



# NURSE PRACTITIONERS

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## The NP Is In Evaluating Wrist Complaints

Darlene Hess, CNP, PhD

### Case Question

*M.J. works with computers and performs data entry for 4 to 6 hours daily. She presented with acute discomfort in the hand and wrist. How should I evaluate her for Carpal Tunnel Syndrome?*

### Answer

The term Carpal Tunnel Syndrome (CTS) is derived from the eight bones in the wrist (carpals) that form a tunnel-like structure. The tunnel is filled with tendons that control finger movement, and it is the pathway for the median nerve to reach the hand. Compression on the median nerve in the wrist results in sensory and motor dysfunctions in the hand.

Nerve compression can result from wrist fractures, tumors, rheumatoid arthritis, and diabetes mellitus. Differential diagnoses include C6 radiculopathy from cervical disease, thoracic outlet syndrome, pronator syndrome, DeQuervain's tenosynovitis, and cubital and ulnar (Guyon) tunnel syndromes. CTS is caused by repetitive flexing and extension of the wrist, which causes the tendons to swell, increases pressure in the bony tunnel, and can trap or pinch the median nerve. Typical symptoms are numbness, pain, and tingling in the thumb and index, third, and half of the fourth fingers.

### Assessing Risk Factors

Operators who use the computer more than 4 hours per day are at highest risk. Playing a musical instrument, writing, bicycling, skiing, sewing, etc. all involve placing hands and wrists in awkward positions for extended periods of time.

Pain along the median nerve distribution is classic. Computer operators can also have atypical pain, which is explained by assessing how the work is performed.

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## Diagnosis and Treatment of Chronic Vulvovaginitis

Mimi Secor RN, MS, MEd, FNP

*Editor's Note: This is no. 3 of 6 articles publishing in 1997 for which CE credit hours may be earned. To participate, see the CE Exam/ Answer sheet enclosed.*

**V**ulvovaginitis (VV) is a common gynecological problem affecting millions of women each year.<sup>1</sup> Inaccurate self-diagnosis contributes to widespread, often inappropriate, use of over-the-counter (OTC) intravaginal medications and delays accurate diagnosis and treatment. Some infections are asymptomatic, further clouding the clinical picture.

Recent research has linked common types of VV to serious medical, gynecological, and obstetrical complications, highlighting the importance of detection and treatment of these infections. Five to eighty percent of women with acute VV will suffer from persistent or recurrent infections.<sup>2</sup> Vulvodynia and vaginismus are serious risks associated with chronic VV. Nurse Practitioners must develop expertise in the prevention, detection, and treatment of women with acute and chronic vulvovaginitis.

### The Vaginal Ecosystem

The warm, moist environment of the vulva and vagina, coupled with its close proximity to the rectum, make it a favorable reservoir for colonization. Normal vaginal flora form a complex ecosystem containing 5 to 15 species of aerobic, facultative, and anaerobic organisms. (See Table 1.) The vagina has numerous intrinsic mechanisms that control the overgrowth of pathogens and maintain a healthy acid balance. Lactobacilli, epithelial cells, and vaginal mucus all interact to maintain this delicate balance.

Lactobacilli, known as "good bacteria," protect the vagina in the following ways<sup>3</sup>:

- Maintain a low vaginal pH (3.8-4.2) controlling overgrowth of potential pathogens like HIV, bacterial vaginosis (BV), trichomonas and Candida
- Prevent adherence of pathogens onto epithelial cells
- Produce lactic acid, hydrogen peroxide,

- and other bacteriocins that inhibit over growth of potential pathogens
- Preserve and protect the mucus barrier of the vagina

Lactic acid, produced by the vaginal epithelial cells, is an important contributor to normal vaginal balance. Vaginal mucus also contains defensive substances that confer additional protection. These include; lysozymes, which destroy bacterial cell walls, immunoglobulins, which block pathogen attachment to mucosa, and phagocytic cells, which actively destroy pathogens. Hormonal levels also influence vaginal pH, rising with menses (6.0-7.0) and dropping at ovulation (4.0) and in pregnancy (3.8-4.4).

