

Chapter Nine

PHYSICAL THERAPY AND SEXUAL HEALTH

Talli Yehuda Rosenbaum

Physical therapists are trained to provide treatment to restore function, improve mobility, relieve pain, and prevent or limit permanent physical disabilities of patients suffering from injuries or disease (Bureau of Labor Statistics, U.S. Dept. of Labor, 2004). As community health professionals, physical therapists are involved in health and fitness education and promoting wellness. Sexual health is an integral component to overall wellness, and sexual activity a valued human activity. Physical therapists in various settings have an important role in promoting sexual health and treating dysfunction, through a specialized area called *pelvic floor rehabilitation*.

The pelvic floor muscles are the slinglike muscles that span across our bottom area and circle the pelvis. These muscles support the internal organs and promote bowel and bladder continence. Normal function of the pelvic floor musculature is essential in maintaining appropriate function of the pelvic organs, as well as optimal sexual functioning. This muscle group has a lifting action to aid in support and control, and relaxes and releases for voiding and sexual penetration. When the function of the pelvic floor is disrupted, due to weakness, known as *hypotonus* and/or excessive tightness, known as *hypertonus*, pain and sexual disorder may result. Physical therapy treatment offers a variety of direct and indirect interventions, utilizing manual techniques, exercises and equipment in the treatment of pelvic floor dysfunction, thereby enhancing sexual functioning. Physical therapists in a variety of rehabilitation settings may be involved in improving sexual health, as the pelvic floor is not the only area in the body that affects sexuality.

REHABILITATION AND ORTHOPEDICS

Ideally, engaging in comfortable and enjoyable sexual activity requires the ability to feel, touch, and move. Physical disability, orthopedic injury, neurological impairments or the presence of pain are all conditions that potentially affect sexual function. Physical therapists in a variety of treatment centers, both inpatient and outpatient, encounter patients with these conditions.

Treatment is geared towards the restoration of the ability to function and perform activities of daily living (ADLs) independently and painlessly. Treatment should include assessment of sexual function. Assessment first requires asking the relevant questions. Many health professionals, including doctors and nurses as well as physical therapists, have not been properly trained to address issues of a sexual nature. In some cases, health professionals may harbor their own feelings of embarrassment or hesitation to discuss sexuality and project these feelings on to their patients. Health professionals may also mistakenly assume that sexuality is not a concern due to advanced age, disability, or marital status. Consider the following example:

Mrs. N. was a 71-year-old, married female who underwent a total hip replacement operation due to chronic degenerative hip arthritis. After surgery, she was transferred to the hospital rehabilitation unit where she began twice daily physical therapy treatments. At the bedside after her surgery, a nurse provided her with instruction regarding the specific, postoperative protocol directed by her orthopedic surgeon. This protocol provided distinct instruction regarding what movements were prohibited for several weeks after the surgery. This included raising her hip past 90 degrees of bending, or bringing it too far out to the side or rolling inward. During the course of physical and occupational therapy she was instructed in functional activities including how to get up off the toilet or a chair, how to climb and descend stairs and how to properly bathe and shower. She personally met with the orthopedic surgeon briefly after surgery and had contact with the medical social worker to plan her discharge needs in addition to her regular contact with the nurses and therapy staff.

On the last day of physical therapy before being discharged home, Mrs. N. confided to her physical therapist that there was one concern that remained unaddressed. She did not know whether or not she was permitted to have sexual intercourse. She stated that when she questioned the orthopedist about it, he made some sort of joke without actually answering her question. Mrs. N.'s physical therapist was glad that the subject was brought up by the patient but also realized she and the rehabilitation staff had been remiss in not providing that information along with the teaching of the functional ADLs. She spent the rest of the session instructing Mrs. N. in positions to comfortably and safely continue sexual relations.

The above example unfortunately describes a medical norm, rather than an exception. A recent survey of orthopedic physicians demonstrated that 80 percent of surgeons reported they rarely or never discuss sexual activity with their patients who have had hip replacement surgery. Of surgeons who stated they did discuss this topic, 96 percent spent five minutes or less on the subject (Dahm, Jacofsky, & Lewallen, 2004).

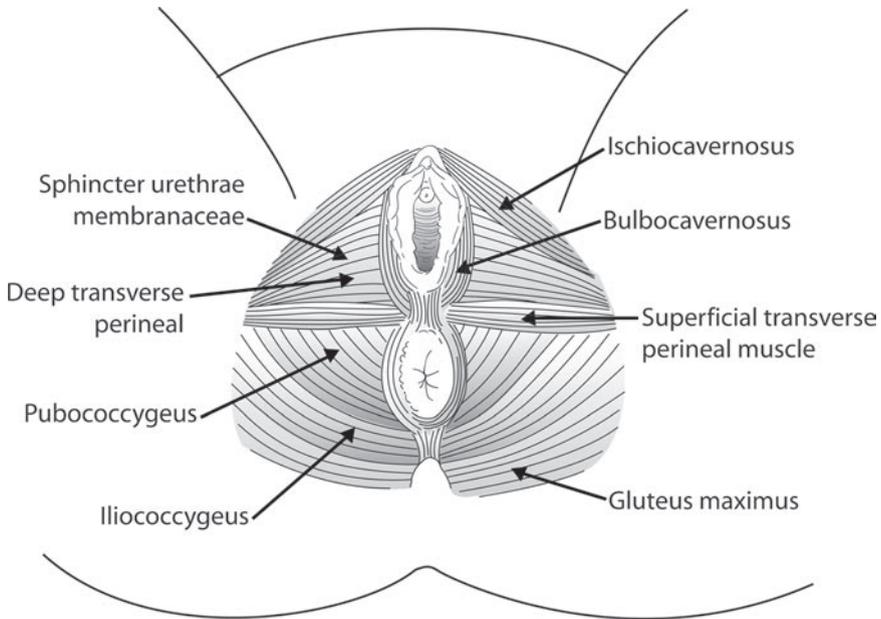
Physical therapists are frequently involved in community wellness. Promotion of health and fitness takes the form of back pain prevention programs in the workplace, and lectures and fitness assessments in various settings. Pelvic floor awareness programs have recently begun to appear in the programs of hospitals and women's health clinics in the United States and abroad. These programs include teaching knowledge and awareness of bladder and bowel continence, as well as awareness of the existence of the pelvic floor and techniques for maintaining optimal strength and fitness of the pelvis.

FEMALE SEXUAL HEALTH AND THE PELVIC FLOOR

The pelvic floor refers to a group of muscles and connective tissues, including ligaments and fascia, which connects from the pubic bone in the front to the coccyx bone at the back. These muscles attach around the entire perimeter of the pelvis, like a shallow bowl. Muscle contraction results in a lifting action. The function of the pelvic floor is to provide a system of support for the organs of the pelvis and a system of voluntary control of the bowel and bladder. The pelvic floor muscles (PFMs) comprise a striated, skeletal muscle group, that is under voluntary control and is important in maintaining urinary and fecal continence as well as in providing support to the bladder, rectum and, in women, the uterus.

