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Pelvicology: A Neuro Muscular Skeletal Approach to the Treatment of Pelvic Conditions

Marilyn Freedman, PT, DPT, CAPP, BCB-PMB™

Riva Preil, MS, PT, DPT

Introduction: Traditionally the care of patients who have symptoms related to pelvic organs has been divided between different medical practitioners. Gynecologists and Obstetricians treat women during their life cycles of reproduction and beyond, with a focus on female organs of reproduction. Patients with urological symptoms, or males with reproductive organ disease are seen by Urologists, while dysfunction of the gastrointestinal tract are treated by Gastro-enterologists, General and Colo-rectal surgeons. More recently the addition of Uro-gynecologists has been an attempt to bridge the specialties of Gynecology and Urology. In all these specialties treatment is mostly symptom driven and treated by dispensing medication or doing surgery. Although Physical Therapists in most parts of the world have been involved with patient care in all of the above fields for many years, their unique role in treatment of the neuro musculo-skeletal system as it relates to all pelvic conditions has only recently been acknowledged. Physical Therapists are the "Pelvicologists" who bridge the uro-gynecological, colo-rectal fields, and as such are beginning to become more mainstreamed as adjuncts to those specialties.

Physical therapists are neuro-muscular skeletal specialists, and the role this system plays in creating a healing environment for pelvic system health is well documented. In order to understand this role our approach in this article is to divide conditions into two main types of pelvic floor dysfunction. These can be classified as hypotonicity and hypertonicity of the pelvic floor muscles. Hypotonicity implies weakness of the

pelvic floor muscles which interferes with the muscles performing several of their crucial roles. Some important functions of the pelvic floor muscles are: to support the pelvic floor organs (bladder, uterus, rectum) which rest atop the sling like pelvic floor muscles; to maintain bowel and bladder continence; sexual function and an important core support of the body. As women age and hormone related changes occur, pelvic floor muscles and the surrounding ligaments become weaker. In addition, each pregnancy and vaginal delivery increases a patient's likelihood of developing pelvic floor muscle weakness. Furthermore, research has shown that there is an increase in joint laxity during pregnancy which may result in altered pelvic floor biomechanical alignment[i]. In addition, birthing position may adversely affect the positioning of the pelvic floor, especially if previous medical conditions exist. Therefore, women with sacroiliac dysfunction should deliver in in semi-reclining position (with hips supported, flexed abducted, and externally rotated), and women with coccyx (tail-bone) pain should deliver in squatting, side-lying, or upright kneeling position.[ii] Also, facilitated delivery with forceps causes more trauma to the pelvic floor compared to vacuum extraction assistance.[iii] In addition, in 2002, approximately 25% vaginal deliveries are still performed with episiotomies despite the fact that this procedure increases the risk of sustaining anal damage.[iv] The resulting scar may not heal properly or may restrict underlying tissue mobility.

Furthermore, prolonged repetitive straining and stress to the pelvic floor such as jobs that involve heavy lifting or chronic constipation increase the likelihood of developing weakened pelvic floor muscles. Several other factors that may contribute to hypotonicity of the pelvic floor muscles are trauma, infection, radiation, chemotherapy, and other co-morbidities that affect and weaken muscle and/or soft tissue (ex. Muscular Dystrophy, Multiple Sclerosis, Parkinson's disease).

Just like a weak biceps or deltoid muscle will interfere with the ability to lift or carry objects normally, so too a weakened pelvic floor will interfere not only with general activities of daily living, but more specifically with the ability to postpone the elimination of bowel and bladder, until arriving at a restroom at an appropriate time and fashion. The bowel and/or bladder related issues that this creates may affect daily activities in a very significant way. For example, a woman who fears that she might "have an accident" if she attempts to participate in a tennis match with her friend may choose to remain at home, within a short distance to a restroom, watching a movie alone. This may negatively affect her socialization as well as her productivity at work. In addition, another symptom that women may experience is a "dropping" sensation in the pelvic floor, as if something inside feels like it is descending. This is referred to as pelvic organ prolapse, and it may involve descent of the uterus, the urethra, bladder or even bowel descending onto the anterior aspect (front) of the vaginal wall (cystocele) or the rectum descending onto the posterior aspect (back) of the vaginal wall (rectocele)[v].

