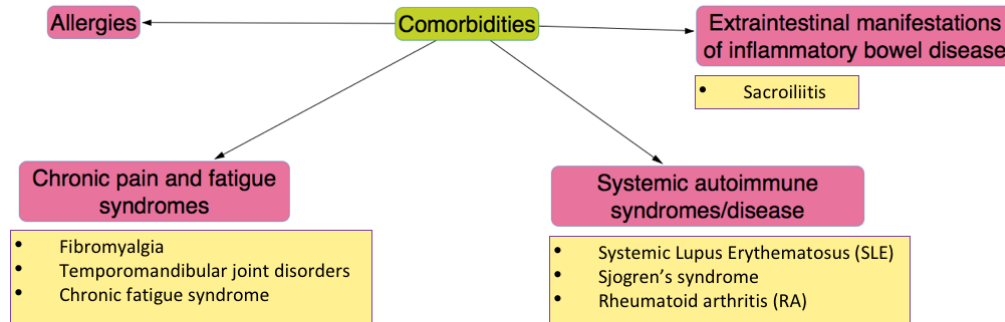
## 7. Sexual Domain

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Sexual function is often affected in patients with chronic pelvic pain. Patients may have a sexual desire disorder, which includes hypoactive sexual desire disorder and sexual aversion disorder. They may also have sexual arousal disorder, orgasmic disorder, and sexual pain disorder. Patients may present with low libido, inability to become aroused, dyspareunia, and difficulty reaching an orgasm. Furthermore, more than 50% of patient's partners also develop sexual dysfunction.

## 8. Comorbidities



Patients with chronic pelvic pain, especially those with interstitial cystitis/bladder pain syndrome (ICS/BPS) have a higher prevalence of comorbidities than the general population. Chronic pelvic pain may co-exist with allergies, chronic pain and fatigue syndromes, systemic autoimmune diseases, and extraintestinal manifestations of inflammatory bowel disease.

Chronic pain and fatigue syndromes includes fibromyalgia, temporomandibular joint disorders, and chronic fatigue syndrome. Systemic autoimmune diseases include lupus, Sjogren's syndrome, and rheumatoid arthritis. Patients may also have extra-intestinal manifestations of inflammatory bowel disease, such as sacroiliitis.

Patients with chronic pelvic pain are also at risk of narcotic pain medication dependence.

## PART 2: PELVIC FLOOR MYALGIA

Let's focus on one of the causes and contributors to chronic pelvic pain, which is pelvic floor myalgia.

## Pelvic Floor Myalgia

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- Pain that originates from the pelvic floor muscles
- It is common for patients with chronic pelvic pain to have pelvic floor myalgia
- May be present alone or may co-exist with other medical conditions
- It is important to rule out any medical pathology

**Also referred to in literature as:**

- Pelvic floor muscle pain syndrome
- Pelvic floor tension myalgia
- Levator myalgia
- Levator ani syndrome

The International Urogynecological Association/International Continence Society joint report published in February 2017 defines pelvic floor myalgia as pain in the musculature of the pelvic floor. Pelvic floor myalgia has also been referred to in literature as pelvic floor muscle pain syndrome, pelvic floor tension myalgia, levator myalgia, and levator ani syndrome.

It is common for patients with chronic pelvic pain to have pelvic floor myalgia. Pelvic floor myalgia may be present alone or may co-exist with other gynecological, urological, colorectal, and musculoskeletal medical conditions. Chronic pelvic pain may be due to dysfunction in the pelvic floor muscles, abdominal muscles, nerves, ligaments, or tendons.

Nonetheless, it is important to rule out any medical pathology.