The muscles of the pelvic floor consist of superficial muscles, including the bulbocavernosus and ischiocavernosus muscles, which are active during sexual activity and act directly on the clitoris, and the deeper muscles known collectively as the "levator ani" (LA) muscles, which consist of the pubococcygeus and iliococcygeus. The levator ani act to lift up the pelvic organs and are active in straining during defecation (Markwell, 2001). The LA muscles contract during sexual intercourse leading to genital responses that improve sexual function (Shafik, 2000). The puborectalis (PR) muscles act with the external anal and urethral sphincters, to close the urinary and anal openings, to contract the sphincters and prevent urinary or fecal leakage. All these muscles together comprise the PFM, which is under voluntary control and is important in sexual function, in maintaining urinary and fecal continence, allowing ease of bowel emptying, and in providing support to the pelvic organs.

Figure 9.1
Pelvic Floor Muscles



It is apparent from the anatomical and physiological makeup of the pelvic floor, that optimal pelvic floor function is crucial in maintaining a healthy sexual life. Muscles that are overactive and high in tonal activity, for example, may cause narrowing of the vaginal entry, preventing vaginal penetration or rendering it painful. Pelvic floor muscles which are weak or de-conditioned, may provide insufficient activity necessary for vaginal friction or blood flow, and may even inhibit orgasmic potential (Graber & Kline-Graber, 1979).

Physiological demands on the woman's body throughout the female life cycle, particularly on the pelvic floor, may influence sexual function in many areas. Pregnancies and deliveries place a particular strain on the body in general and the pelvic floor specifically. During pregnancy, the abdominal muscles stretch, which increases pressure on the pelvic floor muscles. Returning to strenuous activities such as lifting, straining, heavy exercise and running before the abdominal and pelvic floor muscles have regained their strength, further compromises their integrity. During and after menopause, decreases in estrogen levels also affect the integrity of the pelvic floor, and it is during this period where many women begin to feel the effects of pelvic floor weakness. These effects may include urinary stress incontinence, a condition that is characterized by a loss of urine when there is an increase in intra-abdominal pressure, as in coughing, laughing or sneezing. Other common effects of pelvic floor

weakness are prolapse. A prolapse occurs when a downward force on the pelvic organs causes them to slip down from the pelvis toward the vaginal cavity. Prolapse of the bladder, uterus or rectum may occur over time as a combined result of straining due to child-bearing, chronic constipation and/or excessive heavy lifting, combined with progressive weakening of the pelvic floor muscles (Swift, Pound & Dias, 2001).

Lower urinary tract symptoms (LUTS) are characterized by symptoms of urinary frequency (excessive need to urinate), dysuria (pain or difficulty with urination), urinary incontinence, and feelings of urgency. These symptoms have been found to have a close association with weakness of the pelvic floor muscles. Recent studies have indicated that impaired sexual arousal is significantly associated with LUTS and that 40–46 percent of women with LUTS suffer from impairment in their sex lives (Salonia et al., 2004).

Unfortunately, awareness of the existence of the pelvic floor muscles is low, even among the physically fit. Physical education curricula in schools do not generally include pelvic floor muscle education and even today, most fitness studios and gyms do not specifically provide training programs for the pelvic floor muscles as they do the arms, legs, buttocks and abdominals. Pelvic floor muscle contraction is an essential component of core stabilization programs and their inclusion should be determined before undertaking such a program.

Most women are only first made aware of these muscles when they are in advanced pregnancy and are being instructed by childbirth educators to do “Kegels.” These are pelvic floor contractions named for Dr. Arnold Kegel an obstetrician who developed a system for strengthening these muscles in the 1950s. In order to help the woman identify how to activate her pelvic floor muscles when doing Kegels, she is asked to notice what muscles she would use to stop the flow of urine. While this may be an effective cue to teach women to identify the pelvic floor muscles, women today are cautioned that they should not use “stop-flow” contractions as an exercise to strengthen their muscles, as this may lead to a urinary tract infection. Kegel’s research created the guidelines for focusing on endurance through a sustained 10 second muscle contraction and a full 10 second release. He also created the perineometer, which was a vaginal device connected to a pressure gauge. His research noted improved success for pelvic floor rehabilitation with his monitored system on a regular basis. Noteworthy is his acknowledgement that sexual dysfunction may be a result of pelvic floor muscle imbalance. His research documented improved sexual function, (especially with respect to sexual pain and orgasm problems) following pelvic floor muscle rehabilitation (Kegel, 1952).

Along with the abdominal muscles, the pelvic floor muscles are the muscles most affected by pregnancy and childbirth and therefore, affect most women. Even women who have not given birth have a pelvic floor that can be weakened

by repetitive lifting, smoking (due to coughing; see Bump & McClish, 1994), or straining due to chronic constipation; or athletics that include high impact activities, such as running and jumping, for example.

Specifically, sexual function may be affected in women with pelvic floor dysfunction. Women with hypertonus have muscles that are shortened, and they may experience painful intercourse and decreased genital arousal. Women with excessive weakness may also complain of decreased genital arousal and orgasm. Women with LUTS, often report associated decreases in sexual interest and discomfort during sex. Many women fear loss of urine during sexual activity or upon orgasm. Consider the following example:

Mrs. L is a 45-year-old interior designer and mother of three. She is an energetic and busy woman, who presented to her physician complaining of incontinence when she coughed, laughed, or sneezed. Her physician referred her to physical therapy to strengthen her pelvic floor muscles. The physical therapist evaluated Mrs. L and inquired about her urinary habits, exercise regime, and questioned her about her sexual function. Mrs. L appeared quite relieved and stated that she had in fact been refraining from sexual intercourse with her husband the past few months. She admitted that it was because she had begun to leak urine when she would orgasm. She was questioned as to whether it was possible that what she was describing was female ejaculate; however, she stated it was most definitely urine. After three months of physical therapy she stated that she no longer leaked urine and no longer needed a pad. She was however, most pleased that she had resumed sexual intercourse with her husband and no longer leaked urine.

Pelvic floor muscle training has been demonstrated to improve quality of life and sexual function in women with urinary stress incontinence (Bo, Talseth, & Vinsnes, 2000). Pelvic floor rehabilitation to strengthen weakened pelvic floor muscles is designed to increase awareness of the muscles of the pelvic floor, including learning to differentiate between those muscles that act to lift the internal organs (pubococcygeous, the key muscle of the levator ani) and those that provide sphincter closure (puborectalis and external anal sphincter). This may be accomplished through learning proper breathing, awareness of the location of the muscles and how to contract them and exercises to strengthen them.

Biofeedback (surface EMG) is an additional intervention for pelvic floor rehabilitation. It is an updated version of Kegel's perineometer and will be described in more detail in the treatment section of this chapter. Biofeedback is accomplished by inserting a sensor probe into the vagina. The patient is asked to contract the muscles around the probe and the muscle activity produced is displayed on a computer monitor. The patient can view a line graph that shows resting levels, strength and endurance. Training screens can utilize graphs or other animations, such as concentric rings that close and open with

muscle contraction and release. This activity allows the patient to receive feedback regarding the quality of her contraction. By attempting to raise the height of the line graph, she increases her work capacity, thereby strengthening her muscles. She can also learn to recognize how to best release her muscles using the same feedback monitor.

