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NVA News

Superficial Pelvic Floor Muscles and Vulvar Pain

By Dr. Pamela Morrison Wiles, PT, MS, DPT, BCB-PMD, IMTC

Dr. Pamela Morrison Wiles has a private physical therapy practice in New York City specializing in women's and men's pelvic health. She is cited as an expert in pelvic floor muscle dysfunction by the American Physical Therapy Association, and has presented research on physical therapy for clitoral and vulvar pain at international conferences. Dr. Morrison Wiles was inducted as a Fellow into the International Society for the Study of Vulvovaginal Diseases in 2007 and is an Executive Board Member of the NVA.

Pelvic floor muscle (PFM) dysfunction, which usually includes pain and overactivity of the deep PFMs, has been confirmed as an adjunctive diagnosis with vulvar pain syndromes, including vulvodynia, vestibulodynia, and clitorodynia.^{1,2} Anatomically the deep PFMs refer to the levator ani, which is comprised of the pubococcygeus, iliococcygeus, and puborectalis muscles. Some authors and anatomists also consider the coccygeus muscle to be a part of the levator ani complex. Collectively, these deep PFMs form the pelvic diaphragm. The levator ani muscles are innervated by two nerves, the pudendal and the levator ani nerve. The pubococcygeus muscle is innervated by the levator ani nerve S3-5 and the perineal branch of the pudendal nerve

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New Appointment to NVA Executive Board



For more than 20 years, Dr. Pamela Morrison Wiles has been practicing physical therapy (PT) in the areas of orthopedics and women's and men's pelvic health issues and has a private practice in Manhattan. She earned a BS in PT from Downstate Medical Center in NY and then an Advanced Master's degree in orthopedic PT from Touro College in New York in 1999. Dr Morrison Wiles also achieved a Doctorate at Touro College in 2006, with research completed in common PT evaluative findings in patients with chronic vulvar pain. A trained specialist in surface EMG pelvic muscle dysfunction biofeedback, she has also completed training in rehabilitative ultrasound imaging for lumbar and pelvic dysfunction. She earned a Certification in Integrative Manual Therapy at the Connecticut School for Integrative Manual Therapy in 2006.

In 2001, Dr. Morrison Wiles was inducted as a Fellow into the International Society for the Study of Vulvovaginal Diseases as an expert in her field. As a member of their Vulvar Pain Task Force, she devised PT algorithms for the evaluation and treatment of vulvar pain. She also was a primary instructor and curriculum editor for the advanced course in pelvic pain for the Section on Women's Health of the American Physical Therapy Association (APTA). Dr. Morrison Wiles has lectured nationally and internationally on the topics of vulvodynia, interstitial cystitis, treatment of pelvic and sexual pain, surface EMG pelvic floor muscle biofeedback, and pelvic floor muscle dysfunction. She is a member of many organizations such as the International Pelvic Pain Society; Interstitial Cystitis Association; International Society for the Study of Women's Sexual Health; American Association of Sexuality, Educators, Counselors, and Therapists; and the APTA. She has been cited as an expert in her field by PT magazines, the Interstitial Cystitis Association, the APTA, and on medical radio talk shows. Dr. Morrison Wiles reviews papers and research studies for the Journal of Sexual Medicine and the NVA. Above all, she is committed to providing the best possible care for her patients. We welcome her to the NVA Board of Directors. ■

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S3-4. The iliococcygeus is innervated by the levator ani nerve S3-4 and the puborectalis is innervated by the inferior rectal branches of the pudendal nerve S2-4. The coccygeus is innervated by direct nerve roots S3-4.

The functions of the deep PFMs include supporting the abdominal viscera or organs, providing pelvic and spinal stability, assisting in respiration, providing sphincteric closure for bowel and bladder function, as well as playing a role in sexual function.³ There is, however, an entire superficial layer of PFMs, also referred to as the urogenital diaphragm, that needs to be considered in the assessment and treatment of vulvar and sexual pain. This layer is on the outside of the vagina directly under the perineum and vulvar tissue and includes the external anal and urethral sphincter muscles, superficial transverse perineal muscles, bulbocavernosus muscles, and ischiocavernosus muscles.³ The functions of the superficial PFMs include a role in sexual responses such as clitoral engorgement, assisting in vaginal closure, reflexive response to enhance sexual pleasure, and facilitating closure of the urethra and anus for continence.⁴ Although the individual muscles of the superficial layer are much smaller than the deep PFMs, their potential role in vulvar pain syndromes requires equal attention. (See Fig. 1, p.10.)

