

# Assessment of the Pelvic Floor and Associated Musculoskeletal System: Guide for Medical Practitioners

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**Objectives:** This study aimed to assist practitioners in performing an accurate assessment of the external and internal pelvic musculoskeletal (MSK) systems to improve appropriate diagnosis and referral of patients with pelvic floor disorders or pelvic pain and to improve understanding of physical therapy (PT) treatment principles, thereby improving communication between practitioners and encouraging a multidisciplinary approach.

**Methods:** A referenced review of the anatomy of the pelvic floor muscles, pelvis, and surrounding structures, followed by a detailed assessment of anatomy, posture, and gait, is presented. A thorough description of PT assessment and treatment is included with clinical relevance.

**Results:** When proper assessments are routinely performed, MSK conditions can be recognized, allowing for prompt and appropriate referrals to PT. Assessment and treatment by qualified physical therapists are integral to pelvic health care. After efficient medical assessment, MSK dysfunction can be addressed expeditiously, thereby avoiding further decline. Left unaddressed, pelvic dysfunction may become chronic.

**Conclusions:** We propose a guide for MSK assessment of the pelvis and associated structures that can be used for both clinical and research purposes. This guide is designed for health care providers caring for women with pelvic floor disorders, including physicians, advanced practice providers, and nurses. This guide serves to improve communication among multidisciplinary practitioners to refine MSK assessment and treatment approaches and thereby advance clinical care and research.

**Key Words:** musculoskeletal system, pelvic floor, pelvic floor disorder, chronic pelvic pain, vaginal assessment, assessment of associated musculoskeletal system, rehabilitation of the pelvic floor

(*Female Pelvic Med Reconstr Surg* 2021;27: 711–718)

Pelvic floor disorders (PFDs), including pelvic organ prolapse (POP), urinary and fecal incontinence, defecatory disorders (constipation), and pelvic pain, are difficult to completely and accurately diagnose without a comprehensive understanding of the musculoskeletal (MSK) components of the pelvis and the surrounding structures. Accurate assessment of the pelvic floor and associated conditions is further complicated by the interaction of multiple body systems within the pelvis; these include gynecologic, urologic, gastrointestinal, neurologic, rheumatologic, and endocrine systems.<sup>1</sup> Assessment of pelvic floor muscle (PFM) function, however, is not routinely performed.<sup>2</sup> Few medical health care providers perform a basic, let alone a comprehensive, intravaginal palpatory examination.<sup>3</sup> Myofascial dysfunction is

typically overlooked as a result of the lack of knowledge and adequate training.<sup>4</sup> Because MSK dysfunction is rarely recognized or addressed, women suffer for extended periods without proper treatment.<sup>3</sup> In a cross-sectional study, Sedighimehr et al<sup>5</sup> found a higher frequency of pelvic MSK dysfunction in women with chronic pelvic pain (CPP) (also known as persistent pelvic pain); the authors concluded that routine MSK examination should be included in an assessment of the pelvis. A recent literature review suggests that MSK examination by knowledgeable health care providers is essential for identifying MSK-associated dysfunction and ensuring appropriate referral to physical therapy (PT). Stein et al<sup>6</sup> also recommend PT intervention for patients with CPP and sexual dysfunction as a noninvasive treatment option.

It is equally important to properly assess the entire pelvic complex. Pelvic, hip, and back dysfunction can contribute to or mimic other disorders. The lack of knowledge of the MSK system in the pelvic region, coupled with methodological inconsistencies in assessment techniques, contributes to delayed or underused care. Appropriate management of patients presenting with PFD and CPP requires a comprehensive evaluation and treatment to ensure that patients receive proper care.<sup>7</sup> Lack of consensus terminology and consistent research protocols lead to confusion and difficulty comparing outcomes. A narrative review performed by Harris-Hayes et al<sup>8</sup> found that the lack of consistent and valid terms in the reviewed studies limited meaningful conclusions regarding the relationships of MSK dysfunction and CPP. This illustrates that there is a great need for standardization in both clinical and research environments to provide guidance in comprehensive, accurate, and comfortable MSK assessment.<sup>4,9,10</sup>