Many extrinsic factors influence the vaginal flora and pH.<sup>3</sup> Douching removes vaginal mucus and other natural protective substances.

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**Table 1. Normal Vaginal Flora in Premenopausal Non-pregnant Women**

Organism	Average Prevalence (%)
<b>Aerobic/facultative</b>	
Lactobacillus	68
<i>Staphylococcus epidermis</i>	66*
<i>Ureaplasma urealyticum</i>	65
Streptococcus	37*
<i>Mycoplasma hominis</i>	35*
<i>Gardnerella vaginalis</i>	25*
Enterococcus	25*
<i>Escherichia coli</i>	21*
Group B Streptococcus	15*
<i>Staphylococcus aureus</i>	11
<b>Anaerobic</b>	
Bacteroides	52*
Peptostreptococcus	26*
Fusobacterium	18*
Clostridium	11*
Veillonella	15*
<i>Mobil uncus</i>	5*
<b>Fungi</b>	
<i>Candida albicans</i>	11

\* BV-associated bacteria

Semen (pH 9.0) alters the normal acid vaginal pH and may also contain pathogens. Intrauterine devices raise the vaginal pH and increase the risk of ascending infections. Oral contraceptives may contribute to cervical ectopy, increasing both the quantity of cervical mucous and the risk of acquiring STDs. Spermicides further disrupt the vaginal mucosal barrier and alter vaginal flora.

Vaginal infections contribute to changes in vaginal flora and pH. Trichomoniasis, (pH  $\geq$  7.0) is associated with a loss of lactobacilli and replaced by a predominance of diphtheroids, streptococci, staphylococci, and anaerobes. Bacterial Vaginosis (BV), (pH = 4.5-5.5) is associated with a loss of hydrogen peroxide producing lactobacilli and a massive overgrowth of pathogens.

### Organisms Causing Vulvovaginal Infections

Common vulvovaginal infections in order of prevalence are: BV (10-64%), vulvo vaginal candidiasis (VVC) (5-50%), and trichomoniasis (5-35%). Risk factors for BV include lifetime number of partners, number of partners in

**Table 2. Risk Factors for VVC**

<b>Pregnancy</b>	<b>Hematologic Malignancy</b>
<b>Nutritional</b>	•Lymphoma
•High dietary sugar	•Leukemia
•Obesity	•Hodgkin's disease
<b>Hygiene</b>	<b>Immunologic</b>
•Uncircumcised partner	•HIV
•Poor hygiene	•Broad spectrum antibiotic use
<b>Endocrinopathy</b>	<b>Autoimmune</b>
•Diabetes	•Lupus
•Hypothyroidism	•Rheumatoid arthritis
•Cushing's disease	•Temporal arteritis

the past month, past history of BV, presence of other STDs, and current use of an intrauterine device. (See Table 2 for risk factors for VVC.) Risk factors for trichomoniasis include sexual activity with high risk partners, multiple sexual partners, not using condoms, and the presence of other STDs.

In high risk populations, herpes simplex virus (HSV), human papilloma virus (HPV), and mixed infections may occur as frequently as BV and VVC, so a high index of suspicion is indicated. Cervicitis associated with *Chlamydia trachomatis*, HSV, or *Neisseria gonorrhoea* also causes vulvovaginitis, and prevalence rates vary; younger women with multiple sexual partners are at highest risk.

Cytolytic vaginosis (CV) and lactobacillosis and atrophic VV may mimic VVC; prevalence rates are not known. Vulvar dermatologic conditions, such as allergic and irritant vulvitis, lichen sclerosis, lichen simplex chronicus, squamous cell hyperplasia, lichen planus, vulvodynia, vulvar cancer, and a variety of systemic diseases should be considered in your differential diagnosis. (See Table 3.)

