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**Physical Therapy Evaluation of the Pelvic Floor: The Case of Chronic Pelvic Pain**

Personal trainers, fitness coaches, and every exercise guru on the Internet will stress the importance of a strong, stable "core". For most people, the need for a strong core translates as a need for "six pack" abdominals [1,2]. Core stability refers to the ability to control the position and motion of the trunk over the pelvis and, while the role of the abdominal muscles should not be discounted, these muscles are but one of many contributors to core strength and stability [1,2]. Also known as the lumbo-pelvic-hip complex (LPHC), the anatomical core is an essential component of functional mobility and activity performance, creating a bridge between the upper and lower extremities [1,2].

One component of the LPHC, the pelvic floor, is an often-underappreciated group of muscles that play a number of vital roles beyond core strength and stability [2-7]. It is the pelvic floor that provides support to the pelvic organs, enhances sexual appreciation, and assists in regulating the lymphatic system [3-7]. With the increases in intra-abdominal pressure seen with lifting, coughing, and sneezing, the pelvic floor muscles increase their tonic activity to prevent urine leakage and maintain the position of the bladder, playing a key role in continence and sphincter control [3-6,11]. The pelvic floor has also been shown to play a role in maintaining posture by increasing tension on the thoracolumbar fascia and stabilizing the sacroiliac joint [3-6]. Lastly, the pelvic floor influences respiration given its close relationship to the respiratory diaphragm and the intra-abdominal pressure system [3,5-8].

As the role of physical therapy in the management of pelvic floor dysfunction continues to evolve, it is imperative that clinicians not only have the knowledge and skill to access the pelvic floor patient, but that they be able to recognize clinical signs of when a

referral is warranted. This paper will explore the lumbo-pelvic-hip complex as it relates to the pelvic floor, female pelvic floor anatomy, and the physical therapy examination and evaluation of the pelvic floor patient. This paper will conclude with a discussion of the clinical presentation of chronic pelvic pain, treatment options, and indications for additional referral.

## The Lumbo-Pelvic-Hip Complex and its Relationship to the Pelvic Floor

When considering the pelvic floor, it is important to remember that it does not function in isolation [2,11]. As the name suggests, the LPHC is composed of the spine, hip, and pelvis and any associated musculoskeletal tissues and joints [2]. These tissues include the abdominal and spinal musculature, respiratory diaphragm, and the proximal extremity muscles [11]. While the overall job of the LPHC is to provide support and stability to enable functional mobility, the individual components of this complex play unique roles [2].

In many ways, the LPHC can be compared to a canister of air; it has a top, a bottom, and sides that are supported by a pressure system [1]. When the canister is sealed and undamaged, it is difficult to crush [1]. However, once the canister is opened and the pressure system cannot be maintained, it becomes structurally weakened and susceptible to damage [1]. If this analogy is applied to the LPHC, the respiratory diaphragm represents the top of the canister and its sides are composed of the spinal and abdominal muscles [1]. The base of the can is the pelvic floor [1]. The muscles and support structures of the LPHC work together to maintain the intra-abdominal pressure that provides the body and its organs with support and stability [1,2]. Having a strong and stable LPHC is closely tied to injury

prevention; when any aspect of the LPHC is weakened or damaged, intra-abdominal pressure is not maintained and the system is left vulnerable to injury and dysfunction [2].

To better understand the interconnected nature of the pelvic floor and the LPHC, consider the act of breathing. The respiratory diaphragm and the pelvic floor, along with the abdominals and muscles of the rib cage, work to modulate intra-abdominal pressure throughout the respiration cycle by contracting and relaxing [6-8]. The respiratory diaphragm is structurally connected to the pelvic floor via fascia and muscular connections; the medial arcuate ligament of the diaphragm blends in with the tendon of the psoas muscle and the distal fascia of the psoas muscle blends with the pubococcygeus muscle of the pelvic floor [5]. Research suggests that irritation of the psoas can cause dysfunction and pain of the pelvic floor, which can negatively impact respiration [5]. Likewise, irritation of the diaphragm has been shown to cause spasm of the pelvic floor [5].

