

A Handbook for Self-Care and Treatment

Pelvic Pain & Low Back Pain

Janet A. Hulme, PT

**A Quantum
Leap in**

- Diagnosis
- Treatment
- Self-Care
- Function

Pelvic Pain and Low Back Pain, A Handbook for Self-Care and Treatment

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ISBN Number: 1-928812-02-3

Design and Layout by Michael Cutter - www.rainbowcreative.net

Illustrations by Ed Jenne

Published in the U.S.A. by

Phoenix Publishing Co.

P.O. Box 183

Helena, Montana 59624

Acknowledgements

Thank you to the many professionals and patients who have contributed ideas and techniques during my clinical years leading to the development of the comprehensive self- management concepts described in this book. I wish to thank Linda West RN, Gail Nevin PT, Catherine Goodman PT, Anna Furshong PT, Barbara Penner PT and Gayle Cochran PharmD, who have consistently provided information and stimulation for my ideas. My patients through the years have taught me which ideas are valuable and which ideas never to mention again. Last, but not least , I thank my family for their advice about real people, their bravery and fortitude while living with pain and disability.

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INTRODUCTION

CHRONIC PELVIC PAIN with low back pain is a significant diagnosis in men and women from adolescence through adulthood. Approximately 15-20% of women report chronic pelvic pain lasting more than one year and it is estimated that 8% of men have experienced chronic pelvic pain. The symptoms may be constant or recurrent but in either instance the pain alters social, personal and working relationships as well as requiring limitless medical attention for a condition that often seems unsolvable.

Chronic pelvic pain syndrome is a multi-symptom condition. Pain can be located or referred to areas other than the pelvic region. Sensory changes and movement pattern alterations are common with chronic pelvic pain. Multiple associated symptoms are present in conjunction with the condition.

The etiology of chronic pelvic pain is largely unknown. There are often multiple factors preventing the body from returning to a balanced state of health. Imbalance in circulatory, hormonal, immune and reproductive systems can be major factors. What happens inside the body can be as important as what is experienced on the outside. Muscle spasms, joint pain and movement dysfunction in relation to pain sensations are external observations but not necessarily indicative of the cause.

Chronic pelvic pain with low back pain needs to be considered a diagnosis in itself rather than a group of sub-diagnoses with similar symptoms. This allows for assessment and treatment protocols that focus on self-care and management rather than protocols focusing on a cure for a specific condition.

This book is developed with the acknowledgement that self-care and management are the underlying foundations for effective chronic pelvic and low back pain intervention. The first section of the book delineates conditions, definitions, symptoms and hidden triggers of chronic pelvic pain with low back pain. The second section describes anatomy, physiology and neurology involved in chronic pelvic and low back pain. The third section describes effective assessment techniques that include history with special questions and physical assessment with

special tests and considerations. Finally, section four describes basic and advanced self-care management as well as medical intervention strategies for effective treatment of chronic pelvic with low back pain.

The first and second sections develop background information and rationale for the assessment and treatment sections that follow. The third section is designed for the medical professional to use in determining priority areas during treatment. It includes sequential outlines and forms for a comprehensive assessment that directs self-care management. The fourth section provides a step-by-step approach to basic self-care using self-monitoring tests and progressive self-stabilizing loops of care. Once the basic self-care stabilizing loop becomes part of daily life, the advanced techniques can be beneficial in taking the individual to the next level of independence from pain, fatigue and isolation.

This book is written for both the health care professional and the individual with chronic pelvic and low back pain. Sections one, two and four can be of interest to both individuals. Section three is primarily oriented to the health care professional. The words may be technical but the self-care concepts are practical and realistic for individuals with chronic pelvic and low back pain.

Over 25 years, Janet A. Hulme's In-Balance protocol has assisted hundreds of patients improve their lives. Each individual customizes the program to fit her unique characteristics and needs. The commonality is the concept that improvement comes with management tools based on physiological principles and long term commitment to a healthy lifestyle.

Section One

What is Chronic Pelvic and Low Back Pain?

CHAPTER 1

Description, Criteria and Symptoms

Description

Chronic pelvic pain syndrome (CPPS) is defined by the International Association for the Study of Pain as persistent pain of nonmalignant nature in the lower abdominal and pelvic area. There is no proven infection or other obvious local pathology that can account for the pain and its intensity. It is pain in the pelvis, abdomen, low back and/or thighs that has been continuous or recurrent for six months or longer in duration. There are associated behavioral, cognitive, social, sexual and emotional aspects that alter physical activity, work, family and social life in a negative way. Categories of chronic pelvic pain syndrome are described in Chapter Two.

Initially acute pelvic pain is usually identified by the organ system where symptoms first appear. If a pathological process exists such as an infection or inflammation, this is diagnosed and treated. If treatment is ineffective in relation to the pain additional tests are performed, for example cystoscopy or ultrasound. If pathology is found, additional medical treatment continues. However in a percentage of individuals treatment has no effect on the pain or no pathology is found. This condition is labeled Chronic Pelvic Pain Syndrome and is treated most effectively with a behavioral, life style and exercise approach.

The model of altered structure and pathology leading to chronic pain is not appropriate for the Chronic Pelvic and Low Back Pain Syn-

drome group of conditions that have physiological imbalances as the explanation for dysfunction.¹ The persistent pain is related to central nervous system sensitization, autonomic nervous system imbalance, hormonal and neuroendocrine irregularities that lead to muscle pain, fatigue, sleep disturbance, mental confusion and irritability as well as bladder and bowel dysfunction.² Trigger points and tender points in pelvic muscles, hypersensitivity in the vaginal and anal areas can be secondary to the central imbalances. This book provides the guidance to investigate what imbalances are present and to utilize methods that easily return central mechanisms to homeostasis or balance.

Criteria

The criteria for Chronic Pain are:

- Duration - lasting 6 months or longer
- Etiology - lacks apparent physical cause to explain pain severity
- Tests - not indicative of cause
- Functional Level - decreased physical function and interaction with the environment

Pain Intensity, Location and Characteristics

Individuals describe a variety of pain levels and types. Pain varies between 5 and 10 on a 0 to 10 scale. Pain levels 5 and above negatively affect physical activity, work efficiency, family and social interactions. Chronic pelvic pain can be located in pelvic, abdominal, genital, rectal, sacral, coccyx and low back areas. Pain can be referred to the legs and feet.

Types of Pain

Chronic pelvic pain can be better understood by defining three types of pain: somatic, visceral and neuropathic pain.

Somatic pain is the most familiar to individuals. It is pain coming from the muscle and subcutaneous tissue and transmitted to the brain in the cerebral cortex where it is perceived as very localized and sharp or stinging pain. The response of the body part is to withdraw from the pain stimulus. If the pain is in the abdomen, the abdominal muscles tighten. If the pain is in the pelvis the pelvic muscles tighten. For the most part this pain is perceived objectively not emotionally.

Visceral pain comes from internal organs including bladder, bowel, uterus and parietal peritoneum. It is due to stretching, distension, or inflammation of tissues with nerve innervation within the abdominal cavity. Visceral pain is transmitted through the spinal cord to the central portion of the brain called the limbic system. It is perceived by the individual as emotional- dreadful, excruciating, or just plain terrible. Visceral pain leads to withdrawal and avoidance behaviors. Individuals experience decreased social interaction and work activity levels as well as depression, as directed by the limbic system.

Neuropathic pain comes from specific nerve fibers that are affected in some way. It can be due to compression, stretching, tearing, cutting, or interruption of blood supply to the nerve. It is often associated with loss of sensation in the area experiencing pain. Neuropathic pain is described as having a burning or electrical quality. Neuropathic pain can be stimulated by light touch or vibration. It travels to cortical and limbic brain centers resulting in emotional symptoms as well as physical withdrawal.

Associated Problems

Chronic pelvic pain syndrome (CPPS) is used to include the complex of problems surrounding chronic pelvic pain. These include back pain, bowel and bladder dysfunction, sexual and gynecological problems.³ Bowel dysfunction can include constipation, irritable bowel syndrome and fecal incontinence. Bladder dysfunction includes voiding dysfunctions such as a small stream flow, urgency, frequency, or difficulty starting or stopping urine as well as uncontrolled loss of urine (incontinence). Sexual problems include pain with intercourse (dyspareunia), lack of orgasm and erectile dysfunction in men. The pain is often exacerbated by sitting and eating. It may be relieved by reclining or having a bowel movement.

Low Back Pain and Chronic Pelvic Pain

Low back pain (LBP) is commonly seen in association with CPPS. Low back pain can be caused by stenosis, disc degeneration, joint dysfunction, muscle spasm, nerve compression or ischemia. It can also be a referred pain from visceral pathology or dysfunction. Bladder, bowel, uterine or ovarian dysfunction can lead to LPB. Even though LBP is

an associated symptom in many subcategories of CPPS, lumbosacral pathology is rarely the cause of CPPS except during pregnancy according to Howard.⁴

Lumbo-pelvic dysfunction is often the result of instability in the region. Alteration in function of the passive, active or control segments of the lumbo-pelvic region can result in pain, movement disorders, and postural changes. Pelvic muscle weakness, spasm or descent can lead to LBP in women. The dynamic stabilization of the lumbo-sacral region by integrated muscle action enables effective movement and weight transmittal through the neutral zone of stabilized joint structures. The pelvis becomes the fulcrum from which lever arms of the lower extremities and spine move. This book describes the interaction of the pelvic rotator cuff (PRC) with other active segments during movement in the lumbo-pelvic region. In most major functional activities, whether it is standing, walking, bending, or reaching, the lumbo-pelvic dynamic stability is dependent on the pelvic rotator cuff. In dysfunction, the lumbo-pelvic region in conjunction with the pelvic rotator cuff contributes to CPPS and limitation of daily activities.