Another physical therapy tool is electrical stimulation of the pelvic floor. This is accomplished by inserting a probe into the vagina and providing an electrical pulse which contracts the pelvic floor muscles. Providing an electrical stimulus directly to the muscles provides awareness to patients who are too weak or lack the ability to isolate these muscles on their own. Once they gain the awareness of the muscles through the electrical stimulation, they can then begin to strengthen them on their own. Providing a low frequency electrical pulse to the puborectalis muscles also helps to decrease symptoms of urinary urgency and frequency, through a reflex, which causes the smooth muscles of the bladder to relax (Murray, 1984; Sand, 1996).

MALE SEXUAL HEALTH AND THE PELVIC FLOOR

Awareness of the pelvic floor and its relationship to healthy sexual function may be even less prevalent in men than in women. The male pelvic structures are well supported by the prostate gland, and therefore LUTS, due to pelvic floor weakness is less common. Men who do experience LUTS generally do so because of aging and/or growth of the prostate, which may obstruct the urethra, where the urine exits. LUTS is also related to decreases in sexual function in aging men (Rosen et al., 2004).

Because the male pelvic floor does not undergo the transitions and stresses that the childbearing female's does, it is less implicated in sexual dysfunction. However, the pelvic floor has an important role in male sexual function and the pelvic floor muscles are active in normal erectile and ejaculatory function. Pelvic floor dysfunction has been implicated in male erectile dysfunction (Dorey, 2004) and early ejaculation (Piediferro, Colpi, Castiglioni, & Scroppo, 2004) and the efficacy of physical therapy to strengthen the pelvic floor muscles to improve these conditions has been studied (Dorey et al., 2004). One study demonstrated that a pelvic floor muscle rehabilitation program may be a noninvasive alternative for the treatment of patients with erectile dysfunction caused by obstructed blood flow from the veins, known as *venous occlusion* (Van Kampen et al., 2003).

Men can also develop painful pelvic floor muscle conditions, which may be related to hypertonus. Situations creating pelvic pain, such as trauma, prostatitis, or surgery may leave men with difficulties to diagnose conditions related to the muscle dysfunctions. This may impact their sexual function. The same physical therapy pelvic floor rehabilitation techniques that are used for women

may also be applied to men. When using biofeedback or electrical stimulation, the probe is inserted into the patient's anus, or surface electrodes placed directly on the skin around the anus may be used.

THE ROLE OF PHYSICAL THERAPY IN FEMALE SEXUAL DYSFUNCTION

More often than not, sexual dysfunction results from a combination of anatomic, physiologic and psychosocial components. In the past, women experiencing difficulties with sex would consult a physician, who upon finding no physical evidence of disease or injury would treat the problem as psychological. Today, there is a greater understanding that optimal sexual function results from the balance of physical and psychological health, with emotional and relational satisfaction. One important but often overlooked element is that of musculoskeletal function. The condition of the bones and muscles of our body greatly affects how we function sexually. Pelvic floor muscle dysfunction has been associated with decreased libido, arousal, and vaginal lubrication (Berman et al., 1999). Low libido, vaginal dryness, painful intercourse, and decreased sexual satisfaction are reported in women with urinary incontinence (Handa, Harvey, Cundiff, Siddique, & Kjerulff, 2004). It has been proposed (Wurn, 2004) that difficulty in reaching orgasm in women with dyspareunia (painful intercourse) was related to decreases in visceral, bony and soft tissue mobility and demonstrated that manual treatment improved orgasmic ability. The most common dysfunction related to the musculoskeletal system is dyspareunia.

Sexual Pain Disorders

Traditionally, sexual pain disorders are classified as *dyspareunia* and *vaginismus* (see volume 2, chapter 12). *Dyspareunia* means "painful intercourse." It may describe a situation where there is pain with initial penetration, during thrusting, or after coitus is completed. It may manifest as pain at the entry to the vagina, known as superficial dyspareunia, or the pain may be deeper in to the pelvis, a condition known as deep dyspareunia. Dyspareunia has long baffled both the medical and psychological communities in terms of its origins and causes. Another confusing issue is the nomenclature and the tendency to overlap this condition with chronic pelvic pain, vulvar pain, and vulvar vestibulitis syndrome (Pukall, Payne, Kao, Khalifé, & Binik, 2005). While vaginismus and dyspareunia frequently coexist, the current classification of sexual pain disorders recognizes them as two separate entities. Vulvar pain and vulvar vestibulitis are categorized under the heading *dyspareunia*.

Vaginismus has been traditionally described as a condition of vaginal muscle spasm preventing sexual intercourse. While the physiological phenomenon

of vaginal muscle spasm in response to attempted penetration has never been well documented (Reissing, Binik, Khalifé, Cohen, & Amsel, 2004), vaginismus is traditionally described as a contraction of the outer third of the vaginal muscles in response to penetration (American Psychiatric Association, 2000) and has been purported to result from a variety of possible psychological and emotional causes (i.e., sexual inhibitions due to repression, religion, or resentment toward men) (LoPiccolo, 1984; Masters & Johnson, 1970). A recently proposed definition of *vaginismus* is “the persistent or recurrent difficulties of the woman to allow vaginal entry of a penis, a finger, and or any object despite the woman’s expressed desire to do so. There is often phobic avoidance, involuntary pelvic floor muscle contraction, and anticipation/fear/experience of pain. Structural abnormalities must be ruled out/addressed” (Basson et al., 2004).

This recent definition of vaginismus describes a phenomenon of penetration avoidance, which often correlates with fear of pain due to the actual physical perception of pain. It has not been empirically evidenced that patients with vaginismus present with pelvic floor “spasm,” but muscle hypertonus has been documented (Reissing et al., 2004). It has also been suggested that vaginal muscle contraction at the time of attempted penetration represents an overall sympathetic response triggered by anxiety (Van der Velde & Everaerd, 2001). Whatever the mechanism, when the muscles of the vagina are tight, the ability to allow comfortable penetration is affected. Vaginal friction is increased, which narrows the vaginal opening, or *interoitus*, and perpetuates dyspareunia (Abramov, Wolman, & David, 1994). This is a frequent cause of unconsummated union and is discussed in a separate section of this chapter.

Recently it has been suggested that sexual pain disorders should be viewed primarily as pain disorders that affect sex, rather than disorders which are intrinsically sexual in nature (Binik, Meana, Berkley, & Khalifé, 1999). In a clinical setting, it is quite difficult to differentially diagnose sexual pain disorders. Patients with vaginismus are not only unable to have sex, but most often are unable to allow penetration of a tampon, or allow a gynecological exam to occur. Not only are their sex lives affected but also their ability to have standard medical exams which may affect their overall health. Therefore, it is often difficult to ascertain if underneath all that anxious behavior lies a painful disorder. For this reason, vaginismus often overlaps with dyspareunia, and the value of attempting to separate these entities has been questioned (De Kruiff, Ter Kuile, Weijnenborg, & Van Lankveld, 2000).