In a study by Hodges, Sapsford, and Pengel, pelvic floor activity was found to be closely related to abdominal muscle activity [6]. Using EMG electrodes in the vagina and anus of seven participants, pelvic floor muscle activity was recorded in a number of different conditions [6]. Subjects demonstrated an increase in pelvic floor muscle activity during expiration while standing and while performing movements of the upper extremities [6]. An additional study found that contraction of the pelvic floor resulted in increased maximum ventilation volume, further strengthening the connection between respiration and the pelvic floor [7]. It is hypothesized that this is not only due to the physical connections seen in the LPHC, but the fact that increased abdominal wall activity with respiration displaces the pelvic organs to a greater degree, requiring increased activity of the pelvic floor [6].

**Anatomy of the Female Pelvic Floor**

The pelvis acts as a bridge between the upper and lower body, transmitting force from the head, arms, and trunk to the lower extremities [3,4,9-12]. The muscles of the pelvic floor rely on the bony landmarks of the pelvis, including the pubic rami and ischial spine, to serve as important attachment sites for muscles and ligaments [3,4,9-12]. The two innominate bones of the pelvis together with the sacrum and coccyx fuse to form the greater and lesser pelvic basins [3]. While the greater pelvic basin is occupied by a number of abdominal organs, the lesser pelvic basin forms in inferior pelvic outlet [3]. Refer to Figure 1* in Appendix A for additional bony anatomy review [13].

Located at the base of the inferior pelvic outlet is the perineum, a structure that provides passage to the reproductive, gastrointestinal, and urinary tracts [3,9]. The perineum is comprised of a number of important structures that not only provide attachment sites for muscles and ligaments, but that play vital physiologic roles [3,9]. The perineum is bordered by the mons pubis, the labia majora and minora, and the perineal body [3,9]. The perineal body provides an attachment site for a number of pelvic floor muscles, rectum, and anal sphincter [3,9]. The perineum contains a number of structures important for voiding and sexual function including the clitoris, vaginal introitus, and urethral opening [3,9]. Examination of the perineum is a key component of the internal pelvic floor evaluation and will be discussed shortly. For a visual representation of the perineum, refer to Figure 2* in Appendix A [14].

The muscles of the pelvic floor can be divided into three distinct layers with unique functions (Figure 3*, Appendix A) [3,9-11,15]. The most superficial layer, the perineal pouch, is

comprised of the ischiocavernosus, bulbocavernosus, and the superficial transverse perineal muscles [3,9-11]**.** Together, these muscles promote sexual appreciation and provide support for, and control of, the urethra [3,9-11]. Deep to these muscles lies the urogenital diaphragm, a group of muscles whose primary function is to provide urinary continence [3,9-11]. This layer includes the sphincter urethrovaginalis, compressor urethra, and the deep transverse perineal muscles [3,9-11]. The external urethral sphincter is also part of this second layer [3]. The deepest layer of muscles, often referred to as the pelvic diaphragm, includes the levator ani and the coccygeus [3,9-1]. The levator ani is composed of two distinct muscles, the iliococcygeus and the pubococcygeus; the pubococcygeus can be further divided into the pubovaginalis and the puborectalis [3,9-11]. These muscles provide support for the pelvic organs, rectum, and vagina, are involved in sphincter control, and work to stabilize the sacroiliac joint [3,9-11]. A detailed list of muscle origins and insertions is provided in Table 1, located in Appendix A [9].

Many pelvic structures are connected by endopelvic fascia [3,9,11,16]. The endopelvic fascia is continuous with neighboring visceral fascia and contains both collagen and elastin fibers that interpose strength with the ability to deform as needed [3,16]. Much of this fascia blends with the muscles of the pelvic floor and provides additional sites for attachment [3,16]. A number of ligaments, including the pubourethral, transverse cervical, uterosacral, and lateral rectal ligaments provide additional support to the structures of the pelvis [3,16].

## Evaluating Patients with Pelvic Floor Complaints: The Subjective Interview

As with any evaluation, evaluation of the pelvic floor patient begins with a thorough subjective history. Because many of the subjects discussed in the realm of pelvic health may

be perceived as intimate topics, it is important that the practitioner approach the subjective interview with sensitivity [3,5,17]. Aspects of the subjective interview can be revisited in future visits if needed [3,5,17]. The goal of the subjective exam is to paint a picture of the patient, the condition, and how the two interact [3,5,17]. To successfully address a patient's concerns, the physical therapist must understand the impact that the condition has on the patient [3,5,17]. The subjective interview not only provides the opportunity for the patient to establish their own goals for intervention, but also facilitates trust building between patient and practitioner.