Fortunately, there are conservative treatment methods of the aforementioned conditions. The common denominator between all of these approaches is management of the symptoms through Physical Therapy without requiring invasive procedures or surgeries. Like any weak muscle, the key to improving core strength, incontinence and prolapse related symptoms is by strengthening the weak pelvic floor muscles. One way to accomplish this is by regularly performing two types of pelvic floor exercises, phasic or "quick flick" muscle contractions to strengthen the fast twitch muscle fibers, and prolonged tonic "holding" muscle contractions to strengthen the slow twitch

endurance muscle fibers. Laycock developed a four point grading scale called the P/E/R/F model. This scale measures Power (0-5 maximum voluntary strength measurement), Endurance (how long can maximum voluntary contraction be held?), Repetitions (how many repetitions can be performed prior to exhaustion?) and Fast Twitch (how many quick contractions can be performed prior to exhaustion?).[vi] The strengthening can be enhanced by using vaginal or anal weights, and gradually increasing the amount of resistance as the pelvic floor muscles get stronger. Sometimes, individuals do not know how to properly use their pelvic floor muscles, and they may think they are performing a pelvic floor muscle contraction when, in fact, they are mistakenly contracting their abdominal or gluteal muscles instead. This type of substitution is actually counterproductive, because using the more superficial prime movers (rectus abdominus and internal and external obliques) of the abdominal muscles will enhance the opposite role of pelvic floor muscles. Contraction of these substitute muscles cause the pelvic muscles to relax and pelvic contents to descend even further. Contraction of the pelvic floor muscles, muscles on the other hand will help support the pelvic organs and maintain continence. Oftentimes pelvic floor exercises are handed out to a patient in their Doctor's office, with little or no guidance on correct form and execution. Research has shown that abysmally few patients are able to do the exercises correctly, most patients bearing down with their muscles instead of contracting them. When the patient's symptoms do not improve or even worsen, leading to the misconception is that this conservative method was not effective and that the patient requires a more invasive therapy.

To ensure correct exercise technique, a practitioner needs to give adequate biofeedback by inserting a finger vaginally or rectally in order to digitally palpate the muscle contraction. Ultrasonography is another excellent educational biofeedback tool, as is surface electromyography (sEMG). It may even be necessary to use alternating electric current to simulate a pelvic muscle contraction if the above is not enough. Helping a patient make the correct neuromuscular connection is essential to improve their ability to learn how to contract and release their muscles effectively. Biofeedback has been proven to be an effective approach to treating anorectal disorders.[vii] It is sometimes also necessary to dispense a home electrical stimulating device, or biofeedback unit for use on a daily basis until the patient is able to carry out the required exercise independently.

Diet is also an important factor to be considered when treating pelvic floor muscle dysfunction. Some foods, especially highly caffeinated, highly acidic or spicy foods, act as bladder irritants, which make it more challenging for a patient to control bowel and bladder function. Treatment needs to include education about proper foods and beverages as well as tracking toileting habits with bowel and bladder diaries. This helps the individual keep track of the frequency and amount of leaks, and it helps them connect particular triggers in their diet to the incontinent episodes in order to prevent future occurrences. Toileting posture and technique play an important auxiliary role in all conditions. In case of organ prolapse, physical therapists can help guide the individual in the proper selection of a pessary, a device that may be inserted to support the descending pelvic organ during selected activities (ex. exercise) or throughout the day. There are many different types of pessaries, including platform, gellhorn, inflatable, cube, and Smith-Hodge pessaries.[viii] Most importantly these patients need to learn how to use their deep core muscles (levator ani, transverse abdominal and multifidus) during all activities of daily living. Core muscle activity needs to vary with the intensity of activity, for example using stronger muscle contraction when climbing stairs than walking on a floor. Muscles

need to learn how to relax appropriately during activities like sitting or lying down; too much contraction without appropriate relaxation can create a problem of hypertonicity.

Hypertonicity implies that the pelvic floor muscles are tight or overactive, which often is associated with pelvic floor pain. There are several factors that are associated with hypertonicity of the pelvic floor muscles including prior trauma or a genetic pre-disposition. Prior sexual or emotional abuse may sometimes contribute to pelvic floor hypertonicity. Van Der Velde and Everaerd performed a study with 45 women who presented with vaginismus, a condition making vaginal penetration difficult or impossible. Pelvic floor muscle and upper trapezius muscle activity was measured while the women were exposed to four different types of stimuli: neutral, threatening, erotic, and sexual threatening. Their research revealed that the women demonstrated increased pelvic floor muscle and upper trapezius muscle activity during film excerpts that were threatening and sexually threatening. In other words, these women tightened and "held" their pelvic floor muscles when exposed to traumatic stimuli, demonstrating that sexual and emotional trauma can contribute to hypertonicity of the pelvic floor muscles (2001).[ix] Stress can be a trigger for pelvic floor muscle hypertonicity: in the same way that some individuals store stress and tension in their upper trapezius muscle, at the top of their "core", so too, others store stress and tension in their pelvic floor muscles, at the bottom of their "core". Finally, there can be an insidious onset of pelvic floor muscle tightness, without any apparent reason for the hypertonicity.

The symptoms of pelvic floor hypertonicity differ from hypotonicity, and they include pain, tightness of the pelvic floor, sexual dysfunction and dyspareunia (pain with penetration during sexual activity in women). Urinary hesitancy, increased post void residual and frequent urinary tract infections and constipation can also be the result of increased pelvic muscle tone. The aforementioned symptoms are often accompanied by emotional issues such as anxiety and/or depression.