### Diagnostic Work-up for Chronic Vulvovaginitis

The workup of a patient with newly diagnosed chronic vulvovaginitis (VV) includes a comprehensive history, physical examination, and select diagnostic testing. Include a description of the present illness, review of systems, past medical history, family history, psychosocial and lifestyle history. (See Table 4 for history guidelines.) Establish rapport and create an open, warm, relaxed environment. Listen actively and avoid interrupting. A nonjudgmental approach will reduce the patient's anxiety and embarrassment, particularly when discussing her gynecological and sexual history.

### Physical Examination

A thorough general physical is important because findings on the eye, oral cavity, thyroid, back, hip, and skin exam may indicate systemic causes of chronic VV. Inspect the external genital slowly and systematically. Assess the vestibule and identify the Skene glands (lateral to the urethral meatus). Inspect the introitus, which contains the Bartholin gland

Continued on next page

ducts at 5 and 7 o'clock. Note redness, tenderness, lesions, tissue thickening and papulations. Use a cotton tipped swab to move labial and hymeneal tissues, assess for tenderness, and point out anatomical landmarks to the patient. Adequate illumination using a lighted speculum is needed to adequately assess the vaginal walls and cervix for redness, lesions, tenderness, or discharge. Vaginal discharge is observed for quantity, quality and odor. Findings such as vulvar lesions, cervicitis, and vaginal discharge are often nonspecific, making additional diagnostic testing necessary.

## Diagnostic Testing

Diagnostic testing should be individualized, based on the history, examination, and individual risks. Testing may include:

- Vaginal pH
- Whiff test
- Wet mount
- Vaginal yeast culture
- Pap smear
- STD and HIV testing
- Hepatitis screen
- Colposcopy
- Vulvar biopsy
- CBC
- Chemistry 21 profile
- Thyroid stimulating hormone
- Sedimentation rate
- Tuberculosis skin testing

Meticulously rule out the common causes of chronic VV first. Consider other infectious etiologies and systemic diseases such as anemia, hypothyroidism, Crohn's disease and less common causes of chronic VV. (See Table 3.) When possible establish a specific diagnosis before prescribing treatment.

Define the infection as recalcitrant/persistent (not resolved after therapy), or recurrent/relapsing (cured for a period of time but recurrent). Relapsing infections rapidly recur, after a negative test of cure, usually within 6 to 12 weeks of therapy. This critical distinction can be made only if tests of cure are

conducted consistently after therapy. Chronic VV is defined as three to four episodes in 1 year.

## Common Diagnostic Errors

Inaccurate self diagnosis, failure to assess lactobacilli, and failure to detect and treat asymptomatic vulvovaginal infections are the most common diagnostic errors encountered in patients with vulvovaginal complaints. Women are unfamiliar with BV and other potential causes of VV and are not able to self diagnose accurately.<sup>4</sup> Presuming that "everything that itches is yeast," use of OTC antifungal preparations for symptom relief is common. This delays accurate diagnosis and contributes to the emergence of less common, more resistant strains of vulvovaginal candidiasis.<sup>4,5</sup> Clinicians may diagnose VVC falsely even when the wet mount KOH reading is negative for yeast. In this circumstance, yeast cultures are useful.<sup>3</sup>

Failure to detect asymptomatic vaginal infections is an escalating concern. Recent research links BV to serious gynecological, obstetrical, general medical risks, including upper reproductive and postoperative infections, adverse pregnancy outcomes, preterm labor, cervical dysplasia, mucosal barrier disruption, and increased transmission of HIV, HPV, and HSV.<sup>4,7</sup> Routine screening for vaginal infections is recommended by a growing number of experts.<sup>4</sup>

## General Management Guidelines

Reestablish the diagnosis with each episode of symptoms. Even with similar symptoms, each episode of chronic VV may result from different etiologies. Minimal research is available to guide treatment decisions in chronic VV. Empiric recommendations are derived from the treatment of acute VV. These include: (1) doubling the duration of therapy; (2) giving an alternate first

line medication; (3) selecting an alternate route of administration of the same or a different medication; or (4) increasing the dose of medication.