## Pelvic Floor Myalgia

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- **Muscle tone**
  - Resisting tension of the muscle
- **Hypertonicity**
  - Elevated muscle tone
  - Associated with increased contractile activity and/or passive stiffness of the muscle
- **Spasm**
  - Continuous contraction of striated muscle
  - Cannot be relaxed voluntarily

When discussing pelvic floor myalgia, it is important to define muscle tone, hypertonicity, and spasm. Muscle tone is the resting tension of the muscle, which can be determined on the physical exam as resistance to passive movement. Normal pelvic floor muscles have a constant symmetrical resting tone. They are able to contract and relax. Pelvic floor myalgia may or may not be present together with a change in the tone of the pelvic floor muscles. Hypertonicity is defined as an elevated muscle tone. It is associated with an increase in contractile activity and/or passive stiffness of the muscle. Stiffness is defined as resistance to deformation. In contrast to hypertonicity, a spasm is a continuous contraction of a striated muscle that cannot be relaxed voluntarily. Spasms may lead to contractures, which is an involuntary shortening of a muscle.



## Myofascial Pelvic Pain (MFPP)

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- Pain caused by the presence of trigger points in the pelvic floor muscles or fascia
- **Trigger point**
  - "a tender, taut band of muscle that can be painful spontaneously or when stimulated"
  - 2 types: active and latent

Myofascial pain syndrome is the most common medical condition in the general population. It is present in 65% of adult population 30-60 years of age and 85% of the patients older than 65 years of age.

The International Urogynecological Association/International Continence Society joint report defines myofascial pelvic pain as pain caused by the presence of trigger points in the pelvic floor muscles or their fascia. Myofascial pelvic pain is a common contributor to chronic pelvic pain. 74% of patients with chronic pelvic pain were found to have abdominal wall trigger points and 71% had trigger points in the levator ani, obturator internus, or piriformis muscles.

Trigger points may be present in muscles of the pelvic floor as well as the abdominal, gluteal, ileopsoas, and other muscles. A myofascial trigger point is a tender taut band of muscle that can be painful spontaneously or when stimulated. Trigger points are caused by an acute muscle trauma or repetitive microtrauma. The tissue surrounding trigger points often has impaired circulation and autonomic disturbances, such as piloerection (goosebumps). Trigger points can be palpated during a physical examination and produce pain when the muscle is compressed or stretched.

There are 2 types of trigger points: active and latent. Active trigger points produce localized pain and referred pain. Pain may be constant or intermittent, vague or sharp. Rectal and clitoral pain is often sharp, whereas vaginal introital pain often has a burning quality. Latent trigger points do not produce pain and can remain dormant for years, thus identifying the etiology is challenging. Trigger points can be activated by even a seemingly insignificant exacerbating physical and emotional stressors.

Muscles that have trigger points are often weak and stiff. Trigger points prevent the muscles from fully lengthening and restrict range of movement. Movements that require for the shortened muscle to stretch result in pain. Patients may complain of pain with certain postures and activities, such as voiding, defecation, and intercourse. Pain from trigger points can be aggravated by menses, prolonged standing or sitting, certain activities, intercourse, defecation, and alleviated by certain positions.

## Myofascial Pelvic Pain (MFPP)

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- Trigger points in the pelvic floor muscles **can produce pain at other locations** in the body
- Chronic pelvic pain **may be a referred pain** from trigger points in the abdomen, hip, and thigh

**Pain from the pelvic floor muscles may be referred to:**

- Perineum
- Vagina
- Urethra
- Rectum
- Abdomen
- Back
- Thorax
- Hips/buttocks
- Lower leg

**For a table with trigger point patterns of referred pain, please see:**

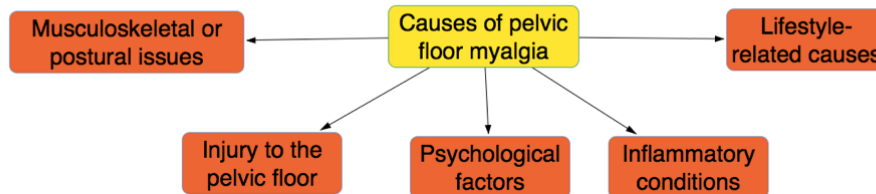
Pastore EA, Katzman W. Recognizing myofascial pelvic pain in the female patient with chronic pelvic pain. J Obstet Gynecol Neonatal Nurs. 2012 Sep;41(5):680-91.