Pelvic floor physical therapy can be very beneficial in treating symptoms of hypertonicity as well. Following the aforementioned analogy of the tight and painful upper trapezius muscle, which requires manual therapy, massage, and soft tissue release to relax and stretch the tight muscle, so too, tight pelvic floor muscles benefit from manual therapy as well. Specially trained pelvic floor therapists are skilled in performing internal vaginal, anal and external muscle massage, stretching and manual trigger point release to tender localized spots. This approach has been demonstrated to be beneficial in decreasing pelvic floor muscle spasm and pain.[x] It is only when patients are taught how to administer this treatment themselves, that they do not become dependent on the therapist to treat their symptoms, but are able to treat themselves on a daily basis in the comfort and security of their own homes. In addition, any of the methods of biofeedback discussed above can also be utilized to help teach individuals with tight pelvic floor muscles how to relax their pelvic floor muscles. It is imperative to stretch and diffuse tender trigger points first, as sEMG administered on its own will only train the muscle to relax in its shortened, painful state. This "down training" helps people who clench the pelvic floor muscles involuntarily learn how to "let go" and lower the resting tone of the pelvic floor muscles from moment to moment in order to facilitate healing of the tissue. Use of vaginal dilators, anal dilators or wands can help patients perform self massage and stretching, especially if it is difficult for them to use self digital manipulation for same. At first, smaller sized dilators are used, and the individual gradually increases the size as their tolerance increases and the tightness decreases.

An additional key to managing pelvic floor hypertonicity is relaxation training. This includes learning how to perform proper diaphragmatic breathing. When used correctly this pattern is the most efficient and effective way to provide oxygen to cells throughout the body; it also promotes overall physiological relaxation of the neuro-musculoskeletal system. An additional approach to relaxation training is Jacobson's relaxation series, where the individual systematically contracts and then relaxes various muscles throughout the body in a specific order. This provides a contrast for the individual to learn how to "turn on" and then "turn off" muscles, with the ultimate goal of eventually "turning off" the overactive pelvic floor muscles at will. Dr. Anderson and Dr. Wise describe a more finely tuned relaxation concept, also developed by Dr. Jacobsen, and known as paradoxical relaxation. The paradox is that by learning to acknowledge and accept bodily discomfort and tension, the tension and discomfort stop fighting back, and so release more easily. At times, pelvic pain may be due to underlying soft tissue and organ restriction. In this case physical therapists can perform visceral mobilization techniques to facilitate proper movement of the internal organs and underlying fascia. This is especially important in conditions like endometriosis, where there can be diffuse scarring, sometimes even after surgery to remove the scar tissue. Even years after abdominal or pelvic surgery, scar tissue massage can release bowel adhesions, improve circulation and reduce tension around involved nerve tissue. Conditions like painful episiotomy or surgical scarring may limit mobility of tissue and or organs and contributing to pain. By teaching the patient how to perform a self-technique at home, it is possible to avoid the kind of symptoms associated with scarring, like repetitive bowel obstruction. Proper toileting posture and colonic transport self-massage is especially beneficial to those who experience irritable bowel syndrome, especially of the constipation type. This technique is an external massage along the direction of the colon to help promote peristalsis and normal passage of stool through the large intestine. Bowel stimulating exercises, usually involving some type of low impact activity, core strengthening and abdominal exercise are an important addition to the program.

It has been well documented in evidence based practice that there is a strong correlation between pelvic floor related problems, respiratory conditions and back pain. It is rare to find an adult patient who has cystic fibrosis who has remained continent. There is a higher correlation between patients who have incontinence (hypotonicity of pelvic floor muscles) and low back pain than patients who have a high body mass index (BMI) and back pain. All musculo-skeletal systems in our bodies are related, and as the pelvis, its contents and structure are supported by a substantial musculo-skeletal system, it is imperative to take this system into account when treating any of the conditions or symptoms related to the pelvis.

Marilyn Freedman has her clinical doctorate in physical therapy. She is certified in pelvic muscle dysfunction biofeedback and has completed a certificate of achievement in pelvic physical therapy through the women's health section of the American Physical Therapy Association (APTA). Marilyn has over thirty years of experience in helping people resolve complex pelvic conditions. She has worked with men, women and children with pelvic pain, urological, obstetrical, gynecological and colorectal conditions. She is an adjunct instructor at area physical therapy schools. She lectures to professional colleagues and has contributed to several publications in her field of expertise. Her research interests include

investigating conservative management of pelvic pain conditions.

Contact Marilyn Freedman at essentialphysicaltherapy@gmail.com or 516-829-0960.
Website: www.pelvicology.com

Riva Preil is a physical therapist who specializes in women's health and pelvic floor dysfunction. She is currently employed in a private Physical Therapy practice in New York City, New York.

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