A test of cure is performed 1 to 3 weeks after completed therapy. This visit includes an interval history and physical exam, vaginal pH, whiff test, wet mount and/or yeast culture, and other diagnostic tests as indicated. Coital friction may slow tissue healing, and semen may inhibit lactobacilli. Patients should abstain from intercourse or use condoms until a negative test of cure is obtained. Follow-up visits every 3 to 6 weeks are essential until the condition improves. Causes of rapid recurring symptoms include noncompliance, persistent infection, reinfection, wrong diagnosis, and serious illness. Teaching VV self-examination and care is an essential prevention technique. (See Table 5.)

Women with chronic VV often feel isolated and unable to discuss their problem with family or friends. Embarrassment, low self-image, anxiety, frustration, and anger are common problems and should be acknowledged. Be aware of the risk of depression and escalation of underlying emotional conditions and refer to a mental health professional if indicated.

## BV Specific Management Guidelines

BV is associated with a dramatic 100 to 1000-fold increase in facultative and anaerobic bacteria and a loss of hydrogen peroxide producing lactobacilli. BV is diagnosed by identifying three out of four of Amsel's Criteria which include<sup>5</sup>:

1. Coaty, homogenous white vaginal discharge
2. Vaginal pH > 4.5
3. Positive whiff or amine test

*Continued on next page*



## Vaginal Microscopy Skills

*Mimi Secor RN, MS, MED, FNP*

Meticulous vaginal microscopy techniques are the cornerstone of establishing an accurate diagnosis in patients with vulvovaginal complaints.

- Teach the 2 to 3 day rule. Teach patients to avoid douching, tampons, intravaginal medications, use of sex toys and sexual intercourse for 2 to 3 days before scheduled examinations, and pap smears. These activities may alter normal vaginal flora and contribute to vulvovaginal mucosal irritation.
- Obtain wet mounts during routine and problem pelvic exams. Testing provides a baseline and longitudinal perspective on vaginal flora and health and is an effective method of early detection and ongoing surveillance.
- Obtain yeast cultures when the wet mount/KOH is negative. Even when performed accurately, 1 out of 4 wet mount KOH readings are false neg-

atives. Ordering a yeast culture is inexpensive and diagnostic.<sup>3,3,5,6</sup>

- Perform vaginal pH, whiff testing, and wet mounts consistently and in tandem.
- Refine your vaginal microscopy skills. To obtain 80% accuracy the wet mount must be performed meticulously. Use fresh saline as old hypertonic solutions immobilize trichomonads hindering identification. Use clear KOH (potassium hydroxide) solution. Cloudy solutions, containing crystal artifact, hinder smear interpretation.

## Vaginal Microscopy Procedure

1. Use double slide holder and two frosted tip glass slides
2. Place 2 to 3 drops of saline on front slide
3. Place 2 to 3 drops of 10-20% KOH on back slide
4. Take sample from lateral vaginal wall using a wooden or plastic spatula
5. Test pH using 1-inch strip of phenolphthalein (Nitrazine™) by Squibb
6. Stir sample into saline 3 to 4 times until light opaque color (dilute)
7. Stir sample into KOH 10 to 12 times until creamy white (concentrated)
8. Immediately check the whiff test from the spatula

9. Apply coverslips gently just before viewing the smear
  10. Identify and quantitate number of lactobacilli for 2-3 minutes
- Avoid the use of general vaginal cultures. Non-specific vaginal cultures reflect colonization and not infection and may result in treatment of normal flora. A dominant organism does not identify the cause of a vaginal infection.<sup>5</sup> Exceptions include cultures for Group B streptococcus in pregnancy and Staphylococcus aureus in patients with symptoms of Toxic Shock Syndrome.
  - Perform a test of cure consistently. Symptom relief does not indicate resolution of the infection. Objective test of cure information is imperative to differentiate between recalcitrant versus recurrent infections.
  - Perform vulvar biopsy for all chronic vulvar skin findings. Clinical diagnosis of vulvar conditions is highly inaccurate making definitive testing imperative.
  - Maintain a schedule of regular pap smears. Cervical dysplasia may be the cause of abnormal vulvovaginal complaints. Do not delay routine pap smears because of chronic VV. ☺