The “Assessment of the Pelvic Floor and Associated Musculoskeletal System: Guide for Medical Practitioners” topic was proposed to the American Urogynecologic Society Publications Committee. It was reviewed for feasibility and importance by the committee and recommended to the American Urogynecologic Society Board of Directors for further development. The following guide aims to assist practitioners in performing both external and internal (vaginal and rectal) pelvic MSK assessments, which will contribute to more thorough multisystem assessments and diagnoses and improve appropriate referral for treatment. The guide includes a review of the basic anatomy of the PFMs, pelvis, and surrounding structures, as well as an assessment of posture and gait. Health care providers, including physicians, advanced practice providers, and nurses, caring for women with PFDs will benefit from an increased understanding and knowledge of proper assessment of MSK anatomy. In addition, a clear understanding of pelvic PT will allow all other practitioners to effectively explain to their patients what to expect in a PT session. This in turn will strengthen the interdisciplinary model, while improving patient understanding of PT, and increase the likelihood that the patient will attend PT. This document includes the following guides: vaginal assessment, assessment of associated MSK system, rehabilitation of the pelvic floor, and associated systems (see Table 1 for an outline of this document).

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The authors have declared they have no conflicts of interest.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site ([www.fpms.net](http://www.fpms.net)).

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DOI: 10.1097/SPV.0000000000001121

## GUIDE FOR VAGINAL ASSESSMENT OF THE PELVIC FLOOR

A clear understanding of the basic pelvic anatomy is essential to diagnosing MSK disorders of the pelvis.<sup>2</sup> We will discuss the basic muscle, viscera, and fascia in the anterior pelvic compartments that are most likely to contribute to dysfunction within and surrounding the pelvis.

### Pelvic Floor Anatomy and Function

The PFMs are striated skeletal muscles that respond to MSK treatment much like striated muscles elsewhere in the body. Although the PFMs have 3 basic layers—(1) superficial, (2) middle (pelvic diaphragm), and (3) deep (pelvic diaphragm)—for the purpose of this guide, we will divide the PFMs into 2 categories: (1) superficial and (2) deep.

The superficial layer of PFMs includes the bulbospongiosus (also known as bulbocavernosus), ischio cavernosus, and superficial transverse perineal muscles. This layer of the pelvic floor is important

in the MSK component of sexual function. These muscles, however, can be overactive, contributing to pelvic pain and sexual dysfunction. The urethral sphincter, which assists in urinary continence, occurs in the intermediate layer of the pelvic floor<sup>11</sup> (Fig. 1).

The deep layer of PFMs is composed of the coccygeus and the levator ani, which are divided into 3 individual muscles: (1) the puborectalis, (2) pubococcygeus, and (3) iliococcygeus.<sup>2</sup> Most of the muscles in this group run posteriorly from the pubic bone via the arcus tendineus fasciae pelvis to attach to the coccyx. The coccygeus originates from the ischial spine and attaches to the sacrum and coccyx bilaterally.<sup>12</sup> The puborectalis muscle originates on the pubic bone just lateral to the urethra and unites with its counterpart to form a sling around the rectum.<sup>13</sup> Although the obturator internus is not considered a PFM per se, it has fascial connections to the PFMs, via the arcus tendineus fasciae pelvis, which create anatomic and functional synergy. It is important to understand that the obturator internus has a significant effect on pelvic floor function secondary to this direct connection. When the length of the obturator internus is altered because of overactivity, spasm, or tension, it can create tension on the levator ani, creating suboptimal functional ability of the levator ani. In addition, the obturator internus assists in hip external rotation and abduction<sup>14</sup> (Fig. 2).

Understanding the association and connection of hip musculature to PFMs is essential in realizing the impact the hip has on the levator ani and vice versa. Indeed, hip muscle fatigue, tightness, and length/strength changes can increase the risk of overactive and painful PFMs.<sup>12</sup> These overactive PFMs and pelvic floor pain often are associated with sexual dysfunction, bowel and bladder urgency, and urinary incontinence.<sup>12</sup> In addition, it is important to realize that pelvic pain also can be visceral (ie, bladder pain) and/or somatic (ie, PFM pain) in origin. Interactions between visceral and somatic neural stimuli can be complex and confusing for patients and practitioners alike. Stress urinary incontinence (SUI), POP, fecal incontinence, and CPP often have both visceral and somatic components.<sup>15</sup> Pelvic floor muscle functions include pelvic organ support, sexual function, bowel and bladder function, and core stabilization.<sup>6,12,13</sup> Overactivity in the PFMs can be the sole cause of pain in the abdomen, pelvis, back, and extremities just as other structures can create painful and overactive PFMs.<sup>6,12</sup> Assumptions that overactive PFM will only be found in CPP can be avoided with proper PFM assessment. Highlighting the importance of accurately assessing the PFMs in women with PFDs, a recent study of women with urinary tract infection (UTI) symptoms found that culture-confirmed UTI was infrequent, and 50% of participants had PFM tension that was likely contributing to their UTI-like symptoms.<sup>16</sup> As a result, it is imperative that medical practitioners perform a comprehensive MSK assessment of the entire pelvis to assist in a more accurate diagnosis of pelvic floor dysfunction.