Trigger points can develop in any of the muscles of the pelvic floor. The referred pain does not follow a dermatomal distribution, however characteristic referral patterns have been documented in literature. For a table of referred pain patterns, please see the 2012 article by Pastore et al. Pain from trigger points in the pelvic floor muscles may be referred to the perineum, vagina, urethra, rectum, abdomen, back, thorax, hips, buttocks, and lower leg. It is common for pain to be referred to the lower abdomen, resulting in possible confusion between musculoskeletal, gynecological, and gastrointestinal causes of pain. Chronic pelvic pain may also arise from the trigger points in the abdomen, hip, and thigh. Trigger points as far as supraspinatus and infraspinatus were found to contribute to chronic pelvic pain, interstitial cystitis, and voiding dysfunction.

# Pelvic Floor Myalgia

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- 85% of chronic pelvic pain patients have postural changes contributing to chronic pelvic pain



Pelvic floor myalgia often develops over a protracted period of time and has multiple possible causes.

Pelvic floor myalgia may be due to musculoskeletal or postural issues, such as impaired biomechanics of the lower extremities, unequal weight-bearing, muscular sprain and strain, scoliosis, hip osteoarthritis, SI joint dysfunction, spondylosis, and congenital malformations of the sacrum or pelvic floor. Unequal weight-bearing can place stress on the abdominal muscles and pelvic floor muscles, resulting in hypertonicity, and pain in the abdominal and pelvic muscles. The 2008 study by Montenegro et al. found that 85% of chronic pelvic pain patients have postural changes contributing to chronic pelvic pain. Pelvic floor myalgia may also be due to injury to the pelvic floor such as pelvic floor sprains and strains, falls during childhood, childbirth, pelvic surgery, post-obstetrical trauma, sexual abuse, and repetitive straining from constipation. Hypertonic pelvic floor after sexual abuse acts as a psychological defense mechanism against unwanted vaginal penetration. It may also develop secondary due to inflammatory conditions such as irritable bowel syndrome, endometriosis, and interstitial cystitis. Lifestyle related causes include repetitive use or underuse, prolonged standing or sitting, frequent wearing of high heels, and ergonomic stressors where chronic overload of the pelvic floor muscles results in activation of trigger points. Another lifestyle-related cause is postponing micturition and defecation, which requires contraction of the pelvic floor.

These conditions can result in muscle strain and formation of trigger points. Trigger points can continue to be a source of peripheral pain, thus contributing to central sensitization, and resulting in lower pain threshold.

# Pelvic Floor Myalgia

- Patients may present with urological, gynecological, and/or colorectal symptoms
- The severity and perpetuation of symptoms may vary

## Severity of the symptoms may be affected by:

- Menstrual cycle
- Emotional state
- Anxiety
- Amount of sleep
- Physical activity
- Prolonged sitting and standing
- Bowel movements
- Sexual activity
- Nutritional state

Patients with pelvic floor myalgia may present with urological, gynecological, and/or colorectal symptoms. The severity and perpetuation of the symptoms may vary depending on the patient's menstrual cycle, emotional state, anxiety, amount of sleep, prolonged sitting or standing, bowel movements, physical activity, sexual activity, and nutritional state.

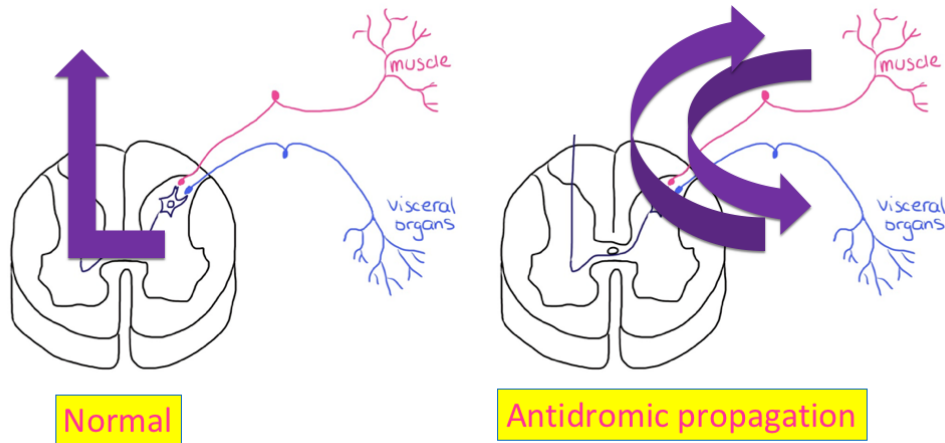
Severity of symptoms may vary throughout the menstrual cycle due to hormonal influences on the muscles, ligaments, and joints in the pelvis.