**Table 3. Differential Diagnosis for Atypical Causes of Chronic Vulvovaginitis**

Condition	Definition	Symptoms	Diagnosis	Treatment
<i>Candida glabrata</i>	Monomorphic, produces spores only. Non- <i>C. albicans</i>	Chronic, cyclic, mild to moderate burning, pruritus	<ul style="list-style-type: none"> <li>•Wet mount KOH buds only. Variable size but smaller than RBC's and difficult to visualize.</li> <li>•Positive yeast culture.</li> </ul>	Often azole resistant. Terconazole vaginal 1 application p.v. at h.s. 2-3 weeks minimum. Boric acid suppositories 600 mg p.v. b.i.d for 2 weeks
<b>Cytolytic Vaginosis (CV)</b>	Lactobacilli overgrowth	Chronic, cyclic, premenstrual pattern. Relieved with menses.	<ul style="list-style-type: none"> <li>•False clue cells</li> <li>•Wet mount KOH negative for yeast</li> </ul>	Self correcting. Avoid tampons. Baking soda sitz baths for comfort.
<b>Lactobacillosis</b>	Unclear etiology. Possible anerobic L.B.	Chronic, cyclic <b>Exam:</b> variable	<ul style="list-style-type: none"> <li>•Wet mount marker very long LB with few short LB, yeast negative</li> </ul>	Augmentin 500 mg orally t.i.d. for 7 days. Doxycycline 100 mg p.o. b.i.d for 10 days
<b>Atrophic Vulvovaginitis</b> 1. Menopause 2. Post-partum 3. DMPA 4. Amenorrhea	Low estrogen and/or high progesterone levels	Vulvar irritation, pruritus, dyspareunia <b>Exam:</b> red tender vestibule, red rugae, scant discharge.	<ul style="list-style-type: none"> <li>•Wet mount immature epithelial cells, WBCs, mixed bacteria, few LB</li> </ul>	Etiology specific treatment 1. Hormone replacement therapy. 2. Discontinue breast feeding. Estrogen vaginal cream. 3. Discontinue DMPA. Use combination oral contraceptive. 4. Combination oral contraceptives.
<b>Vulvitis</b>	External allergen or irritant. Internal irritant with VV	Pruritus, burning <b>Exam:</b> Excoriated, erythema, thickening of labia minor/majora	<ul style="list-style-type: none"> <li>•Wet mount may reflect internal irritant</li> </ul>	Identify and discontinue irritant exposure. Doxepin topical cream 5% q.i.d. for severe itching.
<b>Vulvar Dermatologic Condition</b>	Many types, i.e., lichen sclerosis, squamous cell hyperplasia, lichen planus, VIN	Pruritus, burning, dyspareunia. <b>Exam:</b> Variable, vulvar thickening, erythema, tenderness, fissures	<ul style="list-style-type: none"> <li>•Variable. Diagnosis by vulvar biopsy</li> </ul>	Etiology specific treatment based on biopsy.
<b>Pudendal Neuralgia</b>	Debilitating subset of vulvodinia	Long-term constant "saddle" pain even at rest	<ul style="list-style-type: none"> <li>•Sensation alterations in "saddle" region</li> </ul>	Comprehensive plan including antidepressants. Manage with specialist.
<b>Vulvar Vestibulitis Syndrome (VVS)</b>	Vulvodinia with inflammation of the vestibule	Long-term introital pain and dyspareunia. <b>Exam:</b> Focal erythema, point tenderness at 5 and 7 o'clock of introitus.	<ul style="list-style-type: none"> <li>•Classic history and exam.</li> <li><b>Warning:</b> Avoid vulvar biopsies if possible as may exacerbate symptoms</li> </ul>	Same as Pudendal Neuralgia. Vulvar care, biofeedback. Avoid vulvar surgery including vulvar biopsies.
<b>Vulvovaginal HSV</b>	HSV I or II Virus	Chronic premenstrual/ menstrual unilateral pruritus. <b>Exam:</b> Focal erythema tenderness +/- lesions	<ul style="list-style-type: none"> <li>•Wet mount possible giant cells, WBCs</li> <li>+ Tzanck prep of lesion</li> </ul>	Acyclovir 400-800 mg p.o., b.i.d., or t.i.d. Valacyclovir 500 mg p.o. b.i.d. Cycle for 5-10 days then daily for 3-12 months.

