

The Microbiome of the Vagina and Vestibule

By Steven S. Witkin, Ph.D.

Steven S. Witkin, Ph.D., is the William J. Ledger distinguished professor for infection and immunology in the department of obstetrics and gynecology, Weill Medical College of Cornell University, New York City. His extensive research has focused on genetic, immune and infectious aspects of disorders affecting both pregnant and non-pregnant women.

A major scientific advance in the last 20 years has been the development of techniques to accurately detect microorganisms without having to grow them on culture media in the laboratory. Because the vast majority of microorganisms do not grow in an artificial medium, we do not have a comprehensive assessment of the microbial population at any given site. The range of microorganisms that are present at a specific site, as detected by culture-independent methods, is called the microbiome. Extensive efforts in the United States and Europe have led to characterization of the microbiome at multiple distinct sites

on the human body. There is even a published analysis on the belly button microbiome.

Microbiome analyses have greatly expanded our appreciation of the essential role played by microorganisms in human health. There are ten times more microbial cells in our body than there are human cells, and 100 times more microbial genes than human genes. Many of these microorganisms and their gene products have become essential for the proper development and functioning of our multiple body systems.

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Systemic Conditions May Contribute to Generalized Vulvodynia

By Deborah Coady, M.D., FACOG

*Deborah Coady, M.D., FACOG, is clinical assistant professor of obstetrics and gynecology at NYU Langone Medical Center. She devoted a major portion of her private practice to caring for women with vulvar pain, and currently writes, lectures, and mentors health care providers to improve care of women suffering with chronic pain. She is co-author of *Healing Painful Sex: A Woman's Guide to Confronting, Diagnosing, and Treating Sexual Pain*.*

Vulvodynia is defined as persistent vulvar pain without an identifiable cause. There has been some research on the etiology of vestibulodynia (pain localized in the vestibule), indicating genetic, inflammatory, neurological and musculoskeletal factors as possible causes. At this point, there is little research on Generalized Vulvodynia

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It is generally believed that the human fetus develops in a sterile environment, which is probably incorrect. Bacteria have now been identified by non-culture techniques in the placenta, uterus and amniotic cavity in women with healthy pregnancy outcomes. Regardless, passage through the birth canal during delivery results in extensive bacterial colonization of the newborn. It is interesting to note that babies delivered by Cesarean section first become colonized with a different microbiota (mostly those present on the mother's skin) than do babies who are delivered vaginally (vaginal microbiota). This difference might influence immune system development in the newborn and contribute to the higher rate of allergies reported in individuals who were delivered by Cesarean section.

The vagina is one of the body sites that contains a distinct microbiome. Once maternal hormones and microorganisms are no longer transmitted to the neonate after cessation of breastfeeding (and up to adolescence), the human vagina becomes populated mostly by bacteria from the skin and gastrointestinal tract, and vaginal fluid has a pH of 7 (neutral). Hormonal development at the time of puberty leads to a large increase in the concentration of glycogen in vaginal epithelial cells. This favors the proliferation of bacteria that utilize glycogen and its breakdown product, glucose. Various species of Lactobacilli become the major constituents of the vaginal microbiome in most women at this stage and the glucose is converted to lactic acid. This acidifies the human vagina to a pH of 3.8-4.5. In a minority of women, other lactic acid-utilizing bacteria, not Lactobacilli, become dominant. It is believed that Lactobacilli prevent vaginal colonization by other, potentially pathogenic, bacteria due to (i) the maintenance of vaginal acidity, (ii) direct pathogenic effects of lactic acid on other bacteria, (iii) the production of anti-bacterial compounds by Lactobacilli and (iv) lactic acid-induced production of anti-microbial products from vaginal epithelial cells. It was previously believed that the release of hydrogen peroxide by some Lactobacillus strains also contributed to vaginal health. It has now been shown, however, that hydrogen peroxide activity in the vagina is inhibited by both vaginal secretions and seminal fluid, and thus, is not likely active *in vivo*.

The dominance of lactic acid-producing bacteria continues until menopause at which time reduced estrogen levels result in decreased vaginal glycogen, leading to a change in the dominant bacterial populations. The use of estrogen replacement therapy prevents or modifies this change. During pregnancy vaginal estrogen and glycogen levels are at their highest, so pregnant women have elevated levels of vaginal Lactobacilli as compared to non-pregnant women.

Vulvar vestibulitis syndrome (VVS) is a clinically defined syndrome in which infectious, neurological, physical and hormonal causes cannot be clearly identified. It is characterized by intense pain of at least three to six months duration upon attempted vaginal insertion, or when discrete regions of the vestibule are touched with a cotton swab. (Every so often, a gynecological society proposes a name change for this

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The National Vulvodynia Association is a non-profit organization that strives to improve women's quality of life through education, support, advocacy and research funding.