CHAPTER 2

Diagnostic Categories

CHRONIC PELVIC AND low back pain syndrome does not have a definite cause identified by a specific test. There are physical and psychological factors that contribute to and perpetuate the perception of pain.

Physical factors can include:

Endometriosis, pelvic adhesions, pelvic inflammatory disease, pelvic varicosities, pelvic congestion, organ malposition, nerve entrapment or damage, musculoskeletal dysfunction, myofascial dysfunction (myofascial pain syndrome), cystitis, or fibromyalgia.

Psychological factors can include:

Psychosomatic disorders, depression, sexual abuse, sexual dysfunction, personality disorder, neurosis or post-traumatic stress disorder.

How Is It Diagnosed?

Chronic pelvic and low back pain is diagnosed through a history, a pain diagram, and negative medical test results. Tests for tumors, cancer, inflammation, infection, and neurological deficits are inconclusive or negative.

What Are The Syndromes?

Chronic pelvic pain syndrome is a diagnosis itself but historically has been divided into classic pathology categories. These include diagnoses like prostatitis, endometriosis, interstitial cystitis, vaginismus, levator ani syndrome and proctalgia fugax. In the current nomenclature terms that imply infection or inflammation are avoided and terms that imply a single muscle or organ as the problem are for the most part eliminated.¹ Instead, CPPS is divided into general organ system syndromes where the primary symptoms exist as subcategories. These new categories include: pelvic muscle myalgia syndrome, pelvic muscle relaxation syndrome, urological (bladder) syndrome and bowel syndrome.

Pelvic Muscle Myalgia Syndrome

Pelvic muscle myalgia syndrome includes pain throughout the pelvic floor and associated muscles. It is described as tightness, spasm and pain in relation to urination or sexual function. The pain of CPPS relates to chronically tense muscle and fascia throughout the pelvic floor and extending into the smooth muscle of reproductive and urogenital organs.²

Classic pathology categories under Pelvic Muscle Myalgia Syndrome include:

- Levator Ani Syndrome
- Piriformis Syndrome
- Coccygodynia
- Vaginismus
- Dyspareunia
- Vulvodynia
- Vulvar Vestibulitis Syndrome
- Chronic Prostatitis
- Chronic Orchalgia (Testicular Pain)
- Pudendal Neuralgia

Pelvic Muscle Myalgia Syndrome is sometimes termed pelvic myoneuropathy. In general it includes increased resting tone of levator ani/pelvic diaphragm, urogenital diaphragm, external sphincters, coccygeus, medial fibers of gluteus, piriformis, adductor and/or obturator internus muscles. Pain extends from the abdomen and low back through the pelvic region and into the thighs. Not all individuals will have the same pain pattern or associated symptoms.

Causes can include genitourinary inflammation, rectal dysfunctions or diseases such as fissures and hemorrhoids, post-surgical sequelae from laminectomy or hysterectomy, pelvic fracture, or trauma to sacrum or coccyx.

Levator Ani Syndrome is described by individuals as pain and pressure in the rectal, vaginal or scrotal areas. There is often unilateral pain on the left side more than the right. Defecation can promote pain and throbbing in the affected areas. There is increased resting tone of the levator ani (pelvic diaphragm) muscle group. The resting tone does not relax or release appropriately when the individual attempts to have a bowel movement or urinate. The result can be difficulty initiat-

ing urination and defecation. Straining to push urine out and to have a bowel movement is common. Weak urine stream and constipation are frequent complaints.

Causes include previous pelvic surgery, strenuous physical activity, injury during childbirth, lumbar disc surgery, pelvic infection or inflammation, or sexual assault injury.

Piriformis Syndrome is described by individuals as pain in the buttocks extending into the rectal area. Pain is often referred into the posterior aspect of the thigh and sometimes into the calf musculature.

Coccygodynia is described by individuals as pain around the tailbone region (coccyx). Pain is often referred into the posterior buttocks and thigh. It is often difficult to sit for any length of time.

Causes can include a coccyx injury from a fall or during childbirth or surgery, arthritic changes in joint structures, spasm of coccygeus muscle or piriformis muscle, or neuralgia or neuritis of the coccygeal nerve plexus.

Vaginismus is described by females as pain and spasm around the vaginal opening when there is an attempt to penetrate the vagina. There is increased tone of the superficial muscles (urogenital diaphragm muscles) and the deeper muscles (levator ani/pelvic diaphragm muscles). There is recurrent or persistent involuntary spasm of the musculature around the outer one third of the vagina that interferes with coitus and sexual function.

Causes can include physical and psychological factors. Vaginismus can be a protective response to atrophic vaginitis (hypoestrogenation). The vaginal walls thin and lose lubrication due to the decreased estrogen levels of perimenopause and menopause. Any penetration causes abrasions and irritation when there is inadequate estrogen available to the tissues. This occurs most often in women after 45-50 years of age. Vaginismus can also be a protective response to a hole in the wall of the vagina, called a fistula. Psychological factors include a response to past sexual abuse, physical abuse or other trauma.

Dyspareunia is described by individuals as pain localized to the vagina and lower pelvis before, during, or immediately after intercourse. Symptoms are caused by initial penetration or deep penetration. The pain can be intermittent or persistent. Dyspareunia can prevent intercourse and use of tampons.

Causes of dyspareunia include physical and psychological factors. Physical causes include nerve or muscle damage from surgery, physical or sexual trauma. Psychological causes include past sexual, physical or emotional abuse or other trauma.

Vulvodynia and Vulvar Vestibulitis Syndrome are described by individuals as burning, stinging irritation, and/or rawness in the vaginal and labia area. The discomfort is often unremitting and consuming in generalized vulvodynia. Vulvar vestibulitis is more localized to the vulva around the vaginal opening and experienced only with contact. There is severe pain with touch or attempted vaginal entry.³ Skin around the opening of the vagina often appears normal or only slightly red. Symptoms can prevent the individual from wearing tight clothing, using a tampon, participating in intercourse and sometimes sitting due to the hypersensitivity. The symptoms rarely awaken the individual at night. There is no definite cause for vulvodynia.

Chronic Prostatitis/Prostatodynia is described by men as pelvic muscle pain, pain with erection and ejaculation and dysfunctional urination.⁴ Discomfort often extends into the lower abdomen, low back and thighs. Sitting increases the discomfort while reclining improves the symptoms.

Chronic Benign Prostatitis is a pelvic muscle and prostate smooth muscle myalgia syndrome usually with a circulatory component. There is no infection. Acute prostatitis is often the initial diagnosis. Acute prostatitis is an infectious condition and must be treated with medications.

Chronic Orchialgia is described by men as testicular pain that can be constant or intermittent, unilateral or bilateral.⁵ Discomfort often extends to the pelvic muscles, abdomen, low back and legs. Movement or pressure on the testes can increase the pain.

Men 20-30 years of age are the most common patients. Twenty-five percent have no known precipitating factors. Secondary factors include referred pain from the ureter or hip, infection, tumors, testicular torsion, trauma or previous surgery.⁶

Pudendal Neuralgia is described by individuals as nearly constant burning pain in the saddle region (through the perineum and a line connecting the ischial tuberosities (sits bones), extending into the upper thighs. Light touch can provoke intense symptoms which include

itching, numbness, and a sensation of dryness in the clitoris, urethral opening, vulva and labia in women, the perineum and rectal region in men. There are no skin changes. Pain is aggravated by sitting. It does not awaken the individual at night.⁷

The cause of pudendal neuralgia is irritation of the internal pudendal nerve which provides sensation to the perineal area, upper thighs, and rectal area. The causative factors include pressure, ischemia or damage to the nerve during surgery or vaginal delivery, trauma, or extreme edema.

Pelvic Muscle Relaxation Syndrome

Pelvic Muscle Relaxation Syndrome includes symptoms of pelvic and low back pain related to descent of internal organs and pelvic muscles.⁸ As the pelvic muscles descend they pull on their sacral/coccyx attachment altering the sacroiliac and lumbosacral joints (figure 2-1). Pelvic muscle relaxation syndrome is primarily a female condition due to the stresses of pregnancy and delivery, hormonal changes with menopause and aging, and repetitive activities that increase intra-abdominal pressure like aerobics, coughing and lifting. Approximately 80% of women will experience pelvic muscle descent by 75 years of age.⁹ Internal organs of bladder, uterus, large and small intestine descend into the pelvic cavity through the vagina. When one organ descends all other organs follow. Internal organ and pelvic muscle descent affects pelvic joint alignment, nerve transmission and circulation to pelvic, hip, knee and ankle regions.