Anatomy and Function of the Superficial Layer

It is important to understand the anatomy of the superficial PFMs for proper diagnosis and to design an effective treatment plan. The external anal sphincter encircles the anus and its main function is to contract voluntarily to inhibit defecation. It attaches to the perineal body, superficial transverse perineal muscles, and anococcygeal liga-

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ment (raphae).⁵ The external urethra sphincter is a voluntary muscle that surrounds the urethra and upon contraction compresses the urethra to stop the flow of urine. The superficial transverse perineal muscle runs across the perineum from the vagina and anus and has been referred to as the “bowtie” of the perineum.⁶ Its function is to provide support to the perineal body. The perineal body is considered the central tendon to which most of the deep and superficial PFMs attach. Its essential role is to maintain pelvic floor integrity. This muscle is commonly injured during childbirth due to tearing or an episiotomy. The bulbocavernosus muscles, (also known as bulbospongiosus) muscles, surround the urethra and the vagina and cover the vestibule bulbs. The bulbocavernosus aids in clitoral erection and closure of the vagina. The ischiocavernosus muscles run lateral to the bulbocavernosus muscles along the pubic rim, making palpation challenging. The ischiocavernosus attaches to the medial part of the ischial tuberosity and originates in the crura of the clitoris. The crura are the V-shaped erectile tissue attaching to the clitoral body, that help promote clitoral erection. The superficial PFMs are innervated by the perineal branch of the pudendal nerve S2-4.

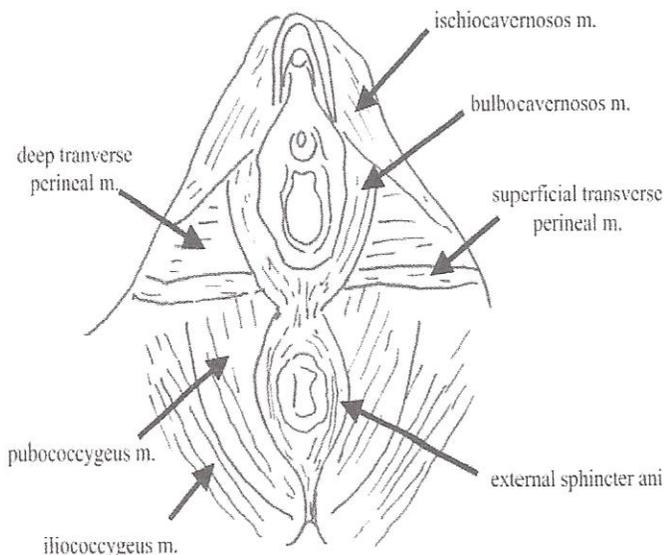


Fig 1: Pelvic Floor Musculature
Reproduced with permission from Reissing et al.

Evaluation of the Superficial Layer

Close evaluation of the superficial layer of PFMs through palpation and strength testing are components

of the PFM examination along with assessment of the deeper layer, the levator ani. Digital palpation assesses for pain, myofascial trigger points, tone, symmetry, and strength. The clinician systematically palpates each superficial PFM individually comparing sides as the patient informs of any pain experienced using a verbal scale of absent, mild, moderate, or severe pain. The clinician should palpate along the entire lengths of the muscles from proximal to distal and lateral to medial to ensure no hidden tender points or myofascial trigger point (MTP) exist. Tender points are specific areas of tenderness or pain in a muscle and can feel like a taut band, whereas MTPs are painful taut bands within a muscle that have a referral pattern of pain away from the site being touched. When compressed, MTPs can have a twitch response. According to trigger point expert Janet Travell, MTPs from the ischiocavernosus and bulbocavernosus refer pain to genital structures, including the clitoris, vulva, and vagina in females.⁷ Vulvovaginal pain can also arise from MTPs in the deep PFMs. Therefore, both superficial and deep PFMs need to be assessed.

Strength testing of the superficial PFMs is next. Using a gloved finger, the clinician inserts one finger into the vaginal entrance at the level of the distal phalangeal joint only. A manual muscle test of the superficial layer collectively is performed by asking the patient to contract layer 1, the outermost layer, pulling “up and in”. The strength is rated using an adapted Oxford Scale 0 to 5, with 0 = no contraction; 1 = flicker or twitch; 2 = weak squeeze without lift; 3 = fair squeeze with definite lift; 4 = good with a palpable lift, able to hold against resistance; 5 = strong squeeze, able to hold against strong resistance.⁸ A score of 5 is ideal.

The anal sphincter is assessed via digital palpating and manual strength testing. The ability of the patient to voluntarily close the anal sphincter and the amount of pressure felt upon removal of the finger should be noted. The strength of the anal sphincter is rated on an Oxford Scale 0 to 5, with 0 = no contraction; 1 = trace or flicker contraction; 2 = minimum contraction; 3 = fair contraction; 4 = good contraction; and 5 = ideal or strong contraction. Palpation should also include assessing symmetry between the right and left sides and noting any divots or scar tissue from prior surgeries or

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tearing from childbirth. Sensation deficits to light touch of the anal sphincter should also be assessed. The anal wink reflex can be tested when the clinician gently yet swiftly strokes the tissue adjacent to the anal sphincter with a cotton swab to view an involuntary contraction of the anal sphincter. This is tested on both sides. Clues regarding function of sacral nerve roots may be revealed.