The NVA is not a medical authority and strongly recommends that you consult your own health care provider regarding any course of treatment or medication.

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syndrome; the current suggestion is the seven syllable word vestibulodynia. I think that this only adds further confusion for both clinicians and women to an already misunderstood disorder.) Although approximately 50 percent of women with VVS can identify a specific event associated with symptom onset – childbirth, yeast or other genital tract infection, sexual intercourse with a specific partner, use of oral contraceptives, vaginal surgery or laser treatment, the precise trigger factor remains undetermined in the majority of sufferers. Similarly, it is unclear whether the initiating factor persists and continues to induce symptoms or if the trigger was a transient event that resulted in alterations, such as an increase in the number and/or sensitivity of nerve fibers in the vestibule that perpetuate the increased local sensitivity. A further complication in the identification of trigger and perpetuating factors is that VVS is a diagnosis of exclusion and it is most likely that women with a range of different medical problems fall under the umbrella of this clinical diagnosis.

My laboratory, in association with Dr. William J. Ledger at Weill Cornell Medical College and Dr. Larry Forney at the University of Idaho, recently initiated a pilot study to characterize the microbiome in the vagina and vestibule of women with VVS, and to compare the findings to the comparable microbiomes present in control women. We wished to test the hypothesis that an altered vaginal and/or vestibular microbial ecosystem contributed to the persistent clinical symptoms that are characteristic of this syndrome. Vaginal and vestibular samples from 30 women with VVS and from 15 control women were analyzed by culture-independent methodologies. Our findings were published in the journal, *Pathogens and Disease*, in 2014. As expected, Lactobacilli were the most commonly detected microorganism in vaginal samples from VVS patients, and in most control samples. This corroborated previous studies of the composition of the vaginal microbiome. Analysis of the microbiome in the vestibule of control women revealed a marked similarity to the vaginal microbiome. There were no significant differences between the dominant bacteria present at each location. Thus, it appeared that secretions from

the vagina that descend and coat the vestibule are a major source of the bacteria present at this site.

Evaluation of the vaginal and vestibular microbiomes in women with VVS revealed an overall similarity to the comparable microbiomes of the control women. In addition, the vaginal and vestibular microbiomes were also very similar. Eighteen different genera of bacteria were identified in the vagina and 23 genera were present in the vestibule. Seventeen of the genera found in the vagina were also present in the vestibule and only six genera that were present as very minor constituents of the vestibule microbiome were not detected in the vagina. Species of *Lactobacilli* were dominant in 73.3 percent and 76.7 percent of the vaginal and vestibular samples, respectively. *Streptococcus*, *Gardnerella* and *Enterococcus* were the dominant vaginal and vestibular bacteria in the remaining women. In our somewhat limited sample size, there were no significant differences in the dominant bacterial genera present in the vagina and vestibule of women with or without VVS.

Differences were noted, however, in the prevalence of individual *Lactobacillus* species between women with VVS and controls. *L. crispatus* was the dominant *Lactobacilli* in 53.3 percent of the controls and in 30.0 percent of women with VVS. Conversely, *L. iners* predominated in 33.3 percent of VVS women as opposed to only 13.3 percent of controls, while *L. gasseri* was present in 26.7 percent of women with VVS and in none of the controls. *L. jensenii* was identified in an equal percentage of women in both groups. The clinical significance of these apparent differences in the prevalence of *Lactobacillus* species between women with VVS and control women remains to be determined. While *L. iners* and *L. gasseri* are frequent components of the vaginal microbiome of healthy women, both bacteria have also been associated with an increased susceptibility to develop bacterial vaginosis. Bacterial vaginosis is the most common disturbance of the vaginal microbiota, and to my knowledge, has not been evaluated as a possible contributor to VVS-related symptoms. Also, while all other vaginal Lactobacilli

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produce both the D- and L- isomers (configurations) of lactic acid from glucose, *L. iners* only produces L-lactic acid. Possible consequences of this difference are only now beginning to be explored.

The more frequent detection of *Streptococcus* in the vagina and vestibule of women with VVS may also be noteworthy. This microorganism, which also produces lactic acid, is occasionally found at low levels in apparently healthy women. High vaginal concentrations of *Streptococcus* are characteristic of a symptomatic vaginal disorder known as aerobic vaginitis. In addition, the presence of one species of this bacterium, Group B *Streptococcus*, has been associated with vulvar pain in one report. The possibility that vaginal *Streptococcus* is a contributing factor to the persistence of VVS in some women deserves further consideration.