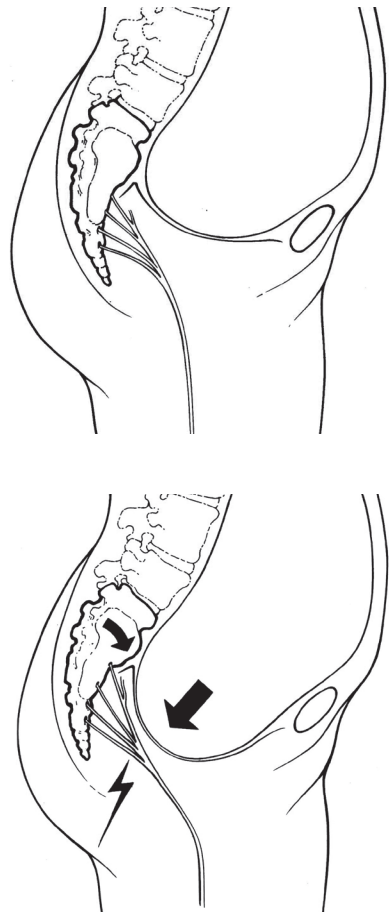


Figure 2-1:
Pelvic Muscle Relaxation

Classic pathology categories under Pelvic Muscle Relaxation Syndrome include:

- Cystocele (figure 2-2)
- Urethrocele
- Enterocele
- Rectocele
- Vaginal Prolapse
- Uterine Prolapse

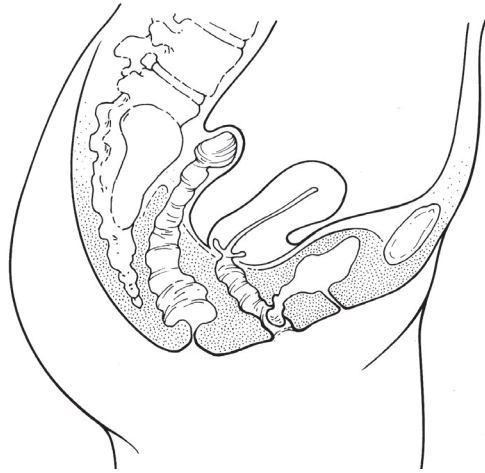


Figure 2-2: Cystocele

Pelvic Muscle Relaxation Syndrome symptoms are described by individuals as central supra-pubic pain, low back pain and fatigue. A heavy, dragging feeling in the groin and

pelvis is accompanied by an inability to stand or walk for an extended period of time. Hip, leg and foot pain are also common complaints. Pelvic muscle relaxation syndrome can mimic hip bursitis, degenerative hip joint symptom, patellar pain syndrome and plantar fasciitis. Bladder and bowel dysfunction is prevalent with this diagnosis. Symptoms are relieved by reclining on a wedge with the hips higher than the shoulders.

Cystocele is the descent of the bladder into the vaginal canal. In addition to the general pelvic muscle relaxation syndrome symptoms, individuals with cystocele can experience leaking, urinary frequency and urgency. Persistent urinary tract infections are common.

Urethrocele is the descent of the urethra down the vaginal canal.

Enterocele is the descent of the small intestines between the rectum and vagina.¹⁰ Symptoms experienced with an enterocele include a dragging sensation and pelvic heaviness when standing and walking.

Rectocele is the descent of the rectum down the vaginal canal. An individual with a rectocele describes difficulty emptying the bowel. As the individual bears down to push the stool out it is pushed into the rectocele. The harder the individual pushes the larger the rectocele becomes. Constipation is a common symptom of rectocele.

Vaginal prolapse is the collapse of the vagina toward or through the vaginal opening after a hysterectomy.

Uterine prolapse is the descent of the uterus toward or through the vaginal opening.

Retroversion of the uterus is the posterior displacement of the uterus and rarely results in pain. The pain described is primarily due to dyspareunia.

Urological Syndrome

Urological Syndrome symptoms include pain primarily in the lower abdomen associated with the bladder and urethra, frequent urination, discomfort with urination and at times a burning sensation at the urethral outlet.

Classic pathology categories under Urological Syndrome include:

- Urethral Syndrome
- Trigonitis
- Bladder-Sphincter Dyssnergia
- Interstitial Cystitis

Urological Syndromes involve pain and dysfunction of smooth muscles of the bladder and urethra in conjunction with hypertonus of the pelvic muscles. The most troublesome symptoms besides pain include urgency, frequency, nocturia (night-time frequency), bladder pressure, voiding difficulty, dysuria (abnormal urine flow), constipation, and fatigue.

Urethral Syndrome is described by individuals as pain, a burning sensation and hypersensitivity around the urethra. This is accompanied by urinary frequency, urgency and hesitancy. The primary complaints are a constant awareness of the urethra and urinary frequency. Toileting is slow and hesitant. Nocturia (night-time leaking) is mild to absent. There may be narrowing of the urethral tube by muscles or fascia. Sexual activity can cause bladder irritation as can hypoestrogenation. Pelvic fractures, complications post bladder suspension surgery and hypoestrogenation after menopause are factors in urethral syndrome.

Trigonitis is described by individuals as discomfort and urgency sensation with pressure on the lower bladder. This often occurs during intercourse if there is urine retention and with atrophic changes from hypoestrogenation. The trigone is the distal third of the bladder, is funnel shaped, richly innervated with sympathetic nerves and receives the ureters through flap valves.

Bladder-Sphincter Dyssnergia is described by individuals as a strong urge to toilet yet when on the toilet the urine flow is not present or is difficult to initiate. The bladder contracts simultaneously with the outlet contracting. This co-contraction can be the result of central neurological conditions such as multiple sclerosis or Parkinson's syndrome, an overly full bladder, or stress.

Interstitial Cystitis (IC) is described by individuals as suprapubic (lower abdominal) pressure and pain accompanied by urgency and frequency. Individuals with interstitial cystitis often toilet every 30 minutes during the day and three or more times at night. They describe being limited in daily activities due to frequent toileting and sleep deprivation.¹¹

There is no known etiology or pathogenesis. Some individuals have changes in the bladder mucosa but it is not present in all cases and some individuals without symptoms have the same mucosal changes. Prevalence is 300 per 100,000 in women and 10-20% of that in men. The median age of onset is 40 but 25% of individuals with IC experience symptoms before 30 years of age.

Bowel Syndrome

Bowel syndrome include categories with pain primarily in the lower bowel, colon, rectum and anus. The pain frequently extends into the coccyx and sacrum. It can affect the sacroiliac joints and sciatic nerve.

Classic pathology categories under Bowel Syndromes include:

- Irritable Bowel Syndrome (IBS)
- Constipation
- Anorectal Pain Syndrome
- Proctalgia Fugax

Irritable Bowel Syndrome (IBS) is a disorder with complaints of abdominal pain and cramping, changes in bowel patterns, and increased gas/flatulence and bloating. Often there is associated low back pain, fatigue and sleep disturbance. IBS exhibits alternating diarrhea and constipation or a predominance of one or the other.

There is no detectable pathology, rather it is classified as a functional gastrointestinal disorder. Sometimes it occurs after an infection of the intestines. This is called post-infectious IBS. There may also be other

triggers such as stress. IBS is diagnosed in 9-23% of the population, affecting women four times more than men.¹²

IBS is not the same as inflammatory bowel disease (IBD), which includes Crohn's disease and ulcerative colitis. In IBS, the structure of the bowel is not abnormal while in Crohn's disease and ulcerative colitis there is degenerative processes in the intestinal lining.¹³

Constipation is a condition defined by the Rome criteria as hard, pellet-like stools, bowel movements less than three times per week, straining to eliminate bowel movements and perception of incomplete emptying. Associated symptoms include abdominal discomfort or pain, low back pain and pelvic pain. Hemorrhoids are associated with constipation.

Pelvic pain and low back pain are frequent symptoms due to pressure on pelvic muscles and other soft tissue structures. The descending colon's ligamentous attachment to the sacrum/coccyx leads to realignment of the sacroiliac and lumbosacral joints when the constipated colon descends into the pelvic cavity. Straining to eliminate feces further descends the pelvic muscle structures that are attached to the sacrum. Nerves and blood vessels are also implicated in this chronic condition.⁸

Anorectal Pain Syndrome is a condition with persistent or recurrent rectal pain and anal sphincter spasm. The pain can be severe because of the many nerve endings in the perianal region. There is usually related bowel dysfunction, the most common being constipation and eventually impaction. It can be related to hemorrhoids (bulging veins at the anus) or rectal prolapse. In many cases anorectal pain is secondary to deterioration of supporting pelvic muscles and soft tissue structures.¹⁴

Proctalgia fugax is described by individuals as sharp fleeting rectal pain lasting from 20-30 seconds to several hours. There are usually long periods of time without pain symptoms. In severe cases with more constant pain, relief may come for a short while after a bowel movement. There is spasm of the levator ani, specifically the puborectalis muscle and external anal sphincter. Proctalgia fugax affects men more than women. There is no known disease process causing proctalgia fugax.¹²

CHAPTER 3

Hidden Triggers for Pelvic Pain and Low Back Pain

HIDDEN TRIGGERS for pelvic pain and low back pain can be major factors in perpetuating the symptoms. After a physical examination, a Pap test to rule out cervical cancer, laboratory blood work, and a cross-sectional imaging study to rule out a pelvic tumor the diagnosis of chronic pain syndrome leads to identifying what hidden triggers are perpetuating the discomfort and lifestyle change. Eliminating or effectively managing the hidden triggers can improve energy, sleep and cognitive processes while significantly reducing pain.