Particular attention should be given to medication usage, surgical history, and birth history, as well as bladder, bowel and sexual function [3,5,17]. It is also imperative that the examining practitioner gains a thorough understanding of symptoms, their onset, and any associated patterns; aggravating and easing factors should also be investigated [3,5,17]. Occupation and work history may be contributing to symptoms and should be explored [3,5,17]. The APTA's Section on Women's Health recommends using the Pelvic Girdle Pain Questionnaire, the Pain Catastrophizing Scale, the Depression, Anxiety, Stress Scale, and the Oswestry Disability Index for women presenting with pelvic pain [18]. These measures have all been shown to be valid and reliable for this population, providing the therapist with a way to monitor response to treatment [19-22].

**Evaluating Patients with Pelvic Floor Complaints: The Lumbo-Pelvic-Hip Complex**

There are multiple aspects of an orthopedic evaluation that may be appropriate for a patient presenting with pelvic floor complaints. Because outlining this process in its entirety is beyond the scope of this paper, this section will focus of the aspects that are

most relevant to this population. Evaluating the LPHC is essential for correct diagnosis and treatment; research suggests that musculoskeletal pain that goes unidentified and untreated may result in pain amplification and perpetuation of dysfunction [23].

The evaluating physical therapist should pay particular attention to posture and breathing patterns [3,5-8,24]. Posture may seem insignificant, but research suggests that upright sitting posture requires significantly more pelvic floor activity than slumped sitting posture and that this activity increases further when sitting is not supported [6]. The presence of scoliosis may lead to altered respiration patterns that may also contribute to pelvic floor dysfunction [3,5,24].

Attention should also be given to the presence of malalignment of the LPHC though observation of gait and palpation of bony landmarks and musculoskeletal tissues [3,24]. A 2008 study showed that women with chronic pelvic pain were statistically more likely to have asymmetries in iliac crest and pubic symphysis height and demonstrate functional limb length discrepancies when compared to those without chronic pelvic pain [24]. The soft tissue structures of the LPHC should be palpated for trigger points, with emphasis on the psoas, piriformis, and rectus femoris muscles [3,5,24]. Women with pelvic floor involvement have been shown to experience significantly more pain and tenderness upon palpation of these muscles [3,5,24].

Of particular importance for the LPHC are the concepts of form and force closure [3]. Form closure refers to a joint inherent structure and its ability to resist shear forces in loading [3]. Force closure pertains to additional forces generated by muscles that are necessary to increase joint stiffness in the presence of a load [3]. Form and force closure relate directly to the LPHC's ability to transfer load from one segment to another [3]. When

closure is not optimal, load transfer is negatively impacted and dysfunctions can result [3]. Testing load transfer can be done through gait analysis, the active straight leg raise test (ASLR), Gillet's test, and the functional squat test providing vital insight into form and force closure and possible sources of dysfunction [3].

Finally, abdominal strength and tenderness should be assessed for patients with pelvic floor complaints [11]. The abdominal wall is a key component of the LPHC, and it is not uncommon for women to present with trigger points throughout the abdomen that can contribute to dysfunction in the pelvic floor [5,11]. Sapsford suggest that pelvic floor function is most strongly associated with coactivation of transverse abdominis; weakness in this muscle likely suggests weakness in the pelvic floor [11]. The physical therapist should also screen for separation of the rectus abdominis, also known as diastasis recti, as this can cause abdominal weakness [24].

**Evaluating Patients with Pelvic Floor Complaints: Internal Evaluation**

After the orthopedic assessment has been completed, an internal evaluation may be warranted. The internal evaluation is important for many reasons. Women with chronic pelvic pain are significantly more likely to experience tenderness of the pelvic floor with palpation than those who do not have the condition [23,24]. A study conducted in 2010 found that women with pelvic floor dysfunction experienced significantly more tenderness of the levator ani and obturator internus muscles [24]. When combined with objective tests like FABER, internal evaluation improves the likelihood than an individual with pelvic floor dysfunction will be correctly identified [23].

It is important that this process is explained to the patient and that consent for the procedure is obtained. Contrary to what many may think, internal vaginal examination is within the physical therapist's scope of practice [25]. Some facilities require that the patient bring a chaperone or that there be a second person in the room [26]. The therapist should leave the room to allow the patient to undress as necessary, providing the patient with sheets or blankets to maintain modesty; adequate draping techniques should be observed at all times [11]. Throughout the internal evaluation, the therapist must maintain open communication with the patient, asking permission to perform certain tasks and explaining what to expect before anything is done [11]. Internal examination is generally contraindicated in women who are in their third trimester or immediately postpartum, those with active infections, and those who have recently had surgical procedures and do not have approval from their medical doctor [23].