In summary, the collected data indicate that it is unlikely that there is a bacterium uniquely present at detectable levels in the vagina and/or vestibule of women with VVS and absent from other women that is responsible for the persistence of vestibular pain. Additional investigations require a larger group of women with VVS, who are sub-divided into specific groups based on probable etiology and whether or not their symptoms began with the first act of vaginal penetration. A large study should more definitively determine whether unique variations in the vaginal microbiome contribute to VVS in some women.

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NVA's 2014 Marinoff Award Recipient



Sonia Bahlani, M.D., an attending physician at The Smith Institute for Urology in New York, received her medical degree from the Virginia Commonwealth University School of Medicine in Richmond, Virginia. She completed her residency in ob/gyn at New York-Presbyterian/Weill Cornell Medical Center, and joined The Smith Institute following a fellowship in urology under the mentorship of Dr. Robert Moldwin, a pioneer in the pelvic pain field.

With her award, Dr. Bahlani will investigate the efficacy of dimethyl sulfoxide (DMSO) in the treatment of vestibulodynia (aka vulvar vestibulitis). DMSO, a by-product of the paper-making process, is known to have analgesic, anti-inflammatory, and possibly anti-carcinogenic properties. It is FDA-approved as an intravesical agent for the treatment of painful bladder syndrome. DMSO can penetrate skin and mucous membranes, which, in combination with its anesthetic, anti-inflammatory, and muscle relaxant properties, makes it a potentially powerful topical treatment for vestibulodynia and co-existing pelvic floor muscle dysfunction. Dr. Bahlani hopes this study will eventually lead to a novel treatment for vestibulodynia. ■

NVA Awards Three New Research Grants

Health care providers who treat vulvodynia do not have evidence-based guidelines to help them select the most appropriate treatment for each patient. Although there are 30 possible treatments to relieve symptoms, there is little, if any, controlled research on most of them. Thus, the burden falls on the patient to determine the efficacy of each treatment, a trial and error process that sometimes takes several years.

Although clinical research is lacking, the NVA has awarded over 40 pilot grants to study the potential causes of vulvodynia. Once the researchers establish the cause(s), they can determine what treatment(s) need to be developed. To date, the NVA has spent over one million dollars to help researchers collect pilot data, so they can subsequently obtain larger grants from major institutions, such as the National Institutes of Health. What follows are summaries of the three grant proposals recently funded by the NVA.

Terry K. Morgan, M.D., Ph.D. **Oregon Health & Science University**



Terry Morgan, M.D., Ph.D., a pathologist at Oregon Health & Sciences University, was awarded an NVA research grant titled, *Heritability and Proteomic Pathway Analysis of Vestibulodynia*.

Prior research, including Morgan's, has shown that inflammation and nerve growth (neurogenic inflammation) are involved in the pathophysiology of provoked localized vestibulodynia, or PLV. Although PLV is not currently considered a genetic disease, Dr. Morgan hypothesizes there is a genetic predisposition that he proposes to test using the Utah Population Database (UPDB). The UPDB takes advantage of large Mormon families with documented genealogies linked to their diagnostic codes. It has been employed in a number of studies to determine whether a disease runs in families, by comparing the frequency of the diagnosis in related versus non-related women. If PLV is familial, it will be more common among blood relatives of women with confirmed disease. Dr. Morgan's goal is to identify distantly related affected

women for subsequent NIH-funded whole genome sequencing and "shared haplotype analysis," a proven method to identify key candidate genes that cause common diseases. He will also screen fresh frozen vestibular biopsies for differences in inflammation and nerve growth.

For this pilot experiment, Dr. Morgan will use pooled samples from each diagnostic group: case-control matched samples from controls (n=12), primary PLV (n=6), and secondary PLV (n=6) subjects. He will use protein expression analysis (proteomics) to test for differences in key regulators like the JAK-STAT pathway known to play a role in neurogenic inflammation. Analysis of pooled samples from multiple women within each of the three diagnostic groups will wash out natural differences between individuals and will amplify shared molecular pathways. Future studies will compare expression levels in individuals within and between groups to validate reproducible differences. The hope is to provide more objective tests to accurately diagnose PLV and to develop more effective patient-based treatments.