Potential hidden triggers include dysfunction in visceral organs, nerve transmission, circulatory function, pelvic muscle tone and joint function and metabolic function. Visceral organ dysfunction leading to pelvic and low back pain includes organ prolapse, general organ descent, hernias, fibroid tumor growth and post hysterectomy complications. Nerve transmission dysfunction leading to pelvic and low back pain includes neurally mediated hypotension, nerve entrapment, neuralgia, neuropathy and fibromyalgia. Circulatory dysfunction leading to pelvic and low back pain includes pelvic congestion, pelvic varicosities and neurally mediated hypotension. Pelvic muscle tone and pelvic joint dysfunction leading to pelvic and low back pain include muscle trigger points and tender points as well as sacroiliac, symphysis pubis, sacrococcygeal and lumbosacral joint dysfunction. Metabolic dysfunction leading to pelvic and low back pain includes hypoglycemic tendency, reactive hypoglycemic tendency, hypothyroid tendency and reproductive hormone imbalance.

Visceral Organ Dysfunction

Visceral organ dysfunction can be from the bladder, uterus, bowel, rectum or related connective tissues such as fascia, ligament, blood vessels, nerve or parietal peritoneum. The pain is described as deep

and nonspecific within the pelvis extending into the abdomen and low back. Pain can also be referred to the deep shoulder region.

Pelvic Organ Prolapse (POP) Pelvic Organ Descent

Organ prolapse and general organ descent can be a major trigger for pelvic pain and low back pain in pregnant and postpartum women and women after 50 years of age.¹ During pregnancy the weight of the growing baby and enlarging uterus leads to descent of the uterus, bladder and bowel into the deep pelvis. The pelvic muscles thin and decrease in resting tone in preparation for delivery allowing the organs more room and less support. Since the pelvic organs and muscles attach to the sacrum, as they descend, alignment of the sacrum, sacroiliac and lumbosacral joints is altered. This leads to pelvic and low back pain as well as potential hip, leg and foot pain. During delivery the pressure to push the baby out also pushes the visceral organs into descended positions.²

Women after 50 years of age experience pelvic organ prolapse and pelvic muscle descent at an increasing rate due to hormonal changes and aging effects on organ, muscle and connective tissue. Hypoestrogenation, the decrease in estrogen related to menopause and aging, thins the pelvic muscle tissue and decreases elasticity and moisture in muscle and connective tissue. Pelvic tissues thin, become dry and fragile and descend lower in the pelvis. Fifty-five percent of women between 50 and 59 years old had some degree of prolapse in a Swedish study.³ Most women by the time they are 70 have significant organ prolapse.

The symptoms of prolapse include a heavy, dragging feeling deep in the pelvis, a feeling that the organs are falling out, low back and pelvic pain and foot pain sometimes misdiagnosed as plantar fasciitis. Women complain of the inability to stand and walk for any length of time due to fatigue and the heavy, “falling out” feeling in the pelvis. Shortness of breath during exertion is another symptom coming from the organ descent pull on the breathing diaphragm through fascial connections.

Hernias

A hernia is a protrusion of tissue through a body cavity in which it is normally contained. It is most often through an opening or weakness in the muscular wall of the abdomen. In men there is usually an obvious bulge on the outside. In women, hernias are usually small and internal without an outward bulge. Sometimes in standing an abdominal exam

reveals a small bulge. Risk factors for hernias in men include sports that include quick turns with the foot planted such as soccer and football and high hip flexion during rapid physical exertion as in sprinting, hurdles and martial arts. Risk factors for hernias in women include being overweight, multiple pregnancies and long delivery stage of labor.

The symptoms can be debilitating pain from nerve or tissue irritation. In severe cases a piece of intestine is entrapped and gangrene occurs due to lack of blood supply. Most common is pain from entrapment of fat and compression of nerves. Pain is usually felt deep in the groin or lower abdomen that gradually worsens over time. It may spread into the perineum, rectus abdominus and in men into the testicles.⁴ The individual may describe burning, pinching pain that shoots into the groin, leg and back. It is worse with exercise and prolonged standing, stair climbing, coughing and laughing. Relief often comes when the individual reclines.

Diagnosing the specific hernia is essential and sometimes difficult if they are hidden and small. The small, deep hernias sometimes cause the most pain. An M.R.I. can reveal small holes in layers of muscle where fat or nerves can protrude. Since the holes may be very small sometimes it may require a trial of different positions to see the tissue protruding into the hole. Inguinal hernias can often be diagnosed through a vaginal exam with the symptoms reproduced by pressure on the internal inguinal area.⁵

Fibroid Tumors (leiomyomas)

Fibroid tumors are benign tumors present within the uterus.⁶ They occur in up to 80% of women between puberty and menopause increasing in number and size with age through menopause. Fibroids can grow to the size of a large grapefruit and there can be more than one in the uterus. Fibroids are estrogen dependent growing larger when estrogen levels rise such as during pregnancy and with the use of hormone replacement therapy or birth control pills. They recede after menopause when estrogen is significantly decreased. Fibroids grow within the uterine wall or into the uterine cavity. Occasionally they develop on the outside surface of the uterus. Many women don't experience significant symptoms and may not know they have fibroids.

Symptoms can interfere with daily function when large fibroids alter menstrual bleeding causing heavy and clotting bleeding and

irregular bleeding cycles. There can be pelvic pressure and pain when the fibroids press on nerves or other innervated tissues. Their weight can lead to uterine descent with resulting bladder and bowel dysfunction such as urinary urgency and frequency and constipation. The uterine descent puts stress on the sacroiliac and lumbosacral joints leading to low back pain along with pelvic pain. Painful intercourse can also be the result of fibroid tumors causing descent of the uterus and shortening of the vagina.⁷

Post-Hysterectomy Complications

Chronic pelvic and low back pain can occur after a hysterectomy secondary to circulatory, neurological or soft tissue dysfunction. The uterus is attached to a major blood supply and nerve bundle. Along with the ligaments severed from the uterus, the blood vessels and nerve bundles no longer have distal attachments. Hysterectomy alters blood and lymph flow to the remaining soft tissues including the vagina and ovaries within the lower pelvis. Ischemia and edema are two primary causes of post-hysterectomy pain in the lower abdominal, pelvic and low back regions.⁸

Surgical disruption of nerve tissue during hysterectomy causes somatic and ANS nerve damage. When sacral nerve trunks S1-S4 are damaged, nerves innervating the pelvic muscles as well as muscles in the leg and foot are affected. Sensory hypersensitivity, pelvic pain and low back pain can be experienced as sharp, burning pain as well as a deep aching pain.

Soft tissue dysfunction occurs when ligamentous, fascial and muscle damage alters support of the vagina, bladder and bowel at the distal surgical site. Postoperative adhesions are present after hysterectomy but they do not always cause pain. The pain from adhesions can be from the pull of the adhesions on the parietal peritoneum or from the adhesions themselves if they have developed their own vascular supply. Pain from a residual ovary can be due to cyst formation in the ovary. This pain is most often cyclical following hormonal changes of the menstrual cycle.

Nerve Transmission Dysfunction

Nerve transmission dysfunction leading to pelvic and low back pain includes neurally mediated hypotension, nerve entrapment, neuralgia, neuropathy and fibromyalgia. Pain is described as sharp,

shooting, burning discomfort when a peripheral nerve is irritated. The pain is located in the area innervated by the specific nerve. Pain is described as aching and pervasive in fibromyalgia and neurally mediated hypotension.

Neurally Mediated Hypotension (NMH)

Neurally mediated hypotension occurs when there is an abnormal reflex interaction between the heart and the brain, both of which usually are structurally normal.⁹ Neurally mediated hypotension often has genetic origins. It is not uncommon to find several individuals with neurally mediated hypotension in the same family. Most people could develop NMH provided that the conditions were sufficiently severe. For example, if someone did not take in enough fluids or salt, was subjected to extremely prolonged periods of upright posture, or to very warm environments, the symptoms could appear. The reflex response which results in lowered blood pressure simply occurs at an earlier point in some individuals. In individuals with neurally mediated hypotension, there is a miscommunication between the heart and the brain. Just when the heart needs to beat faster, (to pump blood to the brain and prevent fainting), the brain sends out the message that the heart rate should be slowed down, and that the blood vessels in the arms and legs should dilate. These actions take even more blood away from the central part of the circulation where it is needed. Chronic fatigue, muscle aches (or fibromyalgia), headaches, and mental confusion can be prominent symptoms of NMH. Blood pooling in the lower pelvic vessels can cause severe pelvic pain and low back pain at the same time the individual feels weak in the knees and mentally confused. The mental confusion takes the form of difficulty concentrating, staying on task, paying attention, or finding the right words. Some describe being in a mental fog. Pain often mimics the extreme pain from gall stones or cancer.