With the patient in a comfortable position and properly draped, the therapist should don gloves and begin with a visual inspection of the external genitalia. Note the color, bulk, and position of the perineum [5,17]. In women who are post-menopausal, the perineal tissue may appear pale or atrophied [17]. Redness, itching, and inflammation may indicate irritation or infection and scaring of the perineum may be noted in women who have delivered vaginally [5]. An elevated perineal body is often noted in cases of pelvic pain, and a lowered perineal body may signal prolapse or incontinence [17]. The patient should be asked to perform a pelvic floor contraction as the therapist monitors the movement of the perineum; with an ideal contraction, the perineal body should elevate, the anus should "wink", and the clitoris should move downward [5,17]. The patient should also be asked to

bear down and to cough, noting any movement of the perineal body [17]. Note any vaginal or rectal prolapse with increases in intra-abdominal pressure [5,17].

Once a visual evaluation has been completed, the therapist should ask permission to physically palpate the external structures of the vulva and perineum including the mons pubis, labia, and vaginal introitus [5,17]. Throughout this portion of the evaluation, the therapist should note any pain or tenderness experienced by the patient or any asymmetries from left to right [5,17]. The urethra can be visualized by gently spreading the labia majora and minora using a cotton swab; redness or visible irritation may signify underlying conditions [5,17]. After changing gloves, the physical therapist should then systematically palpate the pelvic floor muscles externally, noting any tenderness or palpable differences in muscle tension [11,17]. The piriformis and obturator internus should also be palpated externally, as both can refer pain to the vagina and contribute to dysfunction [11,17]. To prevent cross contamination, the therapist should always move anteriorly to posteriorly and change gloves if necessary.

If the patient is comfortable with the therapist proceeding with evaluation, a new set of gloves should be donned. With the pad of the finger down, a lubricated digit is placed at the vaginal opening; the patient's comfort should be assessed [5,17,27]. If acceptable and pain free, the therapist then proceeds to insert the lubricated digit into the vaginal canal to the level of the first knuckle [5,17,27]. At this level, the first layer of pelvic floor muscles is being assessed for pain, tightness, and asymmetry [5,17,27]. The patient is asked to perform a pelvic floor muscle contraction that can be graded on a 0-5 Harvard Oxford Scale [5,17,27]. This process is repeated at the level of the second and third knuckles [5,17,27]. When the lubricated

digit is to the level of the third knuckle, the deepest layer of muscles and the obturator internus can be palpated [5,17,27].

At this point, it is common for therapists to measure pelvic floor muscle strength and endurance using the PERFECT scale established by Jo Laycock (P= Power, E = Endurance, R= Repetitions, F = Fast Twitch, ECT = Every Contraction Timed) [28]. Research shows that this scale has an inter-rater reliability of (r =) 0.73-0.947 for each of the individual sections and a test-retest reliability of (r =) 0.92-0.98 [28]. Utilizing this scale provides therapists with a standardized way to quantify muscle strength and endurance [28].

**Pelvic Floor Dysfunction: The Case of Chronic Pelvic Pain**

Pelvic floor dysfunction can manifest in a number of ways including pain, incontinence, and impaired sexual function [29-32]. The prevalence of pelvic floor dysfunction varies widely based on the population and condition in question [29-32]. A study by Nygaard of 1,961 women over the age of twenty found that 23.7% of participants had at least one pelvic floor disorder, and that the likelihood of developing dysfunction increases with age, pregnancy status, and obesity [29]. Physical therapy plays a vital role in the assessment, diagnosis, and treatment of pelvic floor dysfunction, and proper intervention has been shown to positively impact patient outcomes for a number of conditions [5,11,17,23].