Normally, the pelvic floor muscles provide postural support during physical activity and relax during urination, defecation, and intercourse. Hypertonic pelvic floor muscles do not relax appropriately. Patients may present with symptoms of dysuria, urinary frequency and urgency, delayed voiding, impaired defecation, sensation of incomplete evacuation of bowel or bladder, and dyspareunia. Urgency may be due to trigger points in the levator ani, obturator internus, and rectus abdominis muscles or spasm in the sphincter urethrae and compressor urethrae muscles. Difficulties with defecation may be due to acute ano-rectal angle due to shortened puborectalis muscle.

Furthermore, patients with trigger points often have nutritional deficiencies in Vitamins B1, B6, B12, folic acid, Vitamin C and D, iron, magnesium, and zinc. 90% of patients have insufficient Vitamin D levels and 16% have insufficient Vitamin B12 levels.

## Relationship Between Muscles and Viscera

- Muscular dysfunction can result in pathology in the visceral organs and vice versa

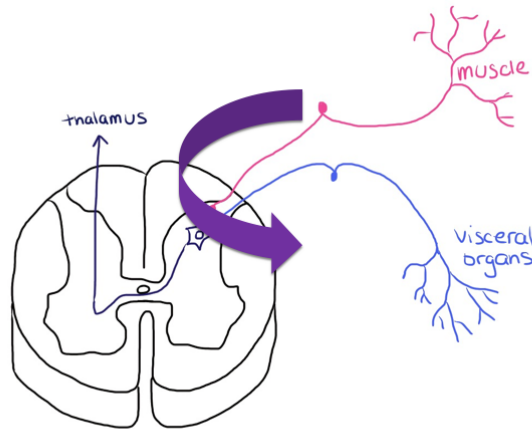


In order to understand why patients with chronic pelvic pain often present with multiple symptoms from multiple organ systems, it is important to understand the inter-relationship between the muscles of the pelvic floor and the visceral organs.

At the level of the spinal cord, the afferent nerves from the somatic structures (which includes pelvic floor muscles) converge with the afferent nerves from the visceral structures (which include bladder, vagina, cervix, uterus, proximal urethra, and the internal anorectal area). This convergence is necessary for the normal regulation of the bladder, bowel, and sexual functions. Normally, the impulse travels from the muscle via afferent nerve fibers to the spinal cord and then to the thalamus. However, it is possible for the impulse to propagate in the reverse direction. This is called antidromic propagation. This impulse travels to visceral organs via visceral afferent nerve fibers and causes for inflammatory mediators to be released into visceral organs, resulting in symptoms. Therefore, muscular dysfunction can result in disease of the visceral organs. The reverse can also occur, where the impulse from visceral organs travels to the somatic structures that share the same dermatome as the visceral organ. Therefore, disease of the visceral organs can create muscular dysfunction. Furthermore, pathology in one visceral organ can result in pathology in another visceral organ.

# Somato-Visceral Convergence

- Hyperactive muscles or trigger points can result in visceral dysfunction



**2007 prospective cohort study (Peters et al.):**

94.2% of the 87 patients with interstitial cystitis/painful bladder syndrome had levator ani pain.

**2008 prospective cohort study (Seith and Teichman):**

94-96% of patients with interstitial cystitis/painful bladder syndrome had bladder neck tenderness.

In the somato-visceral convergence, hyperactive muscles or trigger points cause neurogenic inflammation in the visceral organs, resulting in visceral dysfunction.