The diagnosis can be made using a prolonged standing test or more commonly using a tilt table test. One of the most common, and treatable problems identified in those with neurally mediated hypotension is a low salt (sodium) intake in the diet. Salt helps us retain fluid in the blood vessels, and helps maintain a healthy blood pressure. Salt has received bad press in the last couple of decades because a high salt diet in some individuals with high or high-normal blood pressure can contribute to further elevations in blood pressure, and thereby to heart

disease and stroke. This has led to general health recommendations to cut down on salt. As we are finding, this general recommendation isn't right for all people.

An average adult blood pressure is 120/70, and blood pressure is considered elevated if it is above 140/90. Individuals can have neurally mediated hypotension at a wide range of resting blood pressures. It may be slightly more common in those whose systolic blood pressure [the top number] is in the 90-110 range, but we also see it in those whose resting blood pressure is high. For individuals with neurally mediated hypotension, a low salt intake may be unhealthy, and may move them from feeling good to developing the symptoms of fatigue and lightheadedness described earlier. In experimental work earlier this century, severe short term salt depletion led to fatigue and mental dulling in the adult research subjects. Neurally mediated hypotension is most often treated with a combination of increased salt and water intake in conjunction with drugs that regulate blood pressure. Some drugs work by allowing the kidneys to retain sodium and others block the body's response to adrenaline, which can kick-start the blood pressure abnormality. In addition, it is important to review current medications with the doctor to ensure that medications do not include drugs or vitamins that have the potential to make neurally mediated hypotension worse.

Fibromyalgia

Fibromyalgia is a disorder described as widespread pain often accompanied by fatigue, sleep disturbance, memory and mood alteration. The low back, abdominal and pelvic areas are frequent sites of the pain and for some individuals those are the predominant locations. The fibromyalgia brain amplifies and spreads pain sensations instead of modulating and limiting those sensations over time. Symptoms often begin after some type of physical trauma, surgery, an infection or a significant psychological stress. Sometimes fibromyalgia pain and fatigue symptoms build up gradually over time without any obvious trigger event.¹⁰

Fibromyalgia is a chronic condition diagnosed through history and elimination of other pathologies through negative blood tests, x-rays etc. It is a condition much like chronic pelvic and low back pain in that there is no obvious reason for the extreme discomfort and limited social and physical interactions. There often is a link between the two in that

the brain is perpetuating the pain and fatigue in an amplifying feedback loop. The self-care program is similar for both diagnoses and can bring significant relief from pain and improved energy for daily activities.

Nerve Entrapment, Neuropathy, Neuralgia

Nerve entrapment, neuropathy or neuralgia occurs due to compression, stretching, direct trauma or entrapment. The nerve may be compressed or stretched as it passes through a canal of soft tissue, through tight fascial bands or through tight muscle bundles or a notch of bone. The compression or stretch can be from positioning or retraction of tissue during surgery or while performing a sport. The result is nerve ischemia (lack of oxygen to the nerve) as its vascular supply is decreased or obliterated. Demyelination can also occur with pressure or stretch of a more severe nature. Stretch injury occurs most often during labor and delivery or during abdominal or pelvic surgery such as caesarean section, transvaginal taping for stress incontinence, or hernia repairs. A rupture of nerve fibers can result from an extreme positional stretch during surgery or overzealous training of the abdominal muscles. After nerve damage there can be regeneration of nerve endings- called sprouting. These sprouts become extremely sensitive to any stimuli.

Symptoms from nerve entrapment, neuropathy or neuralgia are similar. They include constant burning pain, tingling or hypersensitivity and sensory loss.

Nerves around the pelvis that are vulnerable to compression and stretching include the ilioinguinal, iliohypogastric, lateral femoral cutaneous, genitofemoral, obturator and pudendal. These nerves originate from L1- S4. Spinal nerves L2-S4 can also refer pain to the groin if stretched. Pain from irritation of the ilioinguinal, iliohypogastric and genitofemoral nerves is felt in the groin and lower abdomen. The pain can radiate into the genitals. Entrapment of the lateral femoral cutaneous nerve as it passes through the inguinal ligament is described as burning and tingling in the lower abdomen, anterior thigh and groin.

Obturator nerve compression or stretching leads to chronic groin and medial thigh pain felt as a deep ache, pain and numbness. It is exacerbated by physical activity. It can occur from compression of the obturator nerve by the fetal head during a difficult delivery.¹¹ Femoral neuropathy is felt as pain and numbness in the anterior thigh. Sciatic

neuropathy is described as pain down the posterior thigh. Both femoral and sciatic neuropathy can lead to symptoms in the pelvis and back.

Pudendal neuralgia is described as severe, throbbing or stabbing pain in the pelvic region, anus and through perineum. Pressure from the bicycle seat during competitive and long distance cycling can lead to pudendal compression symptoms. Sports requiring repetitive squatting and rising activities can also lead to these compression symptoms.¹²

Circulatory Dysfunction

Circulatory dysfunction leading to pelvic and low back pain includes pelvic congestion, pelvic varicosities and neurally mediated hypotension.

Pelvic Congestion Syndrome

Pelvic congestion syndrome is a medical condition in women caused by varicose veins in the lower abdomen. These weak walled uterine and ovarian veins accumulate pooling blood which results in stasis, blood pressure changes and chronic pain.¹³

The condition causes pelvic and low back pain, often described as a constant dull aching pelvic pain present much of the time and aggravated by standing. It is usually absent or minimal first thing in the morning, but increases in intensity when the patient has been up and around for a period of time. It tends to get worse as the day goes on, worse in the evening, and significantly exacerbated by prolonged standing. Sometimes sitting in an upright position can also make it worse. Individuals tend to have some deep pain with intercourse, and usually have pain after intercourse that can last for hours or a day or two.

Individuals with pelvic congestion syndrome describe worsening symptoms the week before their period as the estrogen/progesterone levels drop. They tend to have intermittent episodes of severe sharp stabbing pain. The evaluation is generally completely negative. Migraine headaches occur in the majority of women with pelvic congestion syndrome.

The primary method to diagnose women with pelvic congestion syndrome is to perform a transcervical pelvic venogram. This is an X-Ray test where dye is injected into the muscle of the uterus. The dye is then taken up by the veins which can then be seen on X-Ray. Very few physicians in the country currently perform this test. A more functional way to diagnose pelvic congestions syndrome is by elevating the hips higher than

the shoulders and trunk using a wedge. Within 3-5 minutes the aching pain and fatigue are eliminated or greatly improved since this position drains the incompetent veins. Conservative treatment includes wedge inversion several times a day and pool exercises in shoulder-deep water.

Varicose Veins

Varicose veins in the pelvic region can lead to chronic pelvic and low back pain. In the pelvis, varicose veins can affect the uterus, ovaries and vulva as well as the anus where they are referred to as hemorrhoids. The valves in the veins that help return blood to the heart against gravity become weakened and don't close properly. This allows blood to flow backwards and pool in the vein causing pressure and bulging veins. Up to 15 percent of women, generally between the ages of 20 and 50, have varicose veins in the pelvis, although not all experience symptoms.

Neurally Mediated Hypotension

This condition is both a nervous system dysfunction and a circulatory system dysfunction. The blood pools in the lower extremities due to excessively low blood pressure mediated by the nervous system. Venous return slows, venous valves become sluggish and vein walls weaken and fill with fluid. Symptoms include pelvic and low back pain as well as fatigue and weakness.

Pelvic Muscle Tone and Joint Dysfunction

Pelvic Muscle Tone Dysfunction

Muscle tone dysfunction leading to pelvic and low back pain includes trigger points and tender points in abdominal, back, pelvic and thigh muscles. Trigger points refer pain into the pelvic and low back regions. Pressure on tender points produces pain over the specific area of pressure. Muscle spasm can occur in the same muscles and lead to chronic pain in the back and pelvis.¹⁴ Muscles and symptoms include:

Internal and External Obliques- heartburn, projectile vomiting, diarrhea and belching, lower quadrant abdominal and groin pain.

Rectus abdominus- bilateral horizontal midback and upper buttock pain, lower right quadrant pain, dysmenorrhea, abdominal fullness, nausea and vomiting.

Pectineus- deep groin pain especially with weight bearing and abduction.

Adductors- deep groin pain, internal pelvic pain and pain into the anterior medial thigh.

Quadratus Lumborum- low back pain from the 12th rib to the iliac crest and sacroiliac joint into the buttock; lower abdominal and groin pain.

Iliopsoas- ipsilateral back pain from the 12th rib to the sacroiliac joint; lower abdomen, groin and anterior superior thigh pain.

Obturator Internus- internal pelvic pain in the vagina and rectum, pain around the coccyx, anal sphincter and extending down the ipsilateral posterior thigh.

Levator Ani- pain around the coccyx and anal sphincter.

Anal and Vaginal Sphincters- poorly localized pain in the anal region, painful bowel movements, entry dyspareunia and vaginismus.

Gluteus Maximus- pain in the buttocks, lower sacrum and coccyx into the ischial tuberosity area.