### Pelvic Floor Assessment

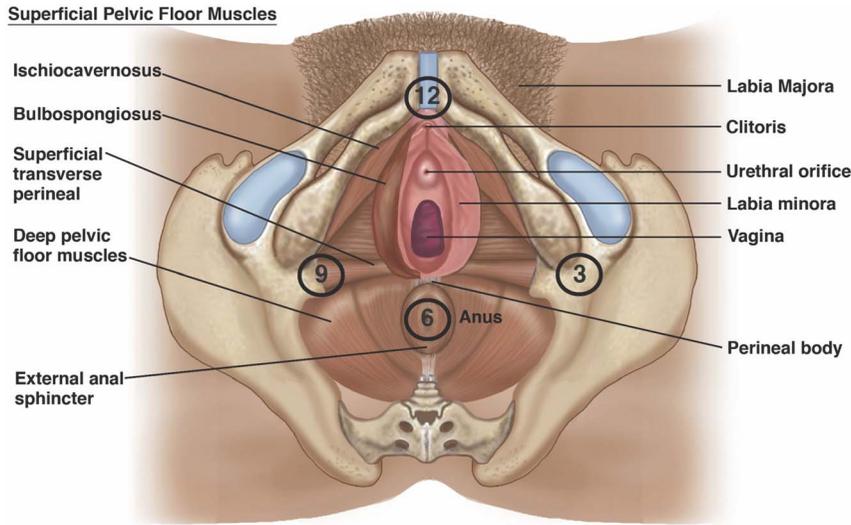
#### Preparation for Pelvic Floor Assessment

Although pelvic examinations routinely include the assessment of the reproductive/pelvic organs, examination of the PFMs is not an integral part of most practitioners' pelvic examinations and often is not performed.<sup>3</sup> The following description of an internal MSK examination is meant to emphasize the importance of a gentle approach, not only for patient comfort but also for the accuracy of the pelvic MSK examination. Understanding how to sensitively approach a pelvic floor assessment can be just as important as the assessment itself. This can significantly affect how the examination will be experienced.<sup>12</sup> If pain is an anticipated finding of your assessment, an internal digital evaluation of pelvic structures is suggested before or, in cases of severe pain or history

**TABLE 1.** Document Components

I. Introduction
II. Guide for vaginal assessment of the pelvic floor
a. Pelvic floor anatomy and function
b. Pelvic floor assessment
i. Preparation for pelvic floor assessment
ii. Assessment of the superficial PFMs
iii. Assessment of the deep PFMs
iv. Assessment of PFMs strength and relaxation
c. Clinical relevance
III. Guide for the assessment of associated MSK system and the lumbopelvic complex
a. Associated MSK anatomy and function
b. Guide to assessment of the MSK system
i. Preparation for assessment
ii. Assessment of posture
iii. Assessment of gait
iv. Assessment of general strength
c. Assessment of lumbar spine, sacroiliac joint, hip, abdomen, iliacus, and psoas and pelvic alignment
i. Preparation for assessment of lumbopelvic and core complex
ii. Assessment of lumbar spine, sacroiliac joint, and pubic symphysis hip, abdomen, iliacus, and psoas and pelvic alignment
iii. Assessment of the hip
iv. Assessment of abdominals, iliacus, and psoas and pelvic alignment
v. Assessment of pelvic and shoulder alignment
d. Clinical relevance for assessment of associated MSK complex
e. Clinical relevance for assessment of lumbopelvic complex
IV. PT: how to prepare patients for referral and treatment
a. PFM training
b. Manual muscle therapy
c. Behavioral/lifestyle training and education
d. Exercise program
e. Pain science
f. PT modalities
g. Multidisciplinary approach
h. Comprehensive PT treatment

MSK, musculoskeletal; PT, physical therapy; PFM, pelvic floor muscle.