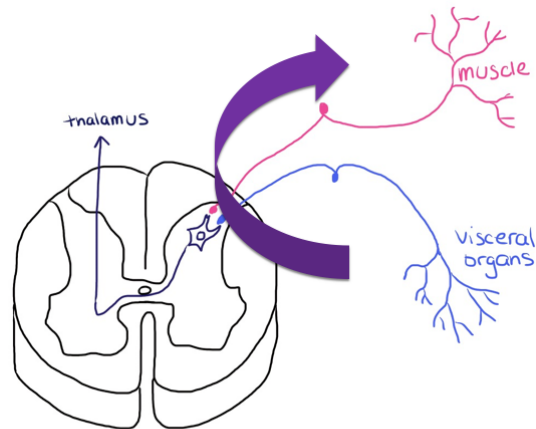
Damage to the motor end plate of muscle fibers results in release of acetylcholine and formation of trigger points. Trigger points result in local ischemia, decrease in pH, and activation of local muscle nociceptors. Noxious signals are then transmitted from muscles to the spinal cord via somatic afferents nerve fibers. A pathologic antidromic signal is then sent back to visceral organs via visceral afferents nerve fibers. Inflammatory mediators are released into the visceral organs, resulting in neurogenic inflammation of visceral structures. As a result, patients may experience diffuse abdominal pain, bowel, bladder, and sexual dysfunction.

Urgency and frequency that are encountered in urogynecological practice may be due to pelvic floor myalgia or myofascial pelvic pain. A 2007 prospective cohort study by Peters et al. demonstrated that 94.2% of patients with interstitial cystitis had levator ani pain and a 2008 prospective cohort study by Seth and Teichman, found that 94-96% of patients with interstitial cystitis had bladder neck tenderness. Therefore, pelvic floor dysfunction can result in neurogenic inflammation in the bladder in patients with interstitial cystitis.

## Viscero-Somatic Convergence

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- Inflammation of the visceral organs can result in muscular dysfunction



In the viscerosomatic convergence, inflammation of the visceral organs result in antidromic signals sent to the skeletal muscle, resulting in neurogenic inflammation in the skeletal muscle. Muscular dysfunction is characterized by muscular inflammation, hyperalgesia, formation of myofascial trigger points, hypertonicity, and decreased muscle strength.

## Central Sensitization

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- State of generalized hypersensitivity to protect against the threat of potential future damage
- Changes in CNS result in
  - Long-term altered perception of pain (allodynia, hyperalgesia)
  - Expansion of receptive fields

Persistent nociceptive stimulus from visceral or myofascial sources may evolve into a pathologic central sensitized state, which contributes to the severity and duration of chronic pelvic pain.

Central sensitization is a state of generalized or wide-spread hypersensitivity. Patients with persistent pelvic pain experience adaptive changes in their central nervous system to protect against the threat of potential future damage, which is determined by patient's beliefs and fears. As a result, there are changes in the morphology and function of the brain and spinal cord. These changes result in incorrect processing of afferent information by increasing activation and decreasing deactivation of pain-related areas of the brain. This results in altered perception of pain. Patients may experience allodynia (painful perception to a nonpainful stimulus) and hyperalgesia (exaggerated and prolonged response to a painful stimulus). There is increased pain responsiveness to mechanical pressure and chemical substances, stress, emotions, mental load, cold, and heat.

This may also result in expansion of receptive fields, where widespread changes in pain perception occur and the source of pain is perceived to be originating from structures that do not have pathology. This occurs when the afferent nerve fibers from the original noxious stimulus synapse in the spinal cord with nerve fibers from segments above, below, and contralaterally.