4. Clue cells on vaginal wet mount (See Table 6 for BV treatment options.) Local therapy has the advantage of reduced dose and fewer systemic side effects. Metronidazole, the first line agent, spares lactobacilli. Schedule follow-up exams 1 to 2 weeks after completion of therapy. When metronidazole fails, clin-

damycin may eradicate the BV-associated anaerobes. Delay follow-up exams 2 to 3 weeks after clindamycin therapy to allow for regrowth of lactobacilli. The use of oral or intravaginal lactobacilli supplements for the treatment or prevention of BV infections is not supported by research. Current commercial exogenous

sources of lactobacilli lack the potency of strains produced endogenously.<sup>1,3,5</sup>

Despite adequate BV treatment, 80% of women will experience a recurrence within 9 months. Chronic BV is caused by partner reinfection, persistence of BV, failure to reestablish normal flora, or other identified host factors.<sup>7</sup> Recalcitrant or re-

*Continued on page 6*

**Table 4. Key Historical Questions and Considerations**

<b>History and Chronology</b> Onset of symptoms Duration of current episode Date, diagnosis, treatment and response of previous infection Self diagnosis and treatment Monthly or seasonal variation Impact on lifestyle Evolution of chronicity Sentinel events History of IV drug use Blood transfusion	Alternative or home remedies Stress reduction measures Vitamins, supplements, and diet
<b>Symptoms</b> Description (Use patient's own words) Location (Use patient guided drawing) Radiation Severity (Use a rating scale of 0-3+) Full review of systems	<b>Sexual History</b> Age of first sexual experience Lifelong number of partners, gender, ages STD exposure Current sexual partner, duration of relationship, other partners Partner history of STD, GU symptoms, circumcision Sexual practices (i.e. anal intercourse, oral sex, order of activities, hygiene) Condom use Sexual devices or toys Lubricants (specify brand) Date of last coitus or genital contact Dyspareunia (superficial, deep, before during or after penetration)
<b>Aggravating Factors</b> Allergies Activities Positions Dietary Self treatments Prescription and OTC medications Clothing Sexual activities	<b>Obstetric and Gynecologic Factors</b> Last menstrual period Duration of menses Tampons versus pads Dysmenorrhea or dysfunctional bleeding Pregnancy, birth, episiotomy, lacerations Pain in pregnancy Infertility Pelvic or genital surgeries Pap smear history Vulvar care
<b>Relieving Factors</b> Vulvar care measures Prescription & OTC medications	