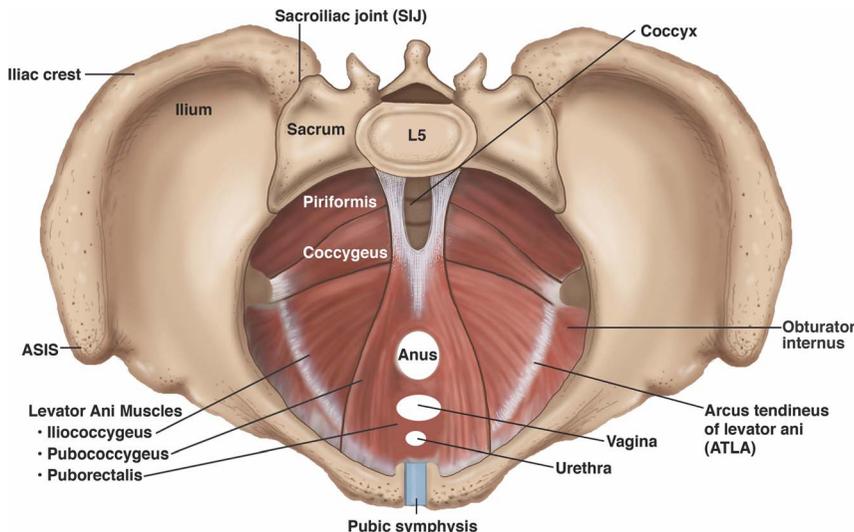


**FIGURE 1.** Superficial PFM, including ischioavernosus, bulbocavernosus (also known as bulbospongiosus), and superficial transverse perineal. Pictured clock numbers can be used to assist with orientation when palpating superficial PFM. Numbers correspond to clitoris (12), ischial tuberosity (9 and 3), and anal sphincter (6). This figure appears in color online (illustrator: Marie Dauenheimer, MA, CMI, FAMI).

of abuse, instead of speculum examination. Insertion of a speculum often exacerbates pain and can trigger subsequent PFM over-activity. As a result, patients may not be able to relax enough to allow for an accurate assessment of the remainder of the MSK assessment. If stirrups can be avoided, it may be helpful for some women, at least during the initial portion of the examination. A preferred and simple position for PFM assessment is the hook-lying<sup>3</sup> position (supine with both hips and knees flexed and feet on the examination table, comfortably placed hip-width apart).

Pelvic floor assessment must always begin with informed consent from patients, and a detailed description of the components of the examination should be provided.<sup>3</sup> Pelvic floor assessment must always begin with informed consent, which is obtained in accordance with organizational and institutional standards and policies. Because increased emotion, stress, anxiety, and/or fear can elevate PFM tension and alter the assessment,<sup>3</sup> providing a

detailed description of the examination and its components before the assessment will help decrease stress and anxiety. This should occur when the patient is clothed and less vulnerable. Care must be taken to ensure that there is an explicit understanding between the patient and practitioner as to the rationale and nature of the examination. Palpation should be with the pad of the finger to avoid any direct pressure with the tip of the finger or fingernail. To reduce anxiety regarding the degree of pressure that is being used, the practitioner can apply equal pressure to the thigh of the patient to demonstrate the degree of pressure used with the internal palpating finger. The purpose of the examination is to assess the musculature and surrounding tissue on the outside, at the entrance of the vagina, the deep muscles, and connective tissues (fascia), as well as the internal organs with the greatest accuracy while being mindful of the patient's comfort and toleration of the examination. A rectal MSK examination may be indicated and of vital



**FIGURE 2.** Internal PFM with bony structures identified. This figure appears in color online (illustrator: Marie Dauenheimer, MA, CMI, FAMI).

importance when pelvic floor conditions such as constipation and fecal incontinence are present. Detailed instruction for rectal assessments warrants a separate publication.

### Assessment of the Superficial Pelvic Floor Muscles

The superficial PFM's include the bulbocavernosus, ischio-cavernosus, and superficial transverse perineal muscles. Locating these small muscles is easiest when using a superimposed imaginary clock on the vulva. The clitoris represents 12 o'clock; the left or right ischial tuberosity, 3 o'clock or 9 o'clock; and the anus, 6 o'clock (see Fig. 1 for reference). To locate the ischiocavernosus muscle, palpate at 1 o'clock and 2 o'clock or at 10 o'clock and 11 o'clock over the labia majora. The bulbocavernosus is palpated around the perimeter of the introitus. Palpation of the superficial transverse perineal muscle begins at 3 o'clock or 9 o'clock and continues to the perineal body where the bilateral muscles attach.<sup>3,10</sup>

The muscles in this group often can be overactive, restricted in mobility, and tender when palpated. Pain with gentle palpation at 1 o'clock and 2 o'clock or at 10 o'clock and 11 o'clock over the labia majora is indicative of ischiocavernosus muscle overactivity. Tenderness along 3 o'clock or 9 o'clock suggests dysfunction in the superficial transverse perineal musculature. Overactivity of the bulbocavernosus can cause tenderness around the vaginal opening and contribute to dyspareunia. Pain with gentle pressure at any of these locations helps determine if superficial MSK dysfunction (or myofascial pain) is present. Recognition of that pain is important because it helps determine the vigor of the rest of the examination (Table 2).