Andrea Nackley, Ph.D. and Denniz Zolnoun, M.D. **University of North Carolina**



Vestibulodynia (VBD) is a significant health care problem that is treated ineffectively due to its unclear etiology and heterogeneous clinical presentation. To reduce

the complexity of VBD and improve standards of care, the identification of unique biological signatures and pathways that contribute to distinguishing clinical features is essential. Emerging evidence indicates that microRNAs, non-coding molecules that regulate gene expression, control molecular pathways linked to pain, mood, and inflammation. Yet little is known about their role in chronic pain conditions such as VBD. In a

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recent case-control study, the investigators evaluated the relationship between pain, psychological traits, inflammatory cytokines and microRNAs in women with VBD alone and those with VBD and chronic overlapping pain conditions (COPCs). Women with VBD had localized pain, normal self-reported pain and psychological profiles, and increased levels of anti- as well as pro-inflammatory cytokines. Those with VBD and COPCs had pain at remote bodily sites, enhanced self-reported pain and somatization, plus no compensatory increase in anti-inflammatory cytokines. Women with VBD, and women with VBD and COPCs, displayed a dysregulation of 10 and 11 microRNAs, respectively, that were correlated with pain-relevant phenotypes and cytokine levels. These results suggest microRNAs represent a valuable tool for differentiating VBD subtypes that are likely to require different treatment approaches.

Investigators will perform in silico pathway analysis to generate a list of predicted targets for the 21 microRNAs dysregulated in women with VBD and women with VBD and COPCs. Using custom protein microarrays, they will measure protein expression levels corresponding to the predicted targets in banked blood samples from women with VBD, women with VBD and COPCs, and controls. Finally, protein expression levels will be correlated with previously collected data on case status, intermediate phenotypes and patient-reported outcomes. Results from the proposed aims will inform the design of a larger population-based study to determine the utility of microRNAs and microRNA targets as screening tools for diagnosis and treatment of VBD subtypes.

Valerie Dernetz, R.N.

University of Maryland School of Nursing



As with most other chronic pain conditions, vulvodynia may involve a complex interaction of physiological and psychological factors. In recent years, studies have indicated that underlying mechanisms and treatment response vary among clinical presentations of vulvodynia. Thus, the purpose of this study is to investigate neurological differences between women with vulvodynia and control subjects, focusing on how these mechanisms differ in women with distinct disease onset, specifically primary versus secondary vulvodynia. In primary vulvodynia, pain is experienced since the first sexual intercourse attempt, but in secondary vulvodynia, symptoms begin after a period of pain-free intercourse. The first aim of the study is to assess neurosensory processing using a comprehensive battery of sensory testing in 20 women with primary vulvodynia, 20 women with secondary vulvodynia, and 20 age- and race-matched controls. The second aim of this study is to assess psychological factors that appear to be associated with other chronic pain syndromes and determine whether they are more prevalent in primary versus secondary vulvodynia patients. Specifically, cognitions such as (i) fear of pain and (ii) catastrophizing (negative cognitive-affective responses in the face of anticipated or actual pain) will be studied. If a difference is proven to exist, targeted treatment strategies may be developed for each subtype. ■

Dr. Andrew Goldstein Appointed to NVA Medical Advisory Board



Andrew Goldstein, M.D., a Board-certified ob/gyn, is the director of the Centers for Vulvovaginal Disorders in Washington, DC, Annapolis, MD and New York City. He specializes in the treatment of vulvodynia, vulvar dermatoses, and other disorders that cause sexual dysfunction and pain. He is the immediate past-president of the International Society for the Study of Women's Sexual Health and a member of the renowned International Society for the Study of Vulvovaginal Disease. Dr. Goldstein has co-authored two books on female sexual pain and published numerous peer-reviewed articles and book chapters on this topic. NVA is very pleased to welcome him to our Medical Advisory Board. ■

Pudendal Neuralgia Association Hosts First Conference

In fall 2014, the recently founded Pudendal Neuralgia Association sponsored its first continuing medical education conference in Waltham, Massachusetts. A distinguished panel of 11 speakers presented a multifaceted approach to diagnosing and treating Pudendal Neuralgia (PN). What follows is a summary of some of those sessions.

Assessment

Richard Marvel, M.D, a Board-certified ob/gyn and an expert in Pudendal Neuralgia practicing in Annapolis, Maryland, led the sessions on assessment and non-surgical intervention. He defined PN as a debilitating chronic pelvic pain condition emanating from one or more areas of the pudendal nerve or one of its branches. The pain is typically described as burning, rawness or irritation and is either constant or intermittent. It usually worsens later in the day and with extended sitting. He noted that the condition is not well-defined and that there are no tests or imaging studies to rule it out. In his words, "the more symptoms consistent with PN, the more likely the diagnosis is accurate." Because many patients have chronic overlapping disorders, PN is not necessarily a diagnosis of exclusion. There is, however, the Nantes, France criteria for Pudendal Nerve Entrapment, in which the nerve is scarred, compressed, or fixed in location. Contrary to PN, patients with Pudendal Nerve Entrapment are awakened by pain during the night.