# Central Sensitization

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**Medical conditions that commonly co-exist with central sensitization:**

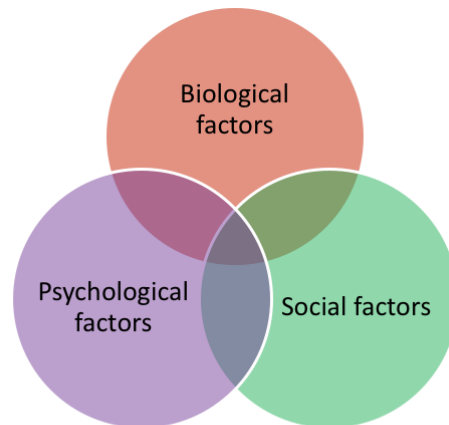
- Pelvic floor myalgia, myofascial pain syndrome, regional soft tissue pain syndrome
- Chronic pelvic pain
- Interstitial cystitis
- Vestibulodynia, vulvodynia
- Endometriosis, primary dysmenorrhea
- Irritable bowel syndrome and other functional GI disorders
- Fibromyalgia
- Chronic fatigue syndrome
- Temporomandibular joint disorder
- Restless leg syndrome, periodic limb movements
- Idiopathic low back pain
- Headaches and migraines
- Multiple chemical sensitivity

Central sensitization may present as multiple co-existing centrally-driven pain conditions. These conditions are characterized by multifocal pain, fatigue, memory difficulties, insomnia, and comorbid mood disorders. These medical conditions include pelvic floor myalgia, myofascial pain syndrome, regional soft tissue pain syndrome, chronic pelvic pain, interstitial cystitis, vestibulodynia, vulvodynia, endometriosis and primary dysmenorrhea, irritable bowel syndrome and other functional gastrointestinal disorders, fibromyalgia, chronic fatigue syndrome, temporomandibular joint disorder, restless leg syndrome and periodic limb movements, idiopathic low back pain, headaches and migraines, and multiple chemical sensitivity.

## Biopsychosocial Model

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- The experience of pain is influenced by biological, psychological, and social factors



When assessing chronic pelvic pain, it is important to consider the biopsychosocial model. The biopsychosocial model was developed by Engel in 1977 and can be applied to chronic pelvic pain. The experience of pain is influenced by biological, psychological, and social factors.

Biological factors include genetics, molecular changes in the body systems, and nutrition. These include changes in the gynecologic, urinary, gastrointestinal, nervous, endocrine, and muscular systems.

Psychological factors include mood, emotions, and behaviours. This includes anxiety, low mood, depression, sleep disturbances, feelings of hopelessness and helplessness, coping mechanisms such as alcohol use, fear avoidance, and psychological distress. Patients may have negative thoughts of mistakenly believing that symptoms are “in their head” or that they will not get well.

Social factors include interactions with others, culture and cultural taboos, religion, and socioeconomic status. This includes loneliness, lack of participation in daily activities, unemployment, and poverty.

Therefore, when assessing a patient with chronic pelvic pain, it is important to also consider all factors that influence the perception of pain and to discuss the patient’s thoughts, beliefs, fears, and expectations.