### Assessment of the Deep Pelvic Floor Muscles

The deep PFM layer, or levator ani, is palpated lateral to midline at 5 o'clock or 7 o'clock by gently inserting the assessing finger 1–2 knuckles (2–4 cm) into the vagina past the superficial muscles. Once inside the vaginal canal, palpation at 6 o'clock is the anal sphincter and rectum (2–3 finger widths). The coccygeus can be palpated by locating the coccyx, behind the rectum, and palpating on either side, following the muscle laterally to the ischial spine. Because of the interplay between pelvic floor and hip muscles, assessment of the obturator internus muscle is included in the internal examination. The right obturator internus is located by moving the assessing digit laterally within the vaginal canal to 9 o'clock and 10 o'clock. Obturator internus function is evaluated by palpating its active contraction. To accomplish this, place a hand on the outside of the flexed knee on the same side as the assessing digit. Ask the patient to gently push the knee outward (hip external rotation/abduction) while resisting any active motion with the hand on the knee.<sup>2</sup> This will produce a palpable obturator internus contraction that will gently rise into the assessing finger. Likewise, palpation at 2 o'clock and 3 o'clock will evaluate the left obturator internus. The puborectalis and periurethral tissue can be found by moving the palpating finger further anterior and superior to 11 o'clock or 1 o'clock, halfway between the obturator internus and pubic symphysis. To continue the examination, turn the examining digit over (palm facing upward). The finger pad is used to palpate the urethra and inferior aspect of the bladder at 12 o'clock, posterior to the pubic symphysis. Palpation of the urethra and bladder tissue is similar in feel to that in the rectum only narrower (Fig. 2).

Pain or tenderness with palpation indicates possible muscle overactivity and/or trigger points. A trigger point is a hyperirritable locus in taut bands of the skeletal muscle. While palpating the deeper muscles, it is important to progress slowly and explain that you will be palpating muscles that lie both on the sides and bottom of the vaginal canal. Active trigger points throughout the broad

**TABLE 2.** Musculoskeletal Assessment Checklist

Assessment* Checklist	
Superficial/External Assessment	Location
Ischiocavernosus	Vaginal 11 o'clock and 1 o'clock
Bulbocavernosus	Vaginal: immediately external to introitus
Superficial transverse perineal	Vaginal: 3 o'clock and 9 o'clock
Levator ani	Vaginal: 7 o'clock and 5 o'clock Rectal: 3 o'clock and 9 o'clock
Anal sphincter	Rectal: visual and palpation at anus and surrounding tissue
Internal/Deep Assessment	Location
Bulbocavernosus	At introitus (with exception of urethral orifice)
Levator ani	Vaginal: 1–2 knuckle depth at 5 o'clock and 7 o'clock
Rectum	Vaginal: central 1–2 knuckle depth
Obturator internus	Vaginal: 3 o'clock and 9 o'clock at 2 knuckle depth Rectal: 4 o'clock and 8 o'clock beyond ischial spines
Puborectalis	Vaginal: 11 o'clock and 1 o'clock at 1 knuckle depth Rectal: sweeping motion just beyond internal/external sphincter
Bladder and urethra	Vaginal: 12 o'clock at 1–2 knuckle depth
Coccyx	Rectal: beyond puborectalis, can use external finger to guide location of coccyx
Muscle Function	Grade
Cue: "Imagine pulling fluid up thru straw in vaginal canal," "Hold back gas"	No contraction, weak, normal, strong PERFECT scale
Pain	Scale
Vaginal and rectal	Absent/pressure (0), mild (1–3), moderate (4–6), strong (7–10)

\*Explain assessment to patient. Ask for consent. Perform pelvic floor musculoskeletal assessment prior to using speculum. Gentle pressure will yield more accurate results.

fibers of the levator ani can create discomfort and referred pain when palpated, whereas underactive PFM's will feel softer, less bulky, and usually not painful. Abnormal rectal tension is palpated as firm roundness, which can reproduce pain or urgency for flatulence or defecation; however, that same roundness when asymptomatic may suggest a rectum full of stool.<sup>17</sup> Overactive obturator internus contraction feels quite bulky and will feel thicker under the assessing digit and can cause pain. Abnormal tension in the urethra, periurethral fascia, and bladder can cause pain or urinary urgency when assessed<sup>17</sup> (Table 3).