As with all chronic pain patients, a comprehensive medical history, as well as a thorough physical examination, is essential to make an accurate diagnosis. For example, many PN sufferers were athletic in their youth. Certain sports may lead to a rotation of the ischial spine, bringing the sacrotuberous and sacrospinous ligaments closer together, a situation commonly found during surgical decompression. Among the risk factors of PN are a low BMI; a history of a fall on the buttocks or tailbone; repetitive trauma from activities such as cycling, horseback riding, powerlifting and gymnastics; chronic constipation; or childbirth. Patients can feel pain in the urethra, bladder, anus, rectum and/or genitals. Some have deep buttocks pain. As expected, most patients experience increased pain with sexual intercourse. Symptoms that are strongly

associated with PN include pain with sitting, persistent sexual arousal of the clitoris, pain on only one side of the vulva and the sensation of a foreign object in the vagina or rectum.

A complete physical examination is essential. Sensation should be tested in the abdomen, pelvis and lower extremities. It is important to carefully examine the vulva, preferably with magnification, to assess inflammatory changes or signs of a skin disease. The vulvar skin should be assessed with touch and a pinprick, because most women with PN have pinprick hyperalgesia (an exaggerated pain response) limited to the pudendal nerve distribution. A single digit pain mapping pelvic examination is also necessary. Each of the following structures should be palpated to determine if there is tenderness: the vestibule, hymen, urethra, bladder base, pelvic floor muscles, Alcock's canal, sciatic notch, sacrospinous ligament and coccyx. Palpation of the nerve itself usually elicits tenderness and occasionally Tinel's sign, a replication of the actual pain.

Non-surgical Treatment

Initially, there are certain self-help measures that may relieve some of the pain, such as minimizing sitting time, alternating sitting and standing, sitting on a special cushion to reduce pressure on vulnerable areas, and eliminating other activities that trigger pain. The most widely used treatments are pelvic floor physical therapy, oral medication (e.g., an anticonvulsant), Botox or steroid injections, pudendal nerve blocks and neuromodulation. Dr. Marvel encourages clinicians to treat the whole patient, not just the condition, and advises patients to set realistic expectations and learn to manage stress. He estimates that 90 percent of PN patients can be helped without surgical intervention. The goal is to reduce the pain to a manageable level, so it is no longer a dominant focus of the person's life. If all conservative measures fail, surgical intervention is an option.

Physical Therapy

Physical therapists Amy Stein, DPT, of Beyond Basics Physical Therapy, and Elizabeth Rummer, MSPT, of the Pelvic Health and Rehabilitation Center, started this

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session by describing various musculoskeletal conditions that can cause PN. They explained that pelvic floor muscle dysfunction can be either a primary or secondary contributor to PN. Thus, it is important to carefully examine the pelvic floor muscles and the surrounding musculoskeletal system. Physical therapy can assist in the treatment of PN and conditions that may cause the disorder, such as pelvic floor muscle overactivity, sacroiliac joint dysfunction, and hip or back conditions. Muscle overactivity, as well as connective tissue, visceral and neural restrictions may be assessed and treated with myofascial trigger point release; connective tissue, visceral and neural mobilization; and/or correction of any biomechanical dysfunction. Additionally, behavior modification techniques can help relieve bladder, bowel and sexual difficulties. All these therapies, plus postural training and targeted exercises, can help to increase range of motion and relieve the pain of PN.

Magnetic Resonance Neuropathy (MRN)

This nerve imaging technique was described by John Carrino, M.D., chair of the department of radiology and imaging in The Hospital for Special Surgery, New York City. MRN is a technique that enhances peripheral nerve visualization with high-resolution and high-contrast nerve-nonspecific and nerve-selective imaging pulse sequences. Although 2-D imaging remains the medical standard for primary interpretation, high-quality 3-D imaging is critical for problem-solving. Using MRN should enhance the visualization of peripheral nerves in various planes to enable the physician to locate and follow the course of the disorder.

MRN is the gold standard for directly visualizing and mapping the course of deep pelvic pain targets. High-field MRN typically precedes MRN-guided nerve blocks. With proper MRN technique, the physician can see the targeted anatomic structure and regional confounding structures, and then determine the precise location to inject medication. Thus, the use of MRN-guided blocks offers exquisite technical accuracy and is especially suited for very deep targets such as the pudendal canal.