Chronic pelvic pain (CPP) is a condition that impacts women around the globe. The definition of CPP varies throughout the literature, but is often defined as noncyclical pain lasting for six months or more that occurs below the umbilicus and leads to functional disability or requires intervention from a healthcare practitioner [33,-35]. CPP can be caused by a number of conditions such as interstitial cystitis, irritable bowel syndrome, and

vaginismus [33,-35]. In 1996, it was estimated that 9.2 million women had CPP [35,36]. In a study of 773 women with this condition, 61% of participants did not have a known cause for their pain [35,36]. It was once thought that CPP was associated with a history of sexual abuse, but current research suggests this may not be the case [37]. However, women who have experienced sexual trauma as an adult are more likely to report pain related disability than those with no history of trauma [37]. CPP has been shown to negatively impact quality of life, increase the likelihood of developing mood disorders, result in lost time at work, and reduce productivity [38,39]. According to the WHO, the United States spends 881.5 million dollars each year on physician visits alone for those with CPP; the estimated out-of-pocket expense for patients is around 1.9 billion dollars annually [38,39].

Women with CPP may present quite differently. A patient with CPP may come to the physical therapy clinic with a number of diagnoses such as endometriosis, pelvic floor myalgia, or interstitial cystitis [34-39]. During the subjective interview, it is not uncommon for these individuals to report symptoms associated with a number of physiological systems including urinary frequency, pain with sexual intercourse, trouble sitting for long periods of time, and abdominal pain [17,24]. Women who have CPP also commonly report symptoms of depression and activity reduction [17,24]. These symptoms often lead to functional impairments such as poor sleep quality, inability to perform work duties, and bladder and bowel dysfunction [17,24].

As previously discussed, objective findings may include elevated or asymmetrical iliac crests or functional limb length discrepancies [3,24]. A patient with CPP may be tender to external palpation of the psoas, piriformis, and rectus femoris muscles and may demonstrate asymmetries in hamstring length [3,24]. Individuals with CPP are likely to

demonstrate impaired posture and reduced abdominal strength secondary to pain. Upper respiratory breathing patterns may be noted as a compensatory strategy for pelvic pain [3,5-8, 24]. Gait evaluation may reveal a Trendelenburg pattern characteristic of gluteus medius weakness or inadequate load transfer [3,24]. The ASLR test, Gillet's test, and functional squat test may also reveal inadequate load transfer [3,24].

On internal evaluation, the patient with CPP will likely be tender to palpation at any number of muscles and structures [34]. The perineal body may appear elevated and pelvic floor contractions will likely be weaker endurance reduced [34]. Women may experience difficulty fully relaxing from a contraction as well, a finding consistent with hypertonicity of the pelvic floor [34]. It is possible that the evaluating therapist will also note increased resting tone with palpation [34]. If the patient is unable to tolerate internal palpation, this can be revisited at a later time.

Physical therapy intervention for CPP can involve a number of different treatments, ranging from manual therapy to electrical stimulation [5,40,42]. Manual therapy is often initiated early on in treatment within the patient's tolerance [5,40,42]. Research shows that manual therapy cannot only significantly reduce pelvic pain and associated symptoms by 50% or more, but can produce long lasting improvements in functional mobility and quality of life [5,40,42]. Beneficial techniques for the pelvic pain patient may include introital stretching, periurethral release, and trigger point release in affected muscles [40,42]. Thiele massage has been shown to be effective when the levator ani and coccygeus muscles are contributing to pain and dysfunction [5,40,41]. A study with six female participants with a diagnosis of CPP reported significant reductions in pain after one month of weekly Thiele massage by a trained provider [41]. Connective tissue mobilization may help to release

abdominal adhesions to promote improved mobility and can be combined with stretching to produce optimal effects [5,40]. When manual therapy is not sufficient at relieving pain and other symptoms, dry needling may be implemented if the provider has the appropriate training [5,40]. Dry needling has been shown to alleviate trigger points in various muscles throughout the body, and is believed to have a similar impact on the muscles of the pelvic floor [40].

Biofeedback, in which a probe is inserted vaginally to provide feedback on muscle contraction and relaxation, can benefit those who have difficulty coordinating muscle activity [5,40]. Biofeedback has been shown to reduce pelvic pain by 50% in women and may be even more effective when combined with electrical stimulation and ultrasound [5,40,43]. In a study of 56 women with inadequate pelvic floor muscle contraction and subsequent urine leakage, 57% of participants demonstrated improved contraction strength after receiving perineal ultrasound and biofeedback [43].

Exercise can also be used to address CPP in the physical therapy clinic [5]. As an intervention, exercise will vary depending on the patient's presentation, suspected causes, and any factors that may be perpetuating symptoms [5,11]. Most patients will benefit from postural retraining and education on proper breathing techniques [11]. Pelvic floor muscle training will likely be needed for the majority of patients and can be facilitated in a number of ways, including biofeedback, ultrasound, and electrical stimulation [11]. Trunk stabilization and strengthening exercises can be initiated once a patient's pain is better controlled to address underlying weaknesses [11]. Addressing any additional muscle imbalances will help to improve load transfer to minimize pelvic floor dysfunction [11].