Palpation of overactive PFM's tends to feel bulkier and thicker and typically creates or elevates tenderness, discomfort, or pain. It also has the ability to cause referred pain to other regions throughout the pelvis, hips, and back. Documentation of the presence or absence of pain with palpation is sufficient to substantiate or rule out PFM and visceral involvement in the differential diagnosis. Description of pain (burning, aching, tingling) can be beneficial in

understanding and communicating symptoms.<sup>18</sup> The majority of studies describing pelvic floor pain assessments use the numeric rating scale (0–10)<sup>10</sup>; however, recording pain as “absent/pressure” (0), “mild” (1–3), “moderate” (4–6), or “strong” (7–10)<sup>19,20</sup> can be sufficient in communicating with the patient and for referral to PT. It is important to understand and take into consideration that factors such as pain beliefs, catastrophizing, and pain interference can all affect how patients rate their pain.<sup>21</sup>

### Assessment of Pelvic Floor Muscle Strength and Relaxation

The current recommendation of the International Continence Society is a simple grading scale of 4 points: (1) strong, (2) normal, (3) weak, or (4) no contraction to classify the patient's ability to contract the PFMs.<sup>12,22</sup> Medical practitioners might also see a therapist use a strength scale of 0 to 5 (Oxford scale<sup>23</sup>) for grading muscle strength and the PERFECT scale by Laycock and Jerwood.<sup>24</sup> A normal contraction is felt as a squeeze with some lift. A weak contraction is felt only as a gentle squeeze with no lift. When there is no squeeze or lift, it is classified as no contraction.<sup>12</sup> This is described in detail in “Pelvic Floor Assessment: The PERFECT Scheme” by Laycock and Jerwood.<sup>24</sup> It is recommended that the same practitioner grade both initial and subsequent assessments for greatest accuracy.<sup>12</sup> Some recommended cues to use for patient PFM contraction include “Pull the PFMs up and inward,” “Squeeze like you are trying to pull fluid up through a straw into your vagina,” or “Pull in like you are trying to hold back gas and pee.” With a strong contraction, the assessing practitioner should feel an inward and anterior lift in the PFMs. Complete absence of contraction may be indicative of levator ani (pubovisceral muscle) tear in postpartum women. As with any other muscle group in the body, normal function of the PFMs includes the ability to actively and fully contract and relax. It is advisable to be mindful of the time it may take for the PFMs to relax after performing a contraction, particularly in those reporting pain. Delay and difficult relaxation are commonly seen in patients with overactive PFMs. The key findings of the internal assessment can be conveyed to

a pelvic physical therapist who will perform a systematic detailed assessment and provide appropriate treatment.

If no abnormalities are found with internal assessment, it does not mean that other MSK components are not present. Abnormalities in the MSK system are still possible throughout the pelvis, abdomen, lower extremities, or low back regions, which can contribute to the PFD (Table 4).

### Clinical Relevance

Pelvic floor muscle dysfunction(s) are extremely varied and quite common.<sup>23</sup> According to the International Continence Society, pelvic floor dysfunction is categorized as either underactive or overactive. When PFMs are unable to voluntarily contract when appropriate, they are considered to be underactive. Urinary incontinence, which frequently occurs as a result of underactive PFMs, is reported in 25% of young women, 44–57% in middle-aged and postmenopausal women, and 75% in older women.<sup>25</sup> Underactive PFMs may also contribute to POP, which has been reported to be very common in older women.<sup>26</sup> A sign of overactive PFMs is defined as PFMs that have an inability to relax or may even contract when relaxation is functionally needed (ie, during micturition or defecation).<sup>27</sup> Pelvic pain, often a symptom of overactive PFMs, encompasses a number of diagnoses with a prevalence range of 3.8–24%.<sup>12</sup> Pelvic floor dysfunction includes dyspareunia, vulvodynia, vaginismus, bladder and bowel dysfunction(s), and POP, all of which can lead to significant limitations in daily function and quality of life<sup>4</sup> and often are associated with anxiety and depression.<sup>28</sup> Terminology is ever changing in this field and can include genito-pelvic pain/penetration disorder and generalized/localized vulvodynia.<sup>29</sup> The reported prevalence of MSK disorders, particularly pelvic floor myofascial pain associated with CPP, can range from 21% to 85%.<sup>3,18,30</sup> It is important for health care providers to realize that there may not be a single source of dysfunction. For example, patients with bladder and bowel dysfunction(s) may have compensatory elevated or overactive PFM tone.<sup>18</sup> Lower urinary tract symptoms related to urgency and frequency, as well as other visceral symptoms (ie, chronic constipation, painful bladder