Associated Musculoskeletal Evaluation

The alignment, function, and soft tissue of the pubic symphysis joint, hip joints, and coccyx may have an influence on the resting tone, length, and function of the superficial PFMs because of the myofascial relationships. A pubic symphysis malalignment may cause abnormal tensions and pain in structures that attach onto the pubis by way of ligaments or fascia such as the mons soft tissue, urethra, clitoris, and bulbocavernosus and ischio-cavernosus muscles. Malalignment of the pubic symphysis, hip impingement syndrome, or hip labral tears can cause abnormal tensions of the hip adductor muscles that attach adjacent to the superficial PFMs and share myofascial connections. The anal sphincter attaches onto the coccyx via the anococcygeal ligament, and thus a coccyx malalignment (rotated, sidebent, or flexed/extended) can influence the myofascial tensions at the anal sphincter, perineal body, and superficial transverse perineal muscles. Persistent abnormal tensions in the fascia and muscles can be a cause of adverse tensions placed on the nerves supplying the area such as

the pudendal and levator ani nerves. This can become a pain source. Eventually these abnormal tensions also result in the production of tender points, trigger points and/or MTPs in the superficial PFMs. Thus, close inspection and evaluation of these musculoskeletal components associated with vulvar pain is prudent.

Research

Studies have confirmed the involvement of the superficial PFMs in vulvar pain. Higher tone or overactivity of the superficial PFMs has been noted in women with provoked vestibulodynia as per Reissing.⁹ In this study, tone was assessed by a passive stretch placed on the bulbocavernosus, ischiocavernosus, and superficial transverse perineal muscles and the physical therapist recorded the findings on a scale of +3 for severe hypertonicity to -3 for severe hypotonicity, with 0 being normal tone. The women with vulvar pain presented with significantly more hypertonicity at the superficial layer compared to the deeper layer. Reissing suggests that both the superficial and deep muscles collectively contract against attempted penetration when pain is experienced during intercourse, decreasing the size of the vaginal opening. This results in increased pressure at the vulvar vestibule. Furthermore, contracted muscles adjacent to the distal vagina most likely contribute to chronic vulvar pain.¹⁰

Another study by Gentilore-Saulnier⁴ had similar findings. Women with vulvar pain demonstrated altered PFM behavior compared with controls. Gentilore-

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Saulnier noted heightened responsiveness to pain in the superficial layer upon stimulation, hypertonicity, decreased flexibility, and impaired relaxation after a contraction. Assessment occurred via surface electromyography (sEMG) with placement of self adhesive disposable electrodes on the patients' bulbocavernosus muscles and an intravaginal probe was placed to assess the response of the deep PFMs. A baseline resting tone of 10 seconds was observed and then the patients performed one maximal voluntary contraction. Patients had increased tonic sEMG in their superficial PFMs as compared with the control group and there were no differences found in the deep PFMs. Patients underwent physical therapy treatment comprised of soft tissue mobilization, manual stretches, sEMG biofeedback, internal PFM electrical stimulation, and a home exercise program of PFM exercises. After treatment, the patients demonstrated resolution of hypertonicity, pain, and improved flexibility and relaxation post-contraction.

Treatment

Medical treatment options available for deep PFM dysfunction include oral and/or vaginal or rectal suppository muscle relaxants, Botox injections and trigger point injections.^{1, 11, 12} Medical treatment options for the superficial PFMs may include oral and/or topical muscle relaxants, Botox injections, or trigger point injections. If anxiety is also a component, SSRIs may be prescribed. Physicians specializing in vulvar pain and pelvic floor dysfunction such as gynecologists, urogynecologists, nurse practitioners, urologists, physiatrists (rehabilitation medicine doctors), osteopaths, and pain management doctors may offer these treatments. Physical therapy treatment options for the superficial PFM layer may include soft tissue mobilization, including myofascial release, massage, trigger point release techniques, and neural mobilization; joint mobilization; manual stretching; therapeutic ultrasound; neuromuscular re-education techniques; external electrical stimulation, sEMG PFM biofeedback; specific PFM and lower quarter therapeutic and motor control exercises; and transcutaneous electrical nerve stimulation. Cryotherapy or heat therapy may also be utilized. Skin rolling, another myofascial release technique, may also be employed systematically over the entire perineum, hip adductors, mons pubis, and suprapubic region. Treatment that addresses

both superficial and deep PFMs, as well as dysfunction and associated musculoskeletal issues, may be the most comprehensive and effective approach because multiple dysfunctions can occur simultaneously and perpetuate chronic vulvar pain.

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