The length of the plan of care for patients with CPP will vary given their unique presentations [11,17]. If a patient does not experience improvements after a number of weeks or if their symptoms worsen, they should be instructed to return to their physician to discuss additional treatment. Throughout this process, the physical therapist should encourage the use of a home exercise program to optimize gains made during therapy sessions while empowering the patient to play an active role in their care.

## Conclusions

The physical therapy evaluation of patients with CPP is a complex, multifaceted process that requires the evaluating therapist to balance objectiveness with sensitivity as they search for means to alleviate symptoms and improve quality of life. It is imperative that the therapist considers the role that the lumbo-pelvic-hip complex plays in pelvic floor dysfunction. Treatment should focus on addressing underlying factors such as muscle imbalances, impaired posture, and non-optimal breathing patterns. Because additional referral may be warranted, it is important that therapists communicate with other healthcare professionals to optimize quality of care. As the role of physical therapy in the management of pelvic floor dysfunction continues to expand, continued research into various treatments is a must.

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Appendix A: Anatomy of the Pelvis and Pelvic Floor

**Figure 1**[13]**.** Bony anatomy of the pelvis. Landmarks such as the ischial spine and pubic rami serve as important attachment sites for the pelvic floor muscles[3]. Of note is the sacrotuberous ligament, which may be tender to palpation in women with pelvic floor dysfunction[3].

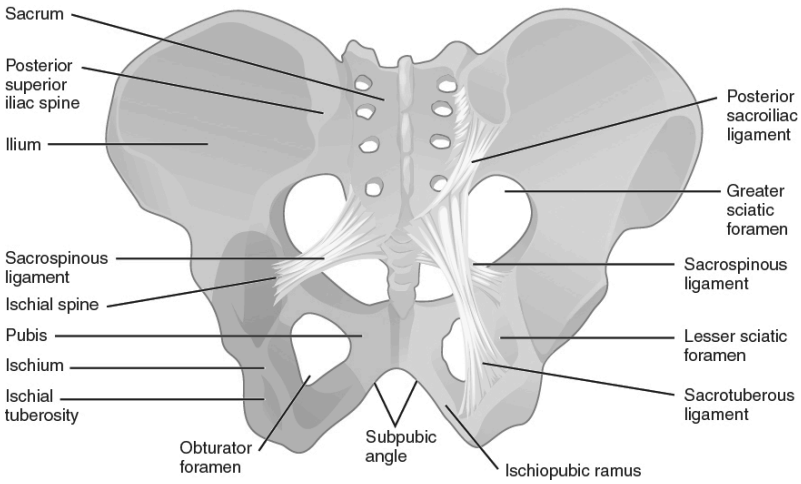


**Figure 2**[14]. Structure of the female perineum. Several perineal structures should be examined during the pelvic floor evaluation process for pain and signs of infection[5,17].

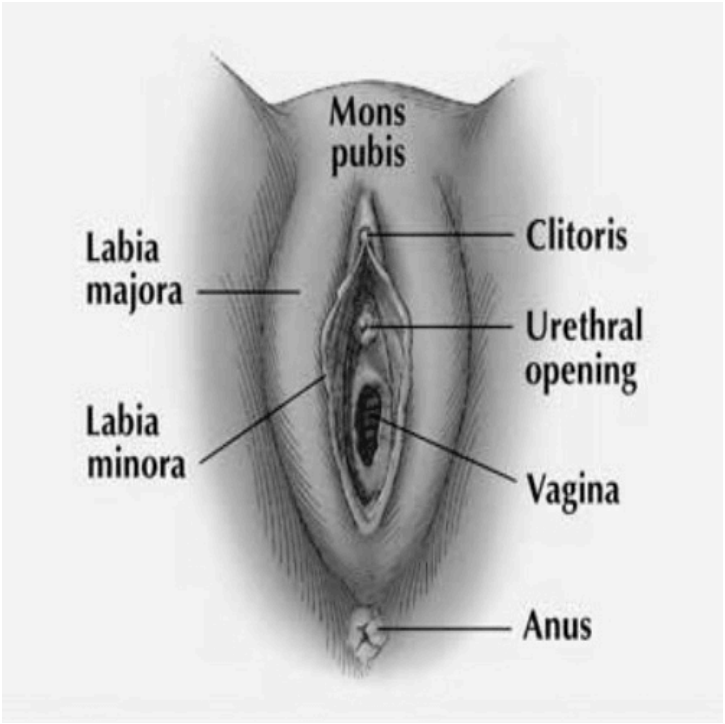

**Figure 3**[15]. Superficial and deep muscles of the female pelvic floor. Here, bulbocavernosus is referred to as bulbospongiosis; the two terms can be used interchangeably[3].