Surgical Treatment

A. Lee Dellon, M.D., Ph.D., a professor of plastic surgery and neurosurgery at Johns Hopkins Medical School in Baltimore, led the session on surgical techniques and outcomes. He pointed out that surgical intervention is often considered after other medical and physical therapy approaches do not provide adequate pain relief. Until now, the most widely used technique for pudendal nerve decompression has been the transgluteal approach (via the buttocks). Unfortunately, the results have been mixed and some experts have concluded that the failure rate is unacceptable. Fortunately, recent research into pudendal nerve anatomy and peripheral nerve pathophysiology should contribute to improved microsurgical outcomes.

To compare results of a peripheral nerve versus transgluteal approach, 55 patients with either a neuroma (nerve tumor) or compression of the pudendal nerve were evaluated prospectively. The cohort consisted of 25 men and 30 women. The transgluteal (posterior) surgical technique was used if the patient's symptoms included rectal pain and the inferior pubic ramus (anterior) technique was used if rectal pain was absent. At 14 months post-operatively, there was no difference in outcome whether neuroma resection or nerve decompression was performed. In general, the more experienced the surgeon, the greater the success. Untreated anxiety or depression was associated with surgical failure, regardless of the approach. From this study, Dr. Dellon concluded that a differential diagnosis of a neuroma versus compression of the pudendal nerve is essential to treatment outcome. Furthermore, it is critical to choose a surgical site (anterior or posterior) that is specific to which pudendal nerve branch is involved.

Integrated Approach

Deborah Coady, M.D., an ob/gyn at the NYU Langone Medical Center in New York City, discussed integrative medicine, which uses many conventional and complementary therapies to relieve the physical, emotional,

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sexual, functional (and even spiritual) consequences of chronic pelvic pain. This integrative approach is based on three goals of care, (i) appreciating the patient as a partner, (ii) strengthening her physical body, and (iii) developing the mind-body connection. The third goal is critical for people suffering from chronic pain. A developed mind-body connection is fostered by the practice of Mindfulness Meditation, encouraging moment-to-moment awareness of thoughts, feelings, bodily sensations and the surrounding environment. Mindfulness is currently being studied by Western medicine as a therapy for many physical disorders, especially those involving pain. This form of meditation limits the negative impact of chronic pain and psychological stress on the body. In order to practice mindfulness to relieve chronic pain, it is important to create conditions conducive to meditation: relax the muscles, start deep breathing, position yourself comfortably, and minimize distractions.

Mindfulness meditation can relieve pain by (i) activating the parasympathetic nervous system, (ii) releasing beta endorphins, (iii) improving immune function, (iv) modulating attention to sensory and affective components of pain, and (v) decreasing co-morbid anxiety and depression. Mindfulness facilitators often create relationships in their communities with practitioners of other complementary therapies, such as acupuncture, yoga, Qigong and Tai chi, referring their clients as

needed. For example, Qigong is an ancient Chinese health care practice that integrates physical movement, breathing techniques and focused attention; it can be particularly helpful for people with PN and pelvic pain because it is gentle, relaxing, strengthens the pelvis, and is mostly done in a standing position.

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(Editor's note: The next PNA conference for health care providers will take place in late September 2015, in Baltimore, Maryland. In addition, there will be a separate conference for patients. For more information, visit www.pudentalassociation.org, click on menu icon and select conferences.) ■

Review of *Heal Pelvic and Abdominal Pain*

By Peggy Zidar Treseler, PT, MA, of Specialized Women's Physical Therapy, Kensington, Maryland

Amy Stein's new CD/DVD, *Healing Pelvic and Abdominal Pain: The Ultimate Home Program for Patients and a Guide for Practitioners*, is highly recommended for anyone suffering from pelvic pain. Similar to her first book, Stein has spelled out a practical self-care program for women to use at home. The program is well organized, easy to follow and designed to enable the patient to quickly find the explanation or chapter needed. Stein's explanations of the anatomy and self-massage techniques are described in excellent detail, but are not overwhelming. The video provides visual demonstrations of the ideal way to perform a stretch or various self-massage techniques.