**TABLE 3.** Trigger Point Examples

Trigger Points <sup>1,2,3,4</sup>	
Muscle	Referral Patterns/Patient Concern <sup>1</sup>
Levator ani	Vaginal, vulvar, bladder, perineal, buttock, rectal
Obturator internus	Rectal, vulvar, urethral, vaginal, mid posterior thigh
Puborectalis	Suprapubic region, bladder, urgency symptoms
Coccygeus	Coccyx, buttock, low back pain
Iliopsoas	Anterior groin and thigh, lower abdominal quadrant “ovary pain,” lateral lumbar region
Quadratus lumborum	Belly pain, back pain, buttock pain
Transverse abdominis	Groin, genital pain, lower quadrant abdominal pain
Rectus abdominis	Back, abdominal, fullness, nausea, bladder urgency
Gluteus medius	Posterior iliac crest, sacrum, buttock and upper thigh

Trigger points of both pelvic floor and pelvic region, and the referral regions/patient concerns associated with those trigger points.

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**TABLE 4.** External Musculoskeletal Assessment

External Musculoskeletal Assessment	Key Checklist Items
Posture	Nonverbal communication Upright posture versus rounded shoulders, forward head <sup>1</sup>
Gait/mobility	Toe out <sup>2</sup> Trendelenburg <sup>1</sup> Speed <sup>3</sup>
Alignment	Shoulder height <sup>4</sup> Anterior superior iliac spine <sup>2</sup> Iliac crest (anterior and posterior) <sup>2</sup> Posterior superior iliac spine <sup>2</sup>
Abdomen	Popliteal folds Scar presence <sup>2,5</sup> Diastasis recti <sup>6,7,8</sup>
Lumbar spine	Trigger point(s) (Carnett test) <sup>9</sup> Lumbar range of motion <sup>1</sup> Seated slump test <sup>10</sup>
Pelvic girdle	Sacroiliac tests <sup>11,12</sup> Active straight leg raise test <sup>13,14</sup> Pubic symphysis palpation <sup>11</sup>
Hip	Range of motion <sup>1,2</sup> Pain provocation <sup>15,16</sup> Strength testing <sup>1</sup>
Strength/stability	Sit to stand ability and form <sup>17</sup> Squat ability and form Step up ability and form Core stability <sup>18</sup>

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syndrome), often are attributed solely to the end organ, thereby ignoring possible PFD in the list of differential diagnoses.<sup>9,10</sup>

## GUIDE FOR THE ASSESSMENT OF ASSOCIATED MUSKULOSKELETAL SYSTEM AND THE LUMBOPELVIC COMPLEX

A basic MSK assessment of the pelvis, including key anatomical structures, can help the practitioner evaluate whether an MSK component is the primary issue creating the symptoms, or the original symptoms are creating guarding and protective responses, which in turn create MSK symptoms. Once an MSK condition is identified, the patient can be referred to PT for a thorough MSK assessment. Assessment components include the following: preparation for assessment, assessment of posture, assessment of gait, assessment of general strength, preparation for assessment of lumbopelvic and core complex, assessment of lumbar spine, sacroiliac joint, hip, abdomen, iliopsoas, and pelvic alignment (for details of external MSK anatomy, assessment of associated pelvic MSK system, and assessment of lumbopelvic complex, see Appendix A, <http://links.lww.com/FPMRS/A269>).

### Clinical Relevance for Assessment of Associated Musculoskeletal Complex

Postural assessment can add valuable findings to the physical examination. Postures assumed by patients can provide information related to presenting patient complaints, such as traumas, injuries, and pathologies. More importantly, the clinician must remember that the patient's overall demeanor can reveal valuable information and needs to be considered in management and referral to other health care providers. It is important to assess both static and dynamic postures to ascertain the patient's functional movement. Observing a patient walk can provide valuable information as well. Abnormal gait patterns arise from traumatic injuries, diseases, or conditions of neurologic or MSK origin. Even when using assistive devices such as a walker or cane, gait should not deviate too far from the normal pattern unless other impairments are present. Observations of overall strength, posture, and gait can help identify suspected weakness of core, gluteal, and quadriceps muscles.