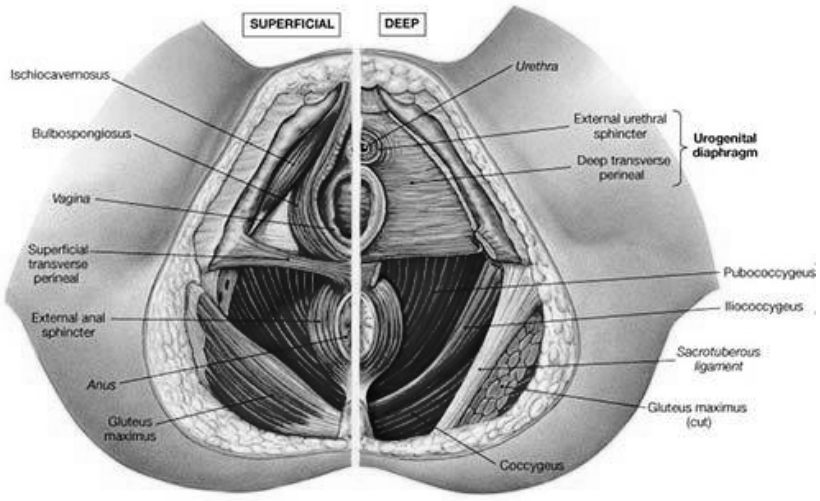


**Table 1**. Female Pelvic Muscle Chart [3,9]

| **Layer 1: The superficial perennial pouch** | **Origin** | **Insertion** | **Innervation** | **Function** |
|---|---|---|---|---|
| **Ischiocavernosus** | Ischial tuberosity and ramus | Crus of the clitoris | Pudendal nerve (S2-4) | Circulates blood to erect the clitoris |
| **Bulbocavernosus (Bulbospongiosis)** | Women: perineal body | Bulb of vestibule, perineal membrane, body of clitoris and corpus cavernosum | Pudendal nerve (S2-4) | Move blood from attached parts of the clitoris into the glans |
| **Superficial transverse perineal** | Ischial tuberosity and ramus | Perineal body | Pudendal nerve (S2-4) | Stabilize the perineal body |

| **Layer 2: The Urogenital Diaphragm** | **Origin** | **Insertion** | **Innervation** | **Function** |
|---|---|---|---|---|
| **Sphincter urethrovaginalis** | Perineal Body | Lateral vaginal wall to blend with muscle on the opposite side | Perineal branches of the pudendal nerve (S2-4) | Assists in closing urethra and vagina |
| **Compressor Urethra** | Ischiopubic rami bilaterally | Blends with muscle on opposite side anterior to the urethra | Perineal branches of the pudendal nerve (S2-4) | Assists in closing urethra |
| **Deep transverse perineal** | Medial ischial rami bilaterally | Perineal body | Perineal branches of the pudendal nerve (S2-4) | Stabilizes the perineal body |
| **External urethral sphincter** | Inferior pubic rami bilaterally | Membranous part of the urethra | Perineal branches of the pudendal nerve (S2-4) | Compresses and relaxes urethra |

| **Layer 3: The pelvic diaphragm** | **Origin** | **Insertion** | **Innervation** | **Function** |
|---|---|---|---|---|
| **Ischiocavernosus** | Ischial tuberosity and ramus | Crus of the clitoris | Pudendal nerve (S2-4) | Circulates blood to erect the clitoris |
| **Bulbocavernosus (Bulbospongiosis)** | Women: perineal body | Bulb of vestibule, perineal membrane, body of clitoris and corpus cavernosum | Pudendal nerve (S2-4) | Move blood from attached parts of the clitoris into the glans |
| **Superficial transverse perineal** | Ischial tuberosity and ramus | Perineal body | Pudendal nerve (S2-4) | Stabilize the perineal body |

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