Stein's home program is recommended to patients in addition to their out-patient physical therapy visits and their prescribed exercises. Specifically, this DVD can be used to help patients with the self ILU (I Love You) massage technique. It is a must-have for anyone suffering from pelvic pain! Although the DVD is intended for patients with pelvic pain, it is also recommended for those with conditions such as bowel and bladder dysfunction, constipation, interstitial cystitis, and Crohn's disease. ■

In Her Own Words

By Michelle Living, NVA Director of Support Services



I'm stronger today than I was 12 years ago and I have Vulvodynia to thank. My life was forever changed in October 2002 when a car swerved in front of my boyfriend's (he is now my husband) truck. There was nothing particularly remarkable about this accident, considered no more than a fender

bender, but the effect it would have on my life was long lasting. I suffered severe whiplash, chronic back and neck pain, and TMJ. I cannot say for sure whether or not this played a role in my eventual diagnosis of Vulvodynia. My health care providers thought it was likely. My journey with Vulvodynia began following that accident and I was eventually diagnosed in 2004, just months before my wedding. It was devastating, and I almost cancelled my wedding. But my husband-to-be told me that he would rather marry me and wait to consummate our marriage than put off the wedding. We married on July 17, 2004, a beautiful and memorable day.

For a long time I felt like Vulvodynia had robbed me of who I was. I felt like a completely different person. I couldn't be the wife I wanted to be. I gave up activities that I loved. I tried to maintain a social life because that's who I am. But it was much more challenging. I couldn't wear jeans or ride a bike. Everything had changed. I wondered if I would ever be the same again. Shortly after my diagnosis, I found the NVA through an online search. I will never forget how I felt the first time I connected with my local support leader and realized I wasn't alone. She remains one of my dearest friends to this day. I'm so grateful to the NVA and all they have done and continue to do. They have been, and still are, an important component of my healing journey.

I have learned a great deal on this road toward healing. There were times when I felt so weak and compared myself to others. I wanted to do everything my

friends could do. One particular day, I expressed to my mom (my constant confidante and supporter) how much more capable my friend was because of all the things she could do in a day...in life! I told her she was stronger than me. My mom rose up to defend me and what she said that day will stay with me forever. She listed all of the medical and home remedies I use on a regular basis just to maintain my health. She told me that most people did not realize the energy it took just to be healthy. Then she told me I was not only stronger than I thought, but stronger than most people! I was so full of gratitude. Now, when I compare myself to others, I remember what she said. If getting out of bed in the morning is an achievement, pat yourself on the back. If going to work every day or taking care of your children is a challenge, you should be proud of what you have managed to do. You don't need to measure yourself against others to validate your accomplishments.

After more than 10 years of facing this challenge, I now understand that Vulvodynia has made me a better person. I'm so glad I persevered. It's a lesson I did not choose to learn. If I could turn back time and prevent it, I still would. I think we all would! But I can honestly say I have been truly blessed on this road toward finding healing. My advice to other women is, "Don't give up!"

I'm happy to say that I gradually found a combination of treatments that healed my body. I did suffer years of depression and hopelessness, and I understand the loneliness that comes with this kind of pain. But I persevered with a great deal of support from my husband, my parents, my brother, wonderful friends, and my faith in God. For the past four years, I have been the Support Director of the NVA. I am by no means cured, but I am thankful for the healing I have experienced. I am also thankful for my experience with Vulvodynia and the amazing women I have met because of it. I still wish to be completely free of pain and have hope that will happen in the future! ■

SYSTEMIC

(from page 1)

(diffuse pain, often unprovoked) and few clinicians have focused on the association of systemic disorders and Generalized Vulvodynia (GV). Among the many contributing systemic disorders that may contribute to GV are diabetes, small fiber neuropathy and autoimmune diseases. Furthermore, GV may develop as a result of hormonal changes or cancer treatments.

It is understandable that little attention has been paid to a possible association of systemic disorders and GV. In seeking a diagnosis, women typically consult a gynecologist and dermatologist, but not their internist. For many years, it has been treated only as a condition of the vulva, not as a chronic pain condition. Some women have found relief with standard treatments, but many have not. Physicians should recommend that women with recalcitrant GV see an internist for a comprehensive physical examination and testing, and referral to an appropriate specialist(s) if needed.

Diabetes

Evaluation for diabetes or impaired glucose tolerance (IGT) is highly recommended. According to the CDC, over 13 million women in the U.S. have diabetes (although 28 percent are undiagnosed), and an astounding 86 million Americans have IGT. If you combine these two groups, about 43 percent experience Diabetic Peripheral Neuropathy. Although symptoms

usually start in the hands and feet, they may eventually affect many areas of the body. Among the symptoms are tingling and burning, sharp pain, and increased sensitivity to touch. Especially since IGT is so prevalent, all chronic pain patients, including women with GV, should be tested for diabetes and IGT. Women with GV who have diabetes may find pain relief with strict glycemic control.