### Clinical Relevance for Assessment of Lumbopelvic Complex

Musculoskeletal dysfunction and its association with a variety of PFD and CPP impairments are well documented. Experts specializing in CPP recommend that initial evaluation of women with pelvic and/or vaginal pain include a thorough MSK assessment because 50–90% of patients were found to have MSK dysfunction.<sup>2</sup> The American College of Obstetricians and Gynecologists recommends MSK evaluation before laparoscopy or hysterectomy for CPP based on the relationship between the MSK and viscera. This is especially the case with an undiagnosed cause of pain. When the pelvic MSK structures are optimally functioning, bowel, bladder, and sexual function as well as mobility occur with a minimal level of awareness. Deviations in strength, flexibility, and/or ability of any one of these structures can potentially create a series of events that, although initiated by one structure, may eventually include others. As a result, patients with unaddressed MSK issues in one region of the pelvis may develop numerous other pelvic MSK issues. Because of the influence of one structure on another, pelvic floor myofascial pain can be directly related to PFMs and fascial tension and/or can be the result of functional changes within the lumbopelvic-hip complex.<sup>14</sup> Pelvic floor comorbidities are common and should be recognized when assessing patients with conditions in the pelvic region. Examples of

common comorbidities include irritable bowel syndrome, fibromyalgia, interstitial cystitis/bladder pain syndrome, and migraines.<sup>28</sup> Awareness of these clusters of conditions can make the practitioner more aware of possible confounding neurologic and/or MSK issues (see Fig. 2 and Appendix A, <http://links.lww.com/FPMRS/A269>, for more information on assessing both complexes).

## PHYSICAL THERAPY: HOW TO PREPARE PATIENTS FOR REFERRAL AND TREATMENT

There is sometimes limited knowledge and understanding of what transpires during a pelvic rehabilitation session. As a result, it is difficult for practitioners to communicate with patients regarding what to expect during their initial visit. This section will present a basic overview of a pelvic rehabilitation session to improve communication between patients and practitioners. Qualified physical therapists complete thorough assessments to determine the most appropriate treatment. Variations in care depend on many factors, including but not limited to diagnoses, comorbidities, patient adherence, and socioeconomic factors.<sup>27</sup> However, many basic treatment techniques and behavioral changes are evidence-based and standardized. Not only is PT a recommended treatment for pelvic conditions, recent analysis of cost-effectiveness of various approaches to treating SUI favors PFM therapy as the most cost effective non-surgical treatment option for SUI.<sup>31</sup>

Physical therapy treatments include but are not limited to PFM training, manual muscle therapy, behavioral/lifestyle training and education, exercise and home exercise programs, pain science education, and modalities. Therapists understand how to assess overall functional ability using subjective and objective data. From those findings, functional limitations and treatment goals are determined, leading to the development of an effective and progressive treatment plan. In addition, PT is an integral part of a multidisciplinary approach to treating pelvic conditions. Appendix B (<http://links.lww.com/FPMRS/A270>) serves as a tool to improve understanding of what can occur in a pelvic PT session. With improved understanding of a pelvic PT session, all practitioners can more effectively discuss treatments with their patients and communicate more effectively with pelvic physical therapists (see Appendix B, <http://links.lww.com/FPMRS/A270>, for more information on pelvic floor PT treatment).

## CONCLUSIONS

Evidence that supports implementation of safe and comfortable pelvic MSK assessments by multidisciplinary medical practitioners is evolving.<sup>10,12</sup> When proper assessments are routinely performed, MSK issues can be recognized, allowing for prompt and appropriate referrals for PT.<sup>2,9,10</sup> Assessments and interventions delivered by qualified physical therapists are integral components of overall pelvic health care. With more efficient and proper medical assessment, MSK dysfunction(s) can be addressed expeditiously, stopping the progression of decline. Left unaddressed, pelvic dysfunction has a much greater risk of becoming chronic. Improved recognition of pelvic and pelvic floor dysfunction by health care providers will reduce impairment and disability that often leads to pelvic floor pain.<sup>12</sup> When practitioners use standardized assessments and terminology, communication will improve. This in turn will strengthen the interdisciplinary model and will continue to improve patient care, optimizing treatment outcomes.<sup>3,4</sup>

This publication serves as a guide for comprehensive pelvic floor assessment and provides a detailed description of evidence based PT treatment. Our goal is to encourage practitioners to perform comfortable, safe, and effective pelvic floor and associated system MSK examinations. This document describes baseline

MSK assessment of the pelvis that can be used in clinical practice and research alike. This guide serves to open and improve communication among multidisciplinary practitioners. Evolving clinical care and research will help refine how the pelvic floor and pelvic region will be assessed and treated.

### ACKNOWLEDGMENTS

*Publications Committee Reviewers: Vivian Aguilar, MD; Lauren Cadish, MD; and Peter Jeppson, MD.*

*This document reflects clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. Its content is not intended to be a substitute for professional medical judgment, diagnosis, or treatment. The ultimate judgment regarding any specific procedure or treatment is to be made by the physician and patient in light of all circumstances presented by the patient.*

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