Piriformis- pain in the sacrum and coccyx area extending to the lateral buttock and posterior thigh.

Pelvic Joint Dysfunction

Pelvic joint dysfunction occurs in the sacroiliac, symphysis pubis, sacrococcygeal and lumbosacral joints. Pain can be localized to the joint area or referred and more generalized to areas in the abdomen, low back and pelvis. At times pain extends into the anterior, medial or posterior thigh.

Metabolic Dysfunction

Metabolic dysfunction leading to pelvic and low back pain includes hypoglycemic tendency, reactive hypoglycemic tendency, hypothyroid tendency and reproductive hormone imbalance.^{15,16} Healthy thyroid function depends on keeping blood sugar in a normal range, and keeping blood sugar in a normal range depends on healthy thyroid function. Healthy reproductive hormone balance depends on healthy thyroid function and vice versa. When the systems are imbalanced the symptoms of fatigue, pain, sleep disturbance, bladder and bowel problems, and ANS dysfunction can be severe and life altering.

Hypoglycemia and Reactive Hypoglycemia Tendency

Hypoglycemia, is a medical term describing recurrent episodes of symptomatic low blood sugar occurring within 4 hours after a high carbohydrate meal in people who do not have diabetes. It is thought to represent a consequence of excessive insulin release triggered by the carbohydrate meal but continuing past the digestion and disposal of the glucose derived from the meal. When there is little to no available sugar/ carbohydrates for brain and body energy use the individual experiences symptoms including pain, numbness and coldness in the extremities, heart palpitation, extreme fatigue, dizziness, light-headedness, sweating, headaches, depression, nervousness and irritability, confusion, insomnia, night sweats, nausea and vomiting. Initially the individual will crave sweets but as the hypoglycemia becomes more severe food must almost be force fed.

The standard definition of hypoglycemia is a blood sugar level below 50 mg/dl. In recent years there have been several studies that suggest individuals have different set points when hypoglycemic symptoms appear. When there is a drop below the individual's specific set point the brain and body exhibit "I'm in trouble" signs. The set point in the research studies varied from 50 to 80 mg/dl. Pelvic pain and low back pain, muscle stiffness, cramping and weakness can occur at any point within that range depending on the individual's set point.

The two subtypes of hypoglycemia are General Hypoglycemia and Reactive Hypoglycemia. They are differentiated by 1) the time frame between eating and the onset of low blood sugar, and 2) the types of food that sets off the symptoms. In General Hypoglycemia the onset of symptoms is usually 2-3 hours after a meal and the foods that set off symptoms include simple sugars and carbohydrates but not complex carbohydrates. In Reactive Hypoglycemia the onset of symptoms is more immediate, usually 30-60 minutes after eating and the foods that cause symptoms include simple and complex sugars and complex carbohydrates. The dysfunction is within the timing and amount of insulin release from the pancreas and the timing and amount of glucose release from the small intestine and liver.

Hypothyroid Tendency

Hypothyroid tendency is exhibited when the body doesn't produce enough active thyroid hormone. Since the main purpose of thyroid

hormone is to run the body's metabolism, people with hypothyroid tendency will have symptoms associated with a slow metabolism. Hypothyroid Tendency symptoms include muscle weakness and pain, cold hands and feet, feeling core cold, weight gain, dry skin, heavy menstruation, constipation, hair loss and memory and concentration problems.

The function of the thyroid gland is to take iodine, found in many foods, and convert it into thyroid hormones: thyroxine (T4) and triiodothyronine (T3). Thyroid cells are the only cells in the body which can absorb iodine. These cells combine iodine and the amino acid tyrosine to make T3 and T4. T3 and T4 are then released into the blood stream and are transported throughout the body where they control metabolism (conversion of oxygen and calories to energy). Every cell in the body depends upon thyroid hormones for regulation of their metabolism. The normal thyroid gland produces about 80% T4 and about 20% T3, however, T3 is the active hormone. T3 is primarily converted from T4 at the distal cellular level, ie in muscle, brain and organ cells. The thyroid gland is under the control of the pituitary gland, a small gland the size of a peanut at the base of the brain. When the level of thyroid hormones (T3 and T4) drops too low, the pituitary gland produces Thyroid Stimulating Hormone (TSH) which stimulates the thyroid gland to produce more hormones. The thyroid gland is the furnace and the pituitary gland is the thermostat. Thyroid hormones are like heat. When the heat gets back to the thermostat, it turns the thermostat off. As the room cools (the thyroid hormone levels drop), the thermostat turns back on (TSH increases) and the furnace produces more heat (thyroid hormones).

The pituitary gland itself is regulated by another gland, known as the hypothalamus. The hypothalamus is part of the brain and produces Thyroid Releasing Hormone (TRH) which tells the pituitary gland to stimulate the thyroid gland (release TSH). The hypothalamus is the person who regulates the thermostat since it tells the pituitary gland at what level the thyroid should be set.

Reproductive Hormone Imbalance Tendency

Estrogen and progesterone hormones (chemical messengers) produced primarily in the ovaries, affect all organ systems including the

brain, gut, smooth and striated muscles. Estrogen facilitates development of endometrium in the uterus, affects blood pressure, sleep, fatigue, and emotions. These two female hormones cycle monthly and vary in their ratio to each other several times monthly. When the absolute amounts, cycle amounts and/or ratios are altered the reproductive hormone imbalance can result in significant symptoms.^{17,18} Reproductive hormone levels also affect each of the other systems that regulate pain and fatigue. The symptoms are experienced prior to menstruation on a monthly cycle and sometimes mid-cycle. Estrogen and progesterone levels rise and fall twice monthly and yearly variations occur more dramatically during the spring and fall.

CHAPTER 4

Causative Factors and Physiology

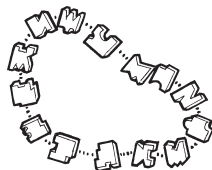
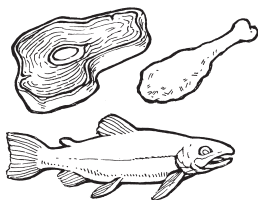
INDIVIDUALS WITH CPP and LBP can have alterations in several of the chemical messengers in their blood stream, spinal fluid, and urine as compared to normal individuals. Most of these chemical assays are primarily performed in research labs and are not available in clinical situations. Research has also discovered that specific body systems are functioning abnormally. These systems include the:

- hypothalamic-pituitary-adrenal axis
- autonomic nervous system axis, and
- reproductive hormone axis

Necklaces as Chemical Messengers

Chemical messengers maintain brain activity. They regulate mood, control sleep, appetite, memory, and mental alertness. Chemical messengers regulate muscle action, gut action, breathing patterns and heart rate. Chemical messengers determine energy levels, metabolic rate, and pain levels.¹

The chemical messengers are formed from molecules of fatty acids which come from fats/cholesterol and from amino acids which come from protein. When fat/cholesterol is eaten it is digested and broken down into fatty acids called steroids. Steroids such as estrogen, progesterone and testosterone are the chemical messengers made from fats that our body uses for optimal functioning.



Most of the chemical messengers are formed from molecules of amino acids which come from proteins. When protein is eaten it is digested and broken into 20-30 different amino acids (figure 4-1). These different amino acids combine into chains similar to necklaces. There are many combinations of amino acid chains just like there are many different kinds of necklaces. These chains of amino acids are called polypeptides. Familiar polypeptides include serotonin, enkephalins and insulin.

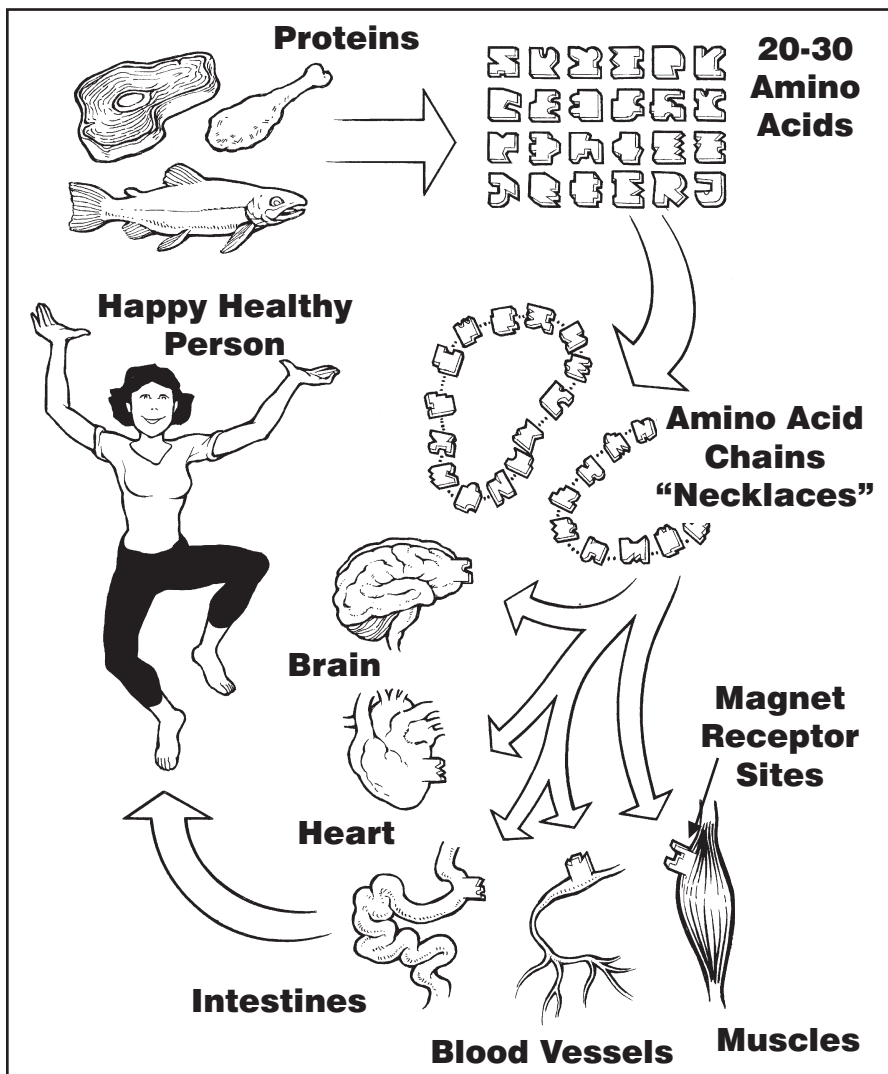
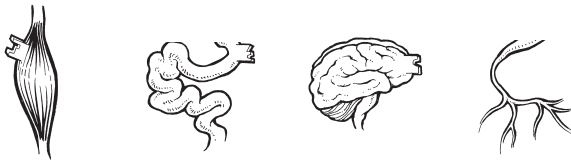