The most common cause of dyspareunia affecting approximately 15 percent of pre-menopausal women is *vestibulodynia*, more commonly referred to as vulvar vestibulitis syndrome (VVS), a condition identified and named in the mid-1980s by the International Society for the Study of Vulvar Disease (ISSVD). The defining criteria used to diagnose vestibulitis are (Friedrich, 1988)

1. Pain with attempted penetration
2. Pain at points along the vestibule (vaginal entry) with cotton swab touch
3. Erythema (redness) of varying degrees

VVS is a subset of vulvodynia. Vulvodynia describes a condition of chronic and diffuse burning, stinging, and discomfort of the vulva that occurs spontaneously and without provocation. Vulvodynia is a chronic pain condition that interferes with sexual activity.

The causes of VVS are multifactorial, and they involve the nervous system, musculoskeletal system, immune system, and vascular system. On a cellular level, findings at the vulvar vestibule of VVS patients include increased mast cells, indicating chronic inflammation (Bornstein, Sabo, Goldshmid, & Abramovici, 2002), increased nociceptors, pain receptors, and increased vascularity (Bohm-Starke, Hiliges, & Brodda-Jansen, 2001). Genetic findings include variation of interleukin-1 receptor antagonist and melanocortin-1 receptor genes (Witkin, Gerber, & Ledger, 2002). This variation affects the ability to fight inflammation and may explain why certain women are more vulnerable to recurrent bacterial and yeast infections. Though not a defining criterion, often a woman with VVS will present with the inability to allow penetration due to the anticipation or genuine experience of pain.

Unconsummated Unions

The terms *unconsummated unions* or *unconsummated marriage* refer to a sociological phenomenon rather than a specific sexual dysfunction. Unconsummated unions/marriages may result from a variety of factors ranging from lack of sexual knowledge, education, or preparation to sexual dysfunction in one or both partners to simply a lack of desire to have sexual intercourse.

Unconsummated marriages may exist in unions where sexual expression, or at least sexual intercourse, within the marriage is not a component of the relationship. Marriages that take place for convenience or companionship, or marriages where one or both partners is homosexual, may be examples of unconsummated marriages by choice.

When a married couple is unable to have sexual intercourse, despite the desire to do so and despite various and repeated efforts, this is a source of a great deal of distress. However, the term "unconsummated marriage" is a limited one in that it only describes married couples and is therefore useful in a sociological and legal context, but not as a descriptive term of sexual dysfunction. The term *unconsummated union* would more accurately describe the inability of a couple, married or otherwise, to complete the act of sexual intercourse, despite the desire and attempts to do so, and where this is a source of distress to both partners.

While statistics regarding the prevalence of unconsummated marriage are not documented, it has been estimated that 1 percent of all couples presenting

to infertility clinics had not consummated their marriage. It is also unclear whether the majority of these situations can be attributed to lack of knowledge, male sexual dysfunction, or female dysfunction. Literature describing this phenomenon has pointed to cultural factors and stresses the importance of an educational and interdisciplinary approach to treatment (Ribner & Rosenbaum, 2005; see also volume 3, chapter 11).

Women presenting with sexual pain disorders, in particular vaginismus and primary vulvar vestibulitis may have never been successful in achieving sexual intercourse due to a combination of pain and anxiety. Often they become “stuck” in a relationship status quo such that when the pain and muscle hyper-tonus are no longer present and they are physically able to allow intercourse, they continue to be held back by the notion that completing the act may change them or the relationship. There are many implications involved in suddenly possessing the tools to be able to consummate a long-term relationship that has been devoid of sexual intercourse. In addition to seeking a physical cure to the sexual dysfunction responsible for the lack of consummation, couples therapy providing tools to making this transition is a critical component of treatment.

PHYSICAL THERAPY TREATMENT OF SEXUAL PAIN DISORDERS

Anna is a tall attractive 26-year-old lawyer. She relates that she began to feel something was wrong with her when at age 14, she could not succeed in inserting a tampon. She recalls her two best girlfriends standing outside the bathroom door giving her instructions, but it was simply too painful, and it just seemed “terribly unnatural for something as large as a tampon to enter such a tiny hole.” She decided to let it go when, at age 17, she felt ready to begin to have sexual intercourse with her boyfriend. They had been together for two years, and had done “everything but.” She trusted him, felt comfortable with him, and had gone on birth control pills and felt she was mature enough and ready to take this step. While she was prepared that the first time may be uncomfortable, she was completely unprepared for how she responded. She simply did not let her boyfriend enter her. Each time he tried, she would close her legs in fear and anxiety. This too, she let go, until her third year of college. She and her high school boyfriend became “just friends” and she avoided dating.

When she finally did meet someone she wanted to have sex with, again she was unable to allow him to penetrate her. She continued to be unable to use tampons, and when she tried to see a gynecologist, she could not undergo the exam. She was diagnosed with vaginismus. She began counseling, which consisted of discussions. At first the discussions were helpful. She learned about her anatomy, and was given instruction to go home and insert a finger in

her vagina. However, she still couldn't have intercourse due to the pain. She continued in therapy to talk about her feelings toward sex, her family, and her religious beliefs, but she didn't think this was advancing her. In fact, she felt that the problem wasn't really psychological at all.

Finally, Anna heard about a physical therapy clinic that specialized in treating painful intercourse. She began physical therapy. The therapist showed her a mirror, and instructed her in inserting a small dilator. At first, she was extremely fearful, but after a few times, she saw that it wasn't so bad. She also allowed the physical therapist to insert the dilator as well. The therapist worked with her on slightly larger dilators until reaching the one that was about the size of an erect penis. This was difficult and painful, but with gentle stretching of the vaginal opening that the therapist did and showed her to do at home, she was finally able to insert it. After eight sessions of physical therapy, Anna was able to have intercourse. She owes her success to the physical therapy, which provided her with practical, hands-on treatment to get over her anxiety.

The physical therapy approach to treatment of women with complaints of inability to have intercourse, or painful intercourse, includes taking a detailed history, performing a physical exam, and providing a treatment plan consistent with the goals of the patient. Treatment tools utilized by the physical therapist range from the educational, providing anatomical and physiological information; cognitive behavioral, particularly with vaginal dilators; rehabilitative, as in pelvic floor muscle strengthening and relaxation with tools such as biofeedback; and palliative treatment methods to decrease pain and improve tissue mobility. Manual techniques including massage, stretching, soft tissue and bony mobilizations are important components of treatment. The physical therapy intervention generally consists of evaluation and treatment with education and cognitive behavioral therapy, exercises, manual therapy techniques and modalities including pelvic floor biofeedback, electrical stimulation, and sometimes ultrasound (Rosenbaum, 2005).

History

The physical therapy intervention begins with taking a detailed medical, gynecological, and sexual history. The history can reveal if there was a relationship between the timing of symptoms and a preceding sequence of events. Obviously a history of sexual abuse can be a strong trigger. However, a history of dysmenorrhea (painful menstruation), urinary tract infections, vaginal infections, and musculoskeletal injury can all contribute to muscle hypertonus. Other situations include complications or difficulty healing from abdominal surgery (including hysterectomy and Cesarean delivery), and following pelvic cancer surgery and treatment. The history includes gathering information regarding the patient's chief complaint with which she presents. In most

cases, patients with vaginismus seek treatment when it becomes apparent that this condition interferes with sexual intercourse and the ability to have sexual intercourse is the goal of treatment. The inability to allow penetration extends to other nonsexually related functional activities as well, such as inserting a tampon or undergoing a gynecological exam. Moreover, patients with a burning vulva may primarily be seeking relief of their symptoms and may or may not even be sexually active. Whether sexual activity is a goal of treatment is determined together with the patient.