**Table 5. Vulvar Self-Care Guidelines**

<b>Daily Care and Prevention</b> Wash genital area with warm water only. Soap is irritating and can lead to soreness and skin damage. Gently apply unscented mineral oil 1-2 times per day. This will replenish essential oils and protect from irritation. After urinating or bowel movements wipe gently from front to back. If possible rinse with water and pat dry gently. Wear all cotton white underwear. Machine wash underwear in very hot, soapy water, rinse thoroughly. Avoid tight pants and waist high panty hose. Wear skirts without underwear to allow ventilation and air drying. Avoid steroid creams, unless prescribed. Persistent use can cause tissue damage. Avoid douching and tampons. Both remove normal protective secretions from your vagina. Tampons can damage the vaginal walls. Perform vulvar self exam every month and report any changes like skin spots, thickened itchy areas, or sores.	sexual toys, and intercourse for 2-3 days before your office visit. For temporary symptom relief try warm or cool water sitz baths or applying mineral oil to the area. Avoid itching. Benadryl 25 to 50 mg, purchased over the counter may be taken every 4 hours to decrease itching. Avoid OTC vaginal medicines which may be irritating and interfere with the diagnosis of vaginal problems.
<b>When You Suspect an Infection</b> See your provider for vaginal infections. It is very difficult to diagnose your own infection and similar symptoms may be caused by different infections. Remembers the 2-3 day rule. Avoid douching, tampons, vaginal medications, use of	<b>Treatment</b> Avoid intercourse during treatment. After treatment use condoms until your follow-up visit. Intercourse and semen can delay healing. Get extra rest, eat a healthy balanced diet, drink lots of water and reduce stress. Keep a symptom diary every day and bring to office visits. Rate symptom severity. 0 = symptom free, 3+ = most severe. Record aggravating and relieving factors. <b>If You Have Chronic Problems:</b> Avoid oral sex, hot tubs, swimming pools, all OTC medicines and commercial lubricants, overcleansing, soap and shampoo contact. Double rinse your laundry. Try cotton menstrual pads. Glad Rags (503) 282-0436 2136 NE 10th Avenue Portland OR 97212 Keep appointments with your provider.

**The NP is In**  
*Continued from page 1*

Assess hand position while using the mouse. Is the hand placed in ulnar deviation causing pain along the lateral side of the wrist and forearm?

Awakening at night with pain is a classic symptom of CTS. Pain that goes away when not at work may be related to both stress and ergonomics.

Assess the client's awareness of ergonomic issues and evaluate his/her ability to make changes. If possible, evaluate the work station for ergonomic issues.

Discuss work and non-work related stressors. Changing ergonomics without addressing work perception may not reduce work-related motion disorders.

**Exam and Diagnostic Testing**

Assess 2-point discrimination, Tinel's sign, Phalen's sign, palmar pinch grip, and hand grip strength. Note the temperature, color, and capillary refill of the hands and fingers. Palpate for any swelling or crepitus. Additional exam of the forearm, elbow, upper arm, shoulder, upper trunk, and neck may be indicated, depending on history and physical findings.

Electrodiagnostic testing (EMG) has high diagnostic accuracy and is the "gold standard" often used to diagnose CTS. False positives and negatives can occur. CT and MRI have no role in diagnosis at this time.

**Treatment**

Splinting may be used continuously for short duration or at night only. Prescribe rest, avoidance of precipitating activities (via work restrictions), work station accommodations and ergonomic changes, stress management, physical therapy and strengthening exercise, and non-steroidal anti-inflammatory drugs. Cortisone injections and surgery are additional treatment alternatives. @

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current chronic BV should be managed by combining general chronic VV treatment guidelines with BV-specific therapy regimens. (See Table 6.) Treatment must continue until BV is resolved and normal flora is restored.

Although research has not demonstrated the effectiveness of partner treatment, it remains a common practice. Uncircumcised male partners may harbor BV under their foreskins, increasing the risk for reinfection. Alkaline semen may contribute to chronic infections so condom use is important. Female partners should be clinically evaluated and treated although their role in transmitting BV is unclear.

### Candidiasis Treatment Guidelines

Chronic VVC is defined as four or more culture positive yeast infections in 1 year. Antifungal cure rates, based on yeast cultures obtained 7 days after treatment, are deceptively high (90% or greater) when compared with cultures done 30 days after treatment (60% or less).<sup>5</sup> Relapse rates are related to the agent and duration of therapy. Thirty percent of women will fail treatment with a single dose of antifungal therapy.<sup>1,5</sup>

Ten to twenty-five percent of yeast infections are caused by non-*C. Albicans* species, which are less susceptible to imidazole and triazole medications. Non-*C. albicans* may be resistant to the entire class of "azole" medications. Failure to respond to OTC antifungal agents and rapidly recurring symptoms after prescription therapy may indicate resistant candidas non-*C. albicans*, mixed infections, cytolytic vaginosis, or other causes of chronic VV.