Figure 4-1: Amino Acid Formation and Function

Manufacturing, Transporting, Receiving of Necklaces

The chemical messengers – amino acid chains – are manufactured at many sites throughout the body. They are manufactured in the brain, in glands like the thyroid, in organs like the pancreas and liver, in the digestive system, in the heart and circulatory system and in the muscles. A certain amino acid chain may be manufactured primarily at one site but will also have several other minor manufacturing “plants” at other sites. For example, 95% of serotonin is produced in the gut but there are also manufacturing sites for serotonin in the brain and the muscles. Insulin is produced primarily in the pancreas but also in the brain and muscles.²



These chemical messengers are transported via the blood stream or nerve fibers to many different receptor-magnet-sites where they regulate body functions. When they are present in nerve fibers they are known as neurotransmitters, in the blood stream they are known as hormones or biochemicals.

Receptor-magnet-sites for specific amino acid chains may be primarily on one organ or in one system but there will be multiple sites throughout the body with minor receptor-magnet-sites. For example, receptor-magnet-sites for serotonin are found in the pancreas, the intestines, the brain, and the heart.

What Can Go Wrong with Necklaces?

The amino acid chains attached to receptor-magnet-sites activate and regulate organs and body systems that allow the human body and mind to function efficiently and without pain or fatigue. What can happen to alter this process?

- There may not be enough amino acid chains due to inadequate “raw materials” or precursors, i.e. proteins, vitamins, and minerals.
- There may be an inefficient manufacturing of protein to amino acid chains leading to excessive need for more and more proteins and amino acids.

- There may be excessive destruction of the chemical messengers before they have delivered the essential messages to the receptor-magnet-sites.
- There may be excessive production of the chemical messengers so they drown the receiving sites instead of providing important information on a gradual basis.
- The receptor sites may not be properly sensitive. The receptor-magnet-sites may not be powerful enough to attract and use the chemical messengers that arrive at the site.

Any disruption in the manufacturing, distribution, or use of these messengers results in body and mind dysfunction – pain, fatigue, memory problems, sleep disruption, sensory hypersensitivity, blood pressure changes or digestive changes.

What Environmental Triggers Can Break the Necklaces?

Environmental triggers can set off CPP and LBP and are often described as the “cause”. A motor vehicle accident, repetitive motion injury at work, divorce, birth or death, surgery, sexual abuse or infection can act as the trigger that sets off the cascade of symptoms based on the underlying problem of the chemical messaging system. Previously the body had been accommodating for the disruption in manufacturing, distribution or use of these chemical messengers, keeping the symptoms to a minimum and maintaining balance within body functions. Once the environmental trigger upsets the applecart and sets off the waterfall of symptoms it is difficult to reverse the process unless the underlying problem is understood.

What Produces the Best Necklaces?

We are ultimately products of both our genetics and our environment.³ Occurrences in our lives trigger or inhibit genetic tendencies. If our genes predispose us to pain and fatigue we must minimize these tendencies through environmental interventions. This is no different than if genetics predispose an individual to be overweight. To minimize the genetic tendency for being overweight, increased exercise and decreased food intake is a necessity. The genetic tendency for disruption in the manufacturing, distribution, and/or use of amino acid messenger chains can be greatly exacerbated by environmental triggers so their influence needs to be minimized.

Whose Job Is This Anyway?

The human body is regulated by control centers using the amino acid or fatty acid necklaces as chemical messengers. A disturbance in any one of these centers affects the other systems and the functioning of the body as a whole. Disturbances in three control systems have been identified in CPP and LBP individuals. The three systems are:

The hypothalamic - pituitary - adrenal axis (HPA)

The autonomic nervous system axis (ANS)

The reproductive hormone axis (RHA)

These three systems function independently to some extent but also influence each other on a regular basis (figure 4-2). Each system provides information and regulation to every cell in the body. Each system provides regulatory influence to the other two systems. Dysfunction in one system can influence dysfunction in the other two systems as well as disrupting general body cellular function.

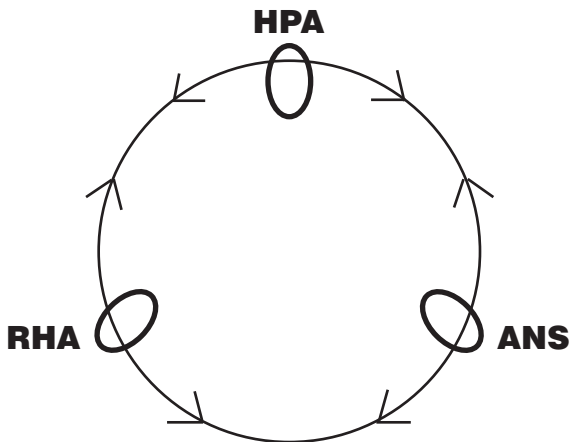


Figure 4-2: Interaction of HPA, ANS and RHA Axis

Hypothalamic - Pituitary - Adrenal (HPA) Axis

The Stress Axis

The hypothalamic - pituitary - adrenal axis is considered the stress system of the body because the chemical messengers given off by this combination of glands effect the body's ability to cope with stress, both emotional and biological. Biological stress includes dysfunction in metabolic and physiologic processes controlling blood pressure, blood sugar, and infection control. The hypothalamus, -pituitary and adrenal glands produce chemical messengers that modulate pain, sleep, mood, sex drive, appetite, energy, and circulation (figure 4-4).

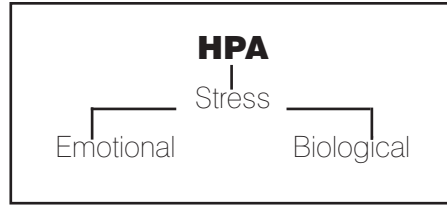


Figure 4-3: HPA Stress

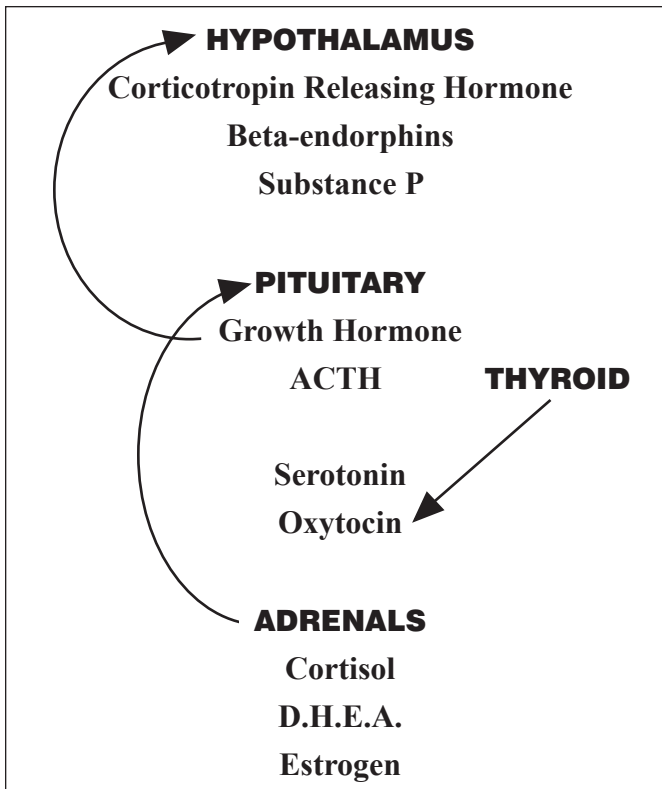


Figure 4-4: HPA Axis Hormones

Many of the HPA axis hormones are found to be at abnormal levels in CPP and LBP. The individuals' cerebral spinal fluid has serotonin in decreased amounts and Substance P in increased amounts. Growth hormone and cortisol are lower than normal. When these chemical messengers are at abnormal levels the individual experiences pain, sleep, mood, and energy changes.