Small Fiber Neuropathy

Small fiber neuropathy is a systemic disease of the peripheral nerves, causing symptoms in small sensory and/or autonomic nerves. Nociceptors (that react to painful stimuli) and unmyelinated C-fibers may be affected. Symptoms include pain, numbness, allodynia, hyperalgesia and/or autonomic dysfunction.

Among the many disorders associated with small fiber neuropathy are diabetes, IGT, fibromyalgia, autoimmune diseases, multiple sclerosis, scleroderma, irritable bowel syndrome and hypothyroidism. To give you some idea of the possible magnitude, there are more than 80 autoimmune diseases alone, affecting about 50 million people in the U.S. Seventy-five percent of sufferers are women. Furthermore, over seven million women are affected by cancer in the U.S. Peripheral neuropathy can be caused by cancer treatments such

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Visit NVA's New Website (www.nva.org)



In February 2015, the NVA launched its redesigned website using search engine optimization, making it more likely that people seeking information on vulvodynia will visit our site. In addition to the obvious aesthetic improvement, we added a search function so visitors can locate a specific topic faster. Although the website content is as comprehensive and detailed as before, viewers will find it much easier to navigate. You can access the "members-only" features, including four self-help guides, back issues of the newsletter and our online patient tutorial on vulvodynia by signing in with your access code. (If you need a new code, email

Gigi Brecheen at gigi@nva.org.) Our executive director, Lisa Goldstein, worked tirelessly on improving our website, so please check it out at www.nva.org. We always welcome your constructive feedback! ■

SYSTEMIC

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as chemotherapy, and radiation, which is directly toxic to the pelvic nerves. Exposure to toxins, or deficiencies of vitamins B1, B6, and/or B12 are other causes. Unfortunately, a physical therapy evaluation of the pelvic floor and nerve conduction studies can not assess small nerve fiber function. Diagnostic options are autonomic testing (a standardized battery of non-invasive physiological tests) or specialized skin biopsy to determine small fiber density.

Menopause

Menopause and other low estrogen/androgen conditions affect all vulvovaginal tissue. During natural menopause 50 percent of women experience vulvovaginal atrophy (thinning, drying and/or inflammation of the tissues), often causing painful sexual intercourse. Surgical-, chemotherapy-, or radiation-induced menopause may result in a systemic illness, with symptoms including sudden onset vulvovaginal atrophy, reduced pain threshold, joint pain/stiffness, loss of fascia and muscle mass, and depression. In both situations, treatment is directed towards the symptoms. For example, topical estrogen and approved vaginal lubricants are often prescribed for vulvovaginal discomfort and/or pain with intercourse.

Specific Diagnostic Testing

To evaluate for diabetes or IGT, the following medical tests are required: hemoglobin blood level, glucose tolerance, and a metabolic and lipid panel. Many tests are necessary to rule out autoimmune diseases and other causes of small fiber neuropathy, including tests of thyroid function, ESR (sed rate), C-reactive protein, ANA (antinuclear antibodies), rheumatoid factor, Sjogren's auto-antibodies, Hepatitis C, vitamin levels, and a musculoskeletal examination for conditions such as Ehlers-Danlos hypermobility.

The Dream Team

In addition to examinations and testing by a gynecologist and physical therapist, a multidisciplinary approach is most desirable in the diagnosis and treatment of systemic conditions that may underlie GV. The necessary disciplines would include endocrinology, rheumatology, dermatology, neurology, physiatry, infectious disease, gastroenterology, and nutrition. This approach would ensure accurate diagnosis; appropriate, individualized, and comprehensive treatment; and improved outcomes for women with GV and co-existent systemic disorders. ■

Participants Needed for UCLA Study Examining Brain Changes in Women with Vulvodynia

Women between the ages of 18 and 55 who have been diagnosed with Vulvodynia or Provoked Vestibulodynia (formerly vulvar vestibulitis syndrome), or are experiencing chronic pain at the vaginal opening with/without intercourse may be eligible to participate in this study. The purpose of this study is to help researchers understand the physiology and genetic makeup of this chronic pain condition in order to develop more effective treatments. Participation involves two visits over approximately 2-4 weeks and includes a pelvic exam, muscle sensitivity testing, and MRI scans. Women must be right-handed and cannot be pregnant. Participants can earn up to \$130 and will receive a picture of their brain. This study is conducted by Dr. Andrea Rapkin in the UCLA Department of Obstetrics and Gynecology and Dr. Jennifer Labus at the UCLA Center for Neurobiology of Stress (www.uclacns.org).

For more information, please contact Kelsy Crim, Clinical Research Coordinator, by email (kcrim@mednet.ucla.edu) or phone (310-825-5255). ■