Treat resistant candida and non-*C. Albicans* acute infections with boric acid suppositories (600 mg boric acid powder in a 0-sized gelatin

capsule) inserted intravaginally b.i.d. for 10 to 14 days. This regime is inexpensive, well tolerated, and effective.<sup>1</sup> Nystatin vaginal suppositories (formulated in a glycerin base) intravaginally twice daily for 10 to 14 days is another treatment option.

Chronic prophylaxis consists of an oral or intravaginal antifungal given over 6 to 12 months after ruling out medical problems such as diabetes and HIV.<sup>1</sup> Biweekly treatment is more effective than a 7-day regimen given once a month.<sup>1</sup> High failure rates mandate an aggressive combination of general management guidelines in concert with the following yeast specific recommendations:

- Document yeast by wet mount or yeast culture
- Establish the Candida species by yeast culture
- Consider yeast sensitivities
- Resistance to 1 "azole" suggests resistance to all "azole" agents
- Administer 2-week course of local terconazole or oral fluconazole therapy, followed by long-term suppressive treatment
- Reduce sucrose- and lactose-containing foods
- Culture and treat reservoirs and partners<sup>3</sup>
- Consider underlying disease

### Trichomoniasis Treatment Guidelines

Trichomoniasis typically responds to the standard CDC treatment guidelines of metronidazole 2 g orally in a single dose for both the patient and the sexual partner. Alternately, 375 to 500 mg orally b.i.d. for 7 days results in cure rates of 92 to 96%. Reinfection from an untreated partner is the most common cause of recurrent infection.

For persistent or recurrent infections, repeating standard treatments will yield cure rates of 85 to 95%. Removing vaginal dis-

charge manually using a proctoswab may increase efficacy. Continued failure may respond to metronidazole 500 mg orally q.i.d. or 1 g b.i.d. daily for 7 days. A culture to rule out resistance, and consultation with a specialist are indicated for continued treatment failures.

### Cytolytic Vaginosis Treatment Guidelines

Cytolytic vaginosis (CV) is caused by an overgrowth of normal lactobacilli. VVC coinfection must be ruled out by wet mount or yeast culture. CV often resolves without specific treatment. Prescribe symptomatic treatment with baking soda baths (2 tablespoons of baking soda in 2 inches of warm bath water). Baking soda douches are controversial. Avoiding tampons allows menstrual flow to raise the vaginal pH, which will naturally inhibit the overgrowth of lactobacilli. Etiology-specific treatments for less common causes of chronic VV are summarized in Table 3.

Chronic vulvovaginitis is a common problem that impacts a patient's biopsychosocial health negatively. To prevent and minimize complications, patients with Chronic VV require prompt, empathetic, accurate diagnosis and appropriate treatment based on a specific diagnosis. Nurse Practitioners can positively impact care by enhancing their own understanding of chronic VV and preventative care measures.

### Selected References

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**Table 6. Treatment of Recurrent BV**

Antibiotic	Dose	Duration
Metronidazole Vaginal Gel .75%	One applicator p.v. at h.s.	10-15 days
Metronidazole Oral	500 mg p.o. b.i.d.	14 days
Clindamycin Vaginal Cream 2%	One applicator p.v. at h.s.	14 days
Clindamycin Oral	300 mg p.o. b.i.d./t.i.d.	14 days
Amoxicillin/ Clavulamate Oral	500 mg. p.o. t.i.d.	14 days
For the most recalcitrant cases give:		
Same or alternate agents	p.o. and vaginally in tandem	10-14 days
<b>Prophylactic Regimes</b>		
Metronidazole Oral	2 grams p.o. stat	× 1 day per month
Metronidazole Oral	500 mg stat	post coital 3× weekly*
Metronidazole Vaginal Gel	One applicator p.v. at h.s.	post coital 3× weekly*
Boric Acid Suppositories	600 mg p.v. at h.s.	post coital 3× weekly*

\* Maximum frequency; adapted from Soper 1995.