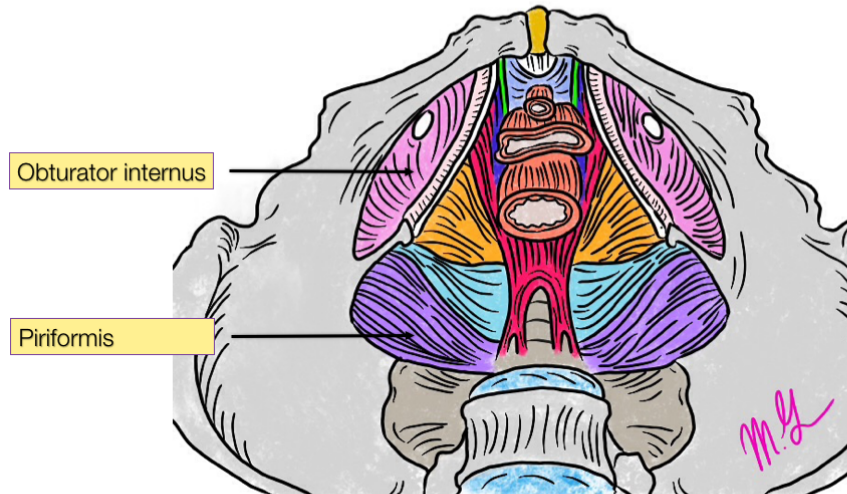
## PART 3: ASSESSMENT OF THE PELVIC FLOOR MUSCULATURE



Although pelvic floor myalgia is a common contributor to chronic pelvic pain, a comprehensive musculoskeletal examination of the pelvic floor is rarely routinely performed. Palpation remains the best method of assessment for pelvic floor myalgia. It is important for gynecologists to perform a simple musculoskeletal screen along with a pelvic floor muscle assessment in an attempt to reproduce patient's symptoms. A positive exam warrants an early referral to a physiotherapist who has experience in treating pelvic floor disorders in order to avoid pathologic progression into central sensitization. Aside from assessing the pelvic floor musculature, physiotherapists also typically perform a biomechanical assessment to assess spine, pelvis, and hips.

## Assessment of the Pelvic Floor Musculature

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The following muscles are important for the assessment.

Obturator internus and piriformis form the muscles of the pelvic side wall.

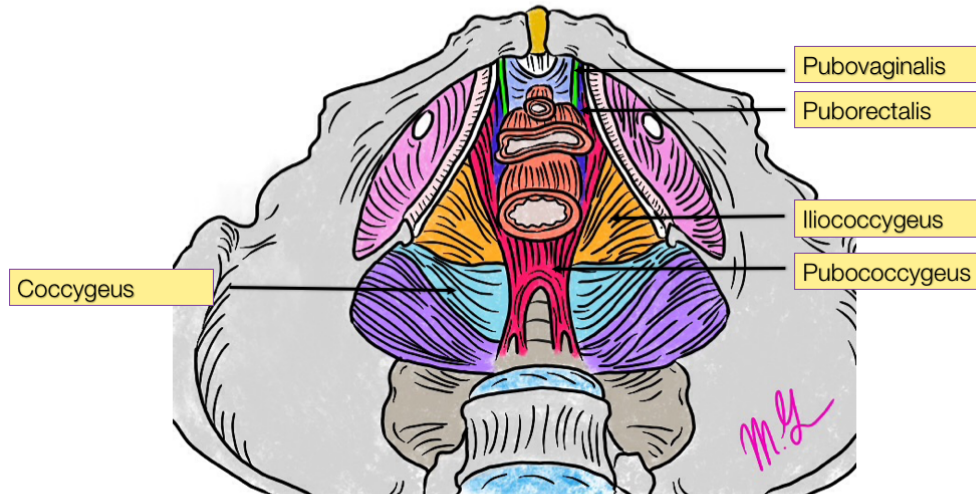
Obturator internus originates from the inferior margin of the superior pubic ramus, passes through the lesser sciatic foramen, and inserts into the greater trochanter of the femur.

Piriformis muscle originates from the anteriolateral aspect of the sacrum and the sacrotuberous ligament and inserts into the greater trochanter of the femur.

Both of these muscles laterally rotate an extended hip joint and abduct a flexed hip.

## Assessment of the Pelvic Floor Musculature

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The pelvic floor consists of levator ani and coccygeus muscles. It stretches like a hammock from the pubic bone to the coccyx and attaches to the pelvic side walls via arcus tendineus levator ani fascia.

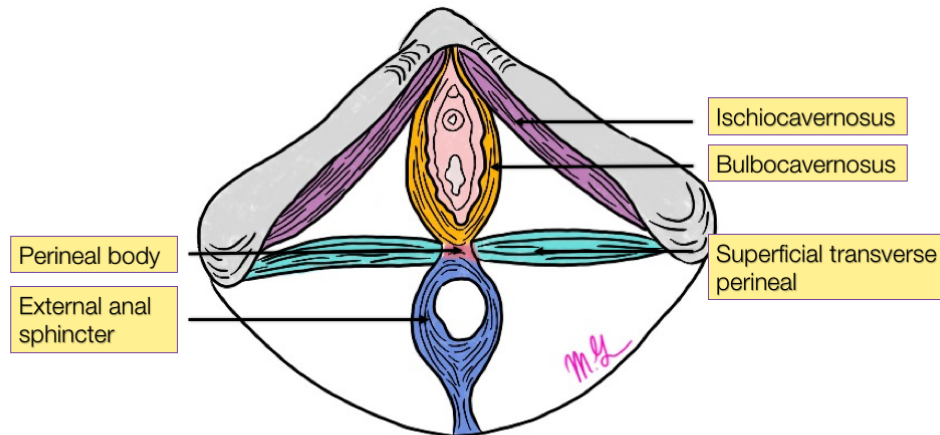
Levator ani muscles include puborectalis, pubococcygeus, and iliococcygeus. They originate from the inferior pubic rami, arcus tendineus levator ani fascia, and ischial spine. They insert into the central tendon of the perineum, the wall of the anal canal, anococcygeal ligament, coccyx, and the vaginal wall. They provide support to the posterior wall of the vagina, assist the anterior abdominal wall muscles, assist in defecation, and maintain fecal continence. They also have a role during childbirth and they support the fetal head during cervical dilation.