When the presenting complaint is pain with penetration or attempted penetration, a thorough pain assessment is necessary. It is important to determine where and when the pain occurs. The pain description helps determine direction for physical examination and treatment. It is important to determine if the pain is superficial or deep, if it occurs with arousal or orgasm, and if the pain can be alleviated and how.

It is also important to ask about urinary symptoms such as frequency and urgency and about bowel dysfunction or pelvic pain. Often, other chronic pain conditions occur together with vulvar pain syndromes. These may include chronic pelvic pain; irritable bowel syndrome; interstitial cystitis, a syndrome characterized by bladder pain; urinary urgency and frequency; and dyspareunia (Doggweiler-Wiygul & Wiygul, 2002; Jamieson & Steege, 1996). The common factor in all these conditions appears to be the existence within the muscles of the pelvic floor of tender areas known as “trigger points.” Pressure applied to these points reproduces the patient’s symptoms and triggers radiating pain (Travell & Simons, 1992). These conditions are related to muscle hypertonus and should be addressed concurrently.

Observation and Musculoskeletal Examination

The patient is observed breathing normally and asked to demonstrate diaphragmatic breathing. Conditions of anxiety, for example, are often manifested by shallow breathing. This places abnormal pressures on the body and can perpetuate conditions of tightness in the pelvic floor. Often it will be noted that these patients are holding in their abdominal muscles as well. Careful assessment is made of the strength, length, and mobility of the pelvic and lumbar joints as well as the surrounding musculature of the pelvis and hips. A typical musculoskeletal presentation of patients with vaginismus is tight hip flexors and adductors, muscles related to posture of “pulling in” and interestingly, they are commonly found to present with weak, undeveloped pelvic floor muscles when asked to perform an active contraction. This may occur even if there is hypertonus of the muscles that close the sphincters. Generally, only a physical therapist trained in urogynecological rehabilitation has the skill to determine the activity and functional ability of the various muscles of the pelvic floor.

Vulvar and Pelvic Floor Examination

The physical therapist's assessment of the vulva differs from a gynecological examination. Both the external and internal exam focuses on the mobility and integrity of the muscular, fascial, and connective tissue components. The vulvar and pelvic floor exam consists of the following:

1. Observation of the vulva, perineum, and anus to note areas of redness, raised areas, scar tissue, or edema
2. Palpation to note areas of tenderness to touch
3. Internal exam to assess pelvic floor muscle tension and tightness, tone, range of motion, and hymen presence and thickness
4. Assessment of internal muscle trigger points
5. Determination of the integrity of the pelvic organs and possible presence of prolapse of the bladder, uterus, or rectum and
6. Anorectal internal exam (when indicated by the history)

Pelvic floor muscle tone is assessed by both manual examination and sEMG (surface electromyography) assessment with a vaginal probe. Studies of the pelvic floors of patients with VVS have found they present with pelvic floor hypertonus and decreased resting and working level muscle stability (Glazer, 1998). Pelvic floor hypertonus has been associated with other dyspareunia related conditions such as interstitial cystitis (IC), levator ani syndrome and proctalgia fugax, a condition of puborectalis tightness, which is related to painful defecation (Kotarinos, 2003). Pelvic floor muscle assessment determines muscle tone when asking for a contraction, and when asking the muscle to rest, how strong the muscle can work, how long it takes for the muscle to contract and to get back to a resting state, and how well the muscle can stay contracted without letting go.

Physical Therapy Treatment

Physical therapy treatment is focused on restoring mobility, decreasing pain, and improving overall function. Physical therapists treating patients suffering from illness or disease address the sensory, inflammatory, neurological, and musculoskeletal aspects of the disease, and their effect on function. The specific techniques chosen for treatment are guided by the findings of the history and examination, and are standards of practice utilized for other regions of the body. Physical therapy treatment may include, but is not limited to the following components:

1. Setting of treatment goals with patient
2. Providing a home program of exercise and behavioral therapy
3. Manual therapy
4. Exercise

5. Biofeedback
6. Electrical Stimulation
7. Ultrasound and other modalities.

Setting of Treatment Goals

Prior to embarking on a treatment program, it is crucial to discuss goal setting with the client. Some women may be very focused on the ability to have pain-free sex, but this may not be the case for other women, who may consider pain relief their primary goal. The goal assessment also provides the patient with an explanation of the treatment and with options regarding what works best for her considering her schedule and the amount of time and energy she wishes or is able to invest. For example, some patients with urinary urgency and frequency may want to address this concurrently while some women may not be bothered by these particular symptoms. When pain-free sexual intercourse is the goal, discussion may ensue regarding other aspects of improvement in sexual function. Was sexual intercourse ever pleasurable and is the ability to enjoy and derive pleasure from intercourse a goal of the patient? Are there other areas of difficulty in sexual function, such as decreased interest, and genital and subjective arousal and to what extent are they related to the pain? Are there difficulties in the relationship that either predate the pain or have resulted from it? Goal setting includes determining what the possible benefits will be of the physical therapy treatment along with referral to appropriate professional colleagues to help address the psychosocial components.

Home Program and Behavioral Therapy

The patient is instructed in self-care including avoidance of irritants such as synthetic garments and detergents, as well as feminine products. Depending on the presentation, she may be instructed in baths with oils such as lavender, tea tree, and sea buckthorn, natural oils known for their anti-inflammatory qualities.

In conditions of pain due to local inflammation, reduced sensory pain threshold, neuropathic conditions, or a combination thereof, sensory rehabilitation provides relief of symptoms by raising pain threshold and “accustomizing” the affected area to touch. Patients with VVS have been found to demonstrate reduced pain threshold and more acute pain perception with touch (Granot, Friedman, Yarnitsky, & Zimmer, 2002; Pukall, Binik, Khalifé, Amsel, & Abbott, 2002).

Patients with VVS often demonstrate behaviors of avoidance regarding allowing direct touch or contact to the area, which hypersensitizes the area even more. Introduction of daily light touch by the patient herself with applications of vitamin E oil provides the therapeutic benefits of increasing proprioception and body awareness, and decreasing local tissue hypersensitivity.

In conditions whereby there is associated voiding dysfunction, such as urinary frequency and urgency, the patient is asked to keep a bladder diary and is taught timed voiding, in order to allow greater bladder capacity with less frequent need to void. In these cases, she is also instructed in avoidance of bladder irritants, such as caffeine and bladder irritating foods.

In conditions of superficial dyspareunia, introital tightness, or vaginismus, the patient may be instructed in home use of vaginal dilators and in therapeutic exercise including deep breathing, relaxation, and pelvic floor conditioning as well as independent manual stretching.