Puborectalis muscle originates from the posterior inferior pubic rami and arcus tendineus levator ani fascia. It forms a sling around vagina, rectum, and perineal body and produces the ano-rectal angle. The ano-rectal angle is thought to contribute to fecal continence.

Coccygeus muscle originates from the ischial spine and sacrospinous ligament. It overlays the sacrospinous ligament and insert into the lateral margin of 5<sup>th</sup> sacral vertebra and coccyx. Its action is to support the coccyx and pull the coccyx anteriorly.

## Assessment of the Pelvic Floor Musculature

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The muscles of the superficial perineal compartment include ischiocavernosus, bulbocavernosus, and superficial transverse perineal muscles. The superficial perineal compartment is located between the superficial perineal fascia and the perineal membrane.

Ischiocavernosus originates from the ischial tuberosity and ramus and inserts into the crus of clitoris. It is innervated by the pudendal nerve (S2–4). It moves blood from crura into the body of the erect clitoris.

Bulbocavernosus originates from the perineal body and inserts into the bulb of vestibule, perineal membrane, body of clitoris, and corpus cavernosum. It compresses the vestibular bulb and dorsal vein of the clitoris.

Superficial transverse perineal muscle originates at the ischial tuberosity and ramus and inserts into perineal body. It stabilizes the perineal body.

Perineal body is a connective tissue structure which acts as the point of convergence of bulbocavernosus muscle, superficial and deep transverse perineal muscles, external anal sphincter, perineal membrane, posterior vaginal muscularis. It also acts as a point of insertion for puborectalis and pubococcygeus muscles.

The external anal sphincter is a striated muscle that encircles the anus. It functions together with puborectalis and internal anal sphincter muscles to control fecal continence and defecation.



*We would also like to thank Marie-Josée Forget, a physiotherapist, for permission to use the pelvic floor model.*

**Marie-Josée Forget**  
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We will now present a teaching demonstration of a comprehensive assessment of the pelvic floor musculature taught by a pelvic floor physiotherapist, Suzanne Funk. This teaching is also available as a hands-on workshop.

We would like to extend a special thank you to the Dilawri Simulation Centre at the Regina General Hospital for providing the pelvic model.

We would also like to thank Marie-Josée Forget, a physiotherapist for permission to use the pelvic floor model.

## Summary

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- Chronic pelvic pain is a multifactorial issue that requires a multidisciplinary approach
- Pelvic floor myalgia is a common contributor to chronic pelvic pain that may be present alone or may co-exist with other medical conditions
- Patients with pelvic floor myalgia may present with urological, gynecological, and/or colorectal symptoms
- Assessment of the pelvic floor musculature is important in gynecological practice

To conclude, chronic pelvic pain is a complex multifactorial issue that requires a multidisciplinary approach. Pelvic floor myalgia is an important and common contributor to chronic pelvic pain that may be present alone or may co-exist with other medical conditions. Patients with pelvic floor myalgia may present with urological, gynecological, and/or colorectal symptoms. It is important for gynecologists to recognize the contribution of pelvic floor myalgia to chronic pelvic pain and to incorporate a musculoskeletal examination of the pelvic floor into their physical examination for patients presenting with chronic pelvic pain.



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