Manual Therapy

Various hands-on techniques are applied to treat musculoskeletal abnormalities, postural and skeletal asymmetries and soft tissue immobility. Trigger points are discrete, focal, hyperirritable spots located in a taut band of skeletal muscle (Alvarez & Rockwell, 2002; Simons & Travell, 1983; Travell & Simons, 1992). They produce pain locally and in a referred pattern and often accompany chronic musculoskeletal disorders. The application of trigger point massage in the pelvic area and transvaginally has been described in the treatment of pelvic pain and interstitial cystitis (Weiss, 2001) and for the treatment of vulvar pain syndromes (Fitzgerald & Kotarinos, 2003). Additional techniques include massage, connective tissue and scar tissue release. Osteopathic techniques such as visceral and urogenital manipulation, taught to physical therapists in advanced training courses, are effective techniques as well (Baral, 1993). Other techniques available to the physical therapist treating musculoskeletal dysfunction associated with pelvic and vulvar pain include muscle energy techniques, strain-counterstrain, contract/relax, and passive and resisted stretching. These mobilization and soft tissue techniques are designed to normalize postural imbalances, improve blood circulation in the pelvic and vulvar area, and improve pelvic and vulvar mobility.

Dilators are used not only to help overcome penetration anxiety but to stretch the vaginal openings. Patients are given very specific guidance in using the dilators, including proper positions that facilitate greater opening of the vaginal entrance. Perineal dilators designed for pre-delivery perineal stretching in women hoping to avoid *episiotomy*, or stitches, is useful for stretching the vaginal opening as well. They are also useful as a means to get used to the touch sensation and learn active release of the muscle. Dilators come in a series of gradually increasing sizes.

Exercise

Therapeutic exercises are designed to strengthen weak muscles, stretch tight muscles, improve mobility and flexibility, increase endurance and decrease pain. Sexual activity, which requires some amount of physical stamina as well as muscle strength, may be hampered by physical limitations and, often,

general as well as specific pelvic exercises are indicated. Relevant to dyspareunia, specific exercises are taught to improve circulation, increase healing of the vulva and pelvis, and increase mobility of the vagina. In the case of vaginismus, often certain muscle contraction patterns are noted, such as hips together and rotated inward. Often the inner thighs are very tight and need stretching, simply to be able to maintain comfort in a lying down, legs-apart position. Finally, the patient is instructed in proper performance of pelvic floor muscle exercise. Research has shown that verbal instruction alone does not produce effective results and that only 30–50 percent of women respond to verbal instruction with proper isolation and contraction of the pelvic floor muscles (Bump, Hurt, Fantl, & Wyman, 1991). Furthermore, for pelvic floor muscle exercises to be effective, it is important not just to contract muscles, but also to coordinate the contraction with proper breathing, timing, and simultaneous recruitment of other core postural muscles.

Pelvic Floor Biofeedback

Pelvic floor biofeedback is based on the use of the perineometer developed by Dr. Arnold Kegel. The technology is similar to that utilized during EKGs for examining heart muscle function. Pelvic floor surface EMG (sEMG) biofeedback involves insertion of a probe into the vagina, which measures the activity of the pelvic floor muscles and displays it in graph form on the computer monitor (for illustrations of biofeedback machines see www.thoughttechnology.com). The patient is then able to visualize the activity of her muscles and learn to relax them as well as strengthen, stabilize and coordinate them. The value of biofeedback in treatment of voiding dysfunction and urinary incontinence is well documented (Jundt, Peschers, & Dimpfl, 2002; Weatherall, 1999). The application of biofeedback in the treatment of vulvar pain syndromes was first explored by Glazer, who noted that the baseline sEMG of women with vulvar pain and VVS differed from women with pelvic floor dysfunction related to conditions such as prolapse and urinary incontinence. He found the treatment with biofeedback helped improve pain and restore sexual function in women with VVS (Glazer, Rodke, Swencionis, Hertz, & Young, 1995). The goals of sEMG biofeedback are to normalize pelvic floor muscle tone, decrease hypertonus and improve contractile and resting stability.

When appropriate, the client is instructed in the use of a home EMG biofeedback unit. This can help to increase sensory awareness for improving exercise efficiency. Hypertonus and tightness conditions can also be accompanied by weakness. Therefore, building strength and endurance for repetitive exercise may add to the resilience toward activity, including intercourse.

Electrical Stimulation and Other Modalities

Other modalities available to the physical therapist include pelvic floor electrical stimulation. This can be delivered directly transvaginally, or used

externally such as with interferential current. Use of pelvic floor electrical stimulation has been studied in the treatment of levator ani hypertonus and pelvic pain (Fitzwater, Kuehl, & Schrier, 2003) and reported to successfully improve pelvic floor muscle strength and reduce pain in the treatment of VVS (Nappi et al., 2003). The use of perineal ultrasound, the application of deep heat produced by frequency waves, for the treatment of dyspareunia has also been reported on in the literature (Hay-Smith, 2000).

THE MIND-BODY APPROACH TO TREATMENT OF SEXUAL PAIN DISORDERS

Successful treatment of sexual pain disorders requires a comprehensive approach. VVS, for example, has been shown to be a multifactorial but primarily physiological disorder (Bornstein, Zarfati, Goldik, & Abramovici, 1999). Various studies failed to link VVS with childhood sex abuse or history of trauma (Dalton, Haefner, Reed, Senapati, & Cook, 2002; Edwards, Mason, Phillips, Norton, & Boyle, 1997) or demonstrate a primary psychological cause for vulvar pain (Meana, Binik, Khalifé, & Cohen, 1997). However, several studies have linked VVS with psychological distress (Brotto, Basson, & Gehring, 2003; Sackett, Gates, Heckman-Stone, Kobus, & Galask, 2001) including increased states of depression and anxiety as well as sexual distress (White & Jantos, 1998) and conclude it is important to address psychological and sexual distress in women with vestibulitis (Danielsson, Sjoberg, & Wilkman, 2000; Gates & Galask, 2001; Nunns & Mandal, 1997). Although physical therapists are not psychologists or social workers, the therapeutic benefit of physical therapy treatment far surpasses only the physical.

Throughout treatment, the patient is encouraged and given practical tools to overcome her fear and anxiety and is given hands-on direction with activities that sex therapists and counselors are traditionally able only to discuss, such as insertion of dilators. Practical suggestions for dealing with decreased libido and arousal are part of treatment; however, when the need for psychological treatment is identified the patient should be referred for therapy. An interdisciplinary approach, in which communication between therapists enhances the results of both treatments, is superior to simply multidisciplinary treatment, where practitioners may be working with the client independently.

CONCLUSION

Although physical therapy is a relatively new profession in the world of sexual health, the contribution of physical therapists is extremely valuable. Physical therapists in various settings can be involved in educating, rehabilitating, and treating individuals who wish to enhance their sexual function.

REFERENCES

- Abramov, L., Wolman, I., & David, M.P. (1994). Vaginismus: an important factor in the evaluation and management of vulvar vestibulitis syndrome. *Gynecological and Obstetrical Investigations*, 38, 194–197.
- Alvarez, D. J., & Rockwell, P. G. (2002). Trigger points: diagnosis and management. *American Family Physician*, 65(4), 653–660.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.-TR). Washington, D.C.: American Psychiatric Association.
- Baral, J. (1993). *Urogenital Manipulation*. Seattle: Eastland Press.
- Basson, R., Leiblum, S., Brotto, L., Derogatis, L., Fourcroy, J., Fugl-Meyer, K., Graziottin, A., Heiman, J. R., Laan, E., Meston, C., Schover, L., van Lankveld, J., & Weijmar Schultz, W. (2004). Revised Definitions of Women's Sexual Dysfunction. *Journal of Sexual Medicine*, Issue 1, Volume 1, 40–48.
- Berman, J. R., Berman, L. A., Werbin, T. J. Flaherty, E. E., Leahy, N. M., & Goldstein, I. (1999). Clinical evaluation of female sexual function: Effects of age and estrogen status on subjective and physiologic sexual responses. *International Journal of Impotence Research*, 11(Suppl. 1), S31–8.
- Binik, I., Meana, M., Berkley, K., & Khalifé, S. (1999). The sexual pain disorders: Is the pain sexual or the sex painful? *Annual Review of Sex Research*, 10, 210–235.
- Bo, K., Talseth, T., & Vinsnes, A. (2000). Randomized controlled trial on the effect of pelvic floor muscle training on quality of life and sexual problems in genuine stress incontinent women. *Acta Obstetrica et Gynecologica Scandinavica*, 79(7), 598–603.
- Bohm-Starke, N., Hilliges, M., & Brodda-Jansen, G. (2001). Psychophysical evidence of nociceptor sensitization in vulvar vestibulitis syndrome. *Pain*, 94(2), 177–183.
- Bornstein, J., Zarfati, D., Goldik, Z., & Abramovici, H. (1999). Vulvar vestibulitis: Physical or psychosexual problem? *Obstetrics and Gynecology*, 93, 876–880.
- Bornstein, J., Sabo, E., Goldshmid, N., & Abramovici, H. (2002). A mathematical model for the histopathologic diagnosis of vulvar vestibulitis based on a histomorphometric study of innervation and mast cell activation. *Journal of Reproductive Medicine*, 9, 742.
- Brotto, L. A., Basson, R., & Gehring, D. (2003). Psychological profiles among women with vulvar vestibulitis syndrome: a chart review. *Journal of Psychosomatic Obstetrics and Gynaecology*, 24(3), 195–203.
- Bump, R. C., Hurt, W. G., Fantl, J. A., & Wyman, J. F. (1991). Assessment of kegel pelvic muscle exercise performance after brief verbal instructions. *American Journal of Obstetrics and Gynecology*, 165, 322–329.
- Bump, R., & McClish, D. (1994). Cigarette smoking and pure genuine stress incontinence of urine. A comparison of risk factors and determinants between smokers and non-smokers. *American Journal of Obstetrics and Gynecology*, 170(2), 579–582.
- Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2004–05 Edition, Bulletin 2540. Superintendent of Documents, U.S. Government Printing Office, Washington, DC.
- Dahm, D. L., Jacofsky, D., & Lewallen, D. G. (2004). Surgeons rarely discuss sexual activity with patients after THA: A survey of members of the American Association of Hip and Knee Surgeons. *Clinical Orthopedics and Related Research*, 428, 237–240.
- Dalton, V. K., Haefner, H. K., Reed, B. D., Senapati, S., & Cook, A. (2002). Victimization in patients with vulvar dysesthesia/ vestibulodynia. Is there an increased prevalence? *Journal of Reproductive Medicine*, 47(10), 829–834.

- Danielsson, I., Sjoberg, I., & Wikman, M. (2000). Vulvar vestibulitis: Medical, psychosexual and psychosocial aspects, a case-control study. *Acta Obstetrica et Gynecologica Scandinavica*, 79, 872–878.
- De Kruiff, M. E., Ter Kuile, M. M., Weijnen, P., & Van Lankveld J. J. (2000). Vaginismus and dyspareunia: Is there a difference in clinical presentation? *Journal of Psychosomatic Obstetrics and Gynaecology*, 21(3), 149–155.
- Doggweiler-Wiygul, R., & Wiygul, J. P. (2002). Interstitial cystitis, pelvic pain, and the relationship to myofascial pain and dysfunction: A report on four patients. *World Journal of Urology*, 20(5), 310–314.
- Dorey, G. (2004). Pelvic floor exercises as a treatment for men with erectile dysfunction. *Nursing Times*, 100(12), 65–67.
- Dorey, G., Speakman, M., Feneley, R., Swinkels, A., Dunn, C., & Ewings, P. (2004). Randomised controlled trial of pelvic floor muscle exercises and manometric biofeedback for erectile dysfunction. *British Journal of General Practice*, 54(508), 819–825.
- Edwards, L., Mason, M., Phillips, M., Norton, J., & Boyle, M. (1997). Childhood sexual and physical abuse. Incidence in patients with vulvodynia. *Journal of Reproductive Medicine*, 42(3), 135–139.
- Fitzgerald, M. P., & Kotarinos, R. (2003). Rehabilitation of the short pelvic floor. II: Treatment of the patient with the short pelvic floor. *International Urogynecology Journal*, 14, 269–275.
- Fitzwater, J. B., Kuehl, T. J., & Schrier, J. J. (2003). Electrical stimulation in the treatment of pelvic pain. *Journal of Reproductive Medicine*, 48(8), 573–577.
- Friedrich, E. G. (1988). Therapeutic studies on vulvar vestibulitis. *Journal of Reproductive Medicine*, 33, 514–517.
- Gates, E. A., & Galask, R. P. (2001). Psychological and sexual functioning in women with vulvar vestibulitis. *Journal of Psychosomatic Obstetrics and Gynaecology*, 22, 221–228.
- Glazer, H. (1998). Electromyographic comparisons of pelvic floor in women with dysethetic vulvodynia and asymptomatic women. *Journal of Reproductive Medicine*, 43, 959–962.
- Glazer, H., Rodke, G., Swencionis, C., Hertz, R., & Young, A. W. (1995). Treatment of vulvar vestibulitis syndrome with electromyographic biofeedback of pelvic floor musculature. *Journal of Reproductive Medicine*, 40, 283–290.
- Graber, G., & Kline-Graber, G. (1979). Female orgasm: role of the pubococcygeus muscle. *Journal of Clinical Psychiatry*, 40, 348–351.
- Granot, M., Friedman, M., Yarnitsky, D., & Zimmer, E. Z. (2002). Enhancement of the perception of systemic pain in women with vulvar vestibulitis. *British Journal of Obstetrics and Gynecology*, 109, 863–866.
- Handa, V. L., Harvey, L., Cundiff, G. W., Siddique, S. A., & Kjerulff, K. H. (2004). Sexual function among women with urinary incontinence and pelvic organ prolapse. *American Journal of Obstetrics and Gynecology*, 191(3), 751–756.
- Hay-Smith, E. J. (2000). Therapeutic ultrasound for postpartum perineal pain and dyspareunia. *Cochrane Database of Systemic Reviews*, (2), CD000945.
- Jamieson, D., & Steege, J. (1996). The prevalence of dysmenorrhea, dyspareunia, pelvic pain and irritable bowel syndrome in primary care practices. *Obstetrics and Gynecology*, 1, 55–58.
- Jundt, K., Peschers, U. M., & Dimpfl, T. (2002). Long-term efficacy of pelvic floor re-education with EMG-controlled biofeedback. *European Journal of Obstetrics, Gynecology and Reproductive Biology*, 105(2), 181–185.

- Kegel, A. (1952). Sexual functions of the pubococcygeus muscle. *Western Journal of Surgery, Obstetrics and Gynecology*, (October issue), 521–524.
- Kotarinos, R. K. (2003). Pelvic floor physical therapy in urogynecologic disorders. *Current Women's Health Report*, 3(4), 334–339.
- LoPiccolo, J. (1984). Treating vaginismus [a video]. Chapel Hill, NC: The Sinclair Institute.
- Markwell, S. J. (2001). Physical therapy management of pelvi/perineal and perianal pain syndromes. *World Journal of Urology*, 19, 194–199.
- Masters, W. H., & Johnson, V. E. (1970). *Human sexual inadequacy*. Boston: Little, Brown & Co.
- Meana, M., Binik, Y. M., Khalifé, S., & Cohen, D. (1997). Biopsychosocial profile of women with dyspareunia. *Obstetrics and Gynecology*, 90, 583–589.
- Murray, K. H. (1984). Treatment of motor and sensory detrusor instability by electrical stimulation; and Re: The neurophysiological basis of bladder inhibition in response to intravaginal electrical stimulation. *Journal of Urology*, 131(2), 356.
- Nappi, R. E., Ferdeghini, F., Abbiati, I., Vercesi, C., Farina, C., & Polatti, F. (2003). Electrical stimulation (ES) in the management of sexual pain disorders. *Journal of Sex and Marital Therapy*, 29(Suppl. 1), 103–10.
- Nunns, D., & Mandal, D. (1997). Psychological and psychosexual aspects of vulvar vestibulitis. *Genitourinary Medicine*, 73, 541–544.
- Piediferro, G., Colpi, E. M., Castiglioni, F., & Scropo, F. I. (2004). Premature ejaculation. 3. Therapy. *Archives of Italian Urology and Andrology*, 76(4), 192–198.
- Pukall, C. F., Binik, Y. M., Khalifé, S., Amsel, R., & Abbott, F. V. (2002). Vestibular tactile and pain thresholds in women with vulvar vestibulitis syndrome. *Pain*, 96, 196–175.
- Pukall, C. F., Payne, K. A., Kao, A., Khalifé, S., & Binik, Y. M. (2005). Dyspareunia. In: Balon, R., & Segraves, R. T. (Eds.). *Handbook of Sexual Dysfunction*, 249–272. New York: Taylor & Francis.
- Reissing, E. D., Binik, Y. M., Khalifé, S., Cohen, D., & Amsel, R. (2004). Vaginal spasm, pain, and behavior: An empirical investigation of the diagnosis of vaginismus. *Archives of Sexual Behavior*, 33, 5–17.
- Ribner, D., & Rosenbaum, T. Y. (2005). Evaluation and treatment of unconsummated marriage in Orthodox Jewish couples. *Journal of Sex and Marital Therapy*, 31(4), 341–353.
- Rosen, R., Altwein, J., Boyle, P., Kirby, R. S., Lukacs, B., Meuleman, E., O'Leary, M. P., Puppò, P., Chris, R., & Giuliano, F. (2004). Lower urinary tract symptoms and male sexual dysfunction: the multinational survey of the aging male (MSAM-7). *Progressive Urology*, 14(3), 332–344.
- Rosenbaum, T. Y. (2005). Physiotherapy treatment of sexual pain disorders. *Journal of Sex and Marital Therapy*, 31(4), 329–340.
- Sackett, S., Gates, E., Heckman-Stone, C., Kobus, A. M., & Galask, R. (2001). Psychosexual aspects of vulvar vestibulitis. *Journal of Reproductive Medicine*, 46(6), 593–598.
- Salonia, A., Zanni, G., Nappi, R. E., Briganti, A., Deho, F., Fabbri, F., Colombo, R., Guazzoni, G., Di Girolamo, V., Rigatti, P., & Montorsi, F. (2004). Sexual dysfunction is common in women with lower urinary tract symptoms and urinary incontinence: Results of a cross-sectional study. *European Urology*, 45(5), 642–648.
- Sand, P. K. (1996). Pelvic floor stimulation in the treatment of mixed incontinence complicated by a low-pressure urethra. *Obstetrics and Gynecology*, 88, 757–760.

- Shafik, A. (2000). The role of the levator ani muscle in evacuation, sexual performance, and pelvic floor disorders. *International Urogynecological Journal*, 11, 361–376.
- Simons, D. G., & Travell, J. G. (1983). Myofascial origins of low back pain. 3. Pelvic and lower extremity muscles. *Postgraduate Medicine*, 73, 99–105, 108.
- Swift, S. E., Pound, T. & Dias, J. K. (2001) Case-control study of etiologic factors in the development of severe pelvic organ prolapse. *International Urogynecology Journal*, 187–192.
- Travell, J. & Simons, D. (1992). *Myofascial pain and dysfunction: The trigger point manual*. (Vol. 2). Baltimore: Williams and Wilkins.
- Van der Velde, J., & Everaerd, W. (2001). The relationship between involuntary pelvic floor muscle activity, muscle awareness and experienced threat in women with or without vaginismus. *Behavior Research and Therapy*, 39, 395–408.
- Van Kampen, M., De Weerd, W., Claes, H., Feys, H., De Maeyer, M., & Van Poppel, H. (2003). Treatment of erectile dysfunction by perineal exercise, electromyographic biofeedback, and electrical stimulation. *Physical Therapy*, 83(6), 536–543.
- Weatherall, M. (1999) Biofeedback or pelvic floor muscle exercises for female genuine stress incontinence: a meta-analysis of trials identified in a systematic review. *BJU International*, 83(9), 1015–1016.
- Weiss, J. M. (2001). Pelvic floor myofascial trigger points: manual therapy for interstitial cystitis and the urgency–frequency syndrome. *Journal of Urology*, 166, 2226–2231.
- White, G., & Jantos, M. (1998). Sexual behavior changes with vulvar vestibulitis syndrome. *Journal of Reproductive Medicine*, 43(9), 783–789.
- Witkin, S. S., Gerber, S., & Ledger, W. J. (2002). Influence of interleukin-1 receptor antagonist gene polymorphism on disease. *Clinical Infectious Diseases*, 34(2), 204–209.
- Wurn, B. F. (2004). Increasing orgasm and decreasing dyspareunia by a manual physical therapy technique. *Medscape General Medicine*, 6(4), 47.

Recommended Resources

- American Physical Therapy Association Section on Women's Health, <http://www.womenshealthapta.org>.
- Dr. Glazer's Web site, <http://www.vulvodynia.com>.
- The International Pelvic Pain Society, <http://www.pelvicpain.org>.
- National Vulvodynia Association, <http://www.nva.org>.
- Talli Y. Rosenbaum's Web site, <http://www.physioforwomen.com>.
- The V-Book: The Doctor's Complete Book to Vulvovaginal Health* by Elizabeth Stewart and Paula Spencer (2002).
- The Vulvodynia Survival Guide* by Howard Glazer & Gae Rodke (2002).