The Autonomic Nervous System (ANS)

The autonomic nervous system is the automatic control system sending messages from the brain subcortex to organs like the heart, lungs, intestines, bowel, and bladder as well as to muscles in our limbs and trunk.

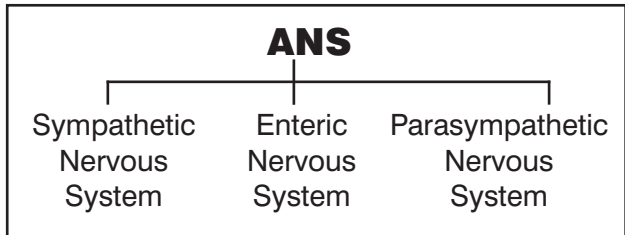


Figure 4-5: ANS Divisions

There are three subdivisions of the autonomic nervous system: the sympathetic, the parasympathetic and the enteric divisions² (figure 4-5). These divisions are named for the locations from which they come. The sympathetic division nerve roots exit from the thoracic and lumbar areas of the spine, the parasympathetic division nerve roots exit from the cranial and sacral areas of the spine, and the enteric division nerves originate in the digestive system or gut. Contrary to popular belief, the sympathetic system is not always defined as excitatory, fight or flight, and the parasympathetic is not always quieting in nature. The parasympathetic nervous system is faster and more localized in its influence on the body. The sympathetic nervous system is slower and more widespread in its influence on the body systems. The parasympathetic nervous system action is more often restricted to a single organ while the sympathetic nervous system action more often effects the body as a whole. The enteric nervous system regulates intestinal or gut function and is the least known and understood division of the autonomic nervous system.

The autonomic nervous system (ANS) and the HPA axis work together affecting each other and all other body systems. Norepinephrine (adrenaline) and neuropeptide Y, dominant in the ANS, facilitate action

in the HPA axis. Together the ANS and HPA axes influence areas of the brain involved in cognitive function, memory, memory retrieval and emotional analysis of experiences.

Sympathetic and Parasympathetic Divisions

The heart, lungs, stomach, liver, pancreas, bladder, uterus, rectum and anus are all directed by sympathetic and parasympathetic divisions of the autonomic nervous system. When there is pain and dysfunction related to these organs, the autonomic nervous system will be involved in either a direct or indirect way. There is most often an imbalance between the parasympathetic and sympathetic input to organ function. Excitatory, survival messages to organs become more predominant and enduring rather than a balance of excitatory and quieting directions that allow the organs to work and rest in a healthy rhythm (figure 4-6). This imbalance in ANS messaging and the resultant organ response leads initially to super-efficient organ function at high energy levels. But as with any machine or body system, rest and maintenance is essential, and in this picture there is little or no rest/maintenance cycle. The result is an eventual melt down of organ function with the symptoms described by the individual as pain, fatigue, indigestion, diarrhea, shortness of breath and menstrual irregularity.

Muscles and the ANS

Muscles of the arms, legs, back and abdomen are influenced by the ANS. In the relaxed state these voluntary muscles have a certain resting tone or tension. The degree of tone/tension present when muscles are at rest is controlled by the sympathetic nervous system. The muscle spindle in each muscle bundle is a spring loaded system that regulates the resting tone of muscle fibers. The spring load is set to various degrees of tension. If the spring is set tight the muscle has high resting tone. If the spring is

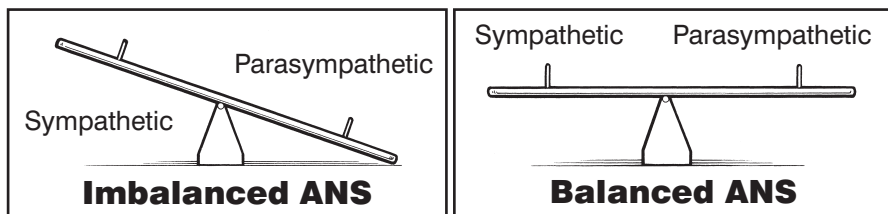


Figure 4-6: ANS Balance

set loose the muscle has low resting tone. The sympathetic division of the ANS sets the tightness or looseness of the spring. When the ANS is imbalanced its influence will result in muscles with abnormally high resting tone. This affects the ability of muscles to work and rest efficiently and effectively. It affects blood flow to and from muscles so waste products accumulate and oxygen and food products are inadequate. Fatigue and pain are the consequence of an imbalanced ANS.

Returning a balance to the sympathetic-parasympathetic divisions of the ANS is essential in improving chronic pain symptoms.

Enteric Division

The enteric division of the ANS is the intestinal control system, the “gut brain”. It lines the digestive system from the esophagus to the anus. The enteric division is a vast chemical and electrical warehouse of messages that influence not only the digestive system but every other cell and organ system in the body.

An Electrical Messaging System in The Gut

Half of the body’s nerve cells are located in the intestines. There are 100 million enteric nerves in the small intestine alone, more than in the entire peripheral nervous system and equal to the number in the spinal cord. Only 1,000-2,000 nerve fibers of the vagus nerve connect the human brain to the enteric system. The enteric nervous system functions as an independent brain, controlling the digestive system, other organs and muscles, in conjunction with the head brain.

We think of nerve messages as electrical events so it is easy to think of 2000 telephone lines between the head and gut compared to 100 million telephone lines within the small intestine. The 2000 messages sent from the head will be heard but the dominant voices will be from the 100 million enteric telephone lines electrical messages from the small intestine.

The enteric nervous system controls the efficiency and effectiveness of gut functions. The gut’s major function is to digest food, absorb the digested nutrients into the blood stream and defend against poisons. The enteric nervous system determines to a large extent what nutrients and how much of each is absorbed or excreted. A second major function of the gut is to protect the body from disease. Seventy percent of the immune system is located in the gut. The enteric nervous system is directly involved in maintaining a healthy immune system.

A Chemical Messaging System

The enteric nervous system is a control system that sends its messages via chemicals as well as through electrical output. It produces information molecules called hormones or biochemicals that travel throughout the body to magnet sites on cells and organs. The same chemical messengers are produced by the enteric system and the brain. The “feel good” information molecules - endorphins, the “pain perception” information molecules – substance P, the stress molecules – cortisol, and the calming information molecules – serotonin, are all produced in the gut’s enteric nervous system and then travel to the rest of the body through the blood stream, attaching to magnet sites and influencing function and behavior at that organ system site.

One of the most discussed information molecules in chronic pain is serotonin. Ninety-five percent of the body’s serotonin is produced in the gut not the brain! When the gut produces an abundance of serotonin it flows not only in the gut, influencing function there, but also to the head, the heart, the blood vessels, the uterus, and the bladder. What is serotonin’s influence at these various sites? In the gut it facilitates contraction, in the heart it increases heart rate, in the blood vessels it stimulates constriction, in the uterus and bladder it induces contraction, in the head it facilitates sleep and decreases pain perception.

Another chemical messenger produced by the enteric nervous system is substance P whose influence is felt throughout the body. Substance P increases the perception of pain, increases heart rate and decreases blood pressure. Chronic pelvic and low back pain severity is strongly influenced by excessive substance P and other pain amplifying chemicals.

When Humpty Dumpty Falls...

The enteric nervous system in CPP and LBP often has difficulty maintaining balance between rest and work (figure 4-7). For example, serotonin is released in the gut when the enteric nervous system stimulates cells in the mucosal lining of the bowel. Serotonin excites peristalsis and thus elimination. If the release of serotonin is excessive then peristalsis is initially increased which may cause diarrhea, dehydration and discomfort. As excessive serotonin production continues it “drowns” the gut’s magnet receptor sites and as with any drowning victim the sites cease to function so the gut shuts down. This exces-

sive serotonin results in paralysis of the gut until the excess serotonin is broken down or otherwise incapacitated. Constipation and even fecal impaction with inflammation is the result. Constipation and impaction of the gut is accompanied by abdominal pain, inability to stand upright and a shuffling gait with quick fatigue. In severe cases the individual cannot get up from a chair without help.

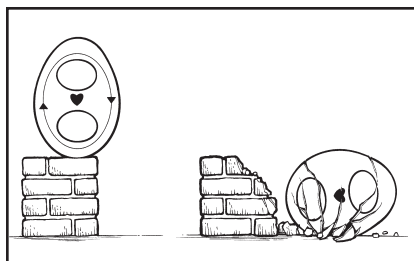


Figure 4-7: Humpty Dumpty

Another example of imbalance in chemical messengers produced by the enteric nervous system is the production of substance P. Substance P magnifies threat sensations in sensory fibers as they travel to the spinal cord and then to the brain with information about pain and discomfort. As substance P increases in the gut and spinal fluid, pain messages increase along the pain fibers. Additionally, fibers that transmit other sensations like touch, pressure, vibration, heat, cold, sound and light can become highly sensitized and begin to transmit messages that are interpreted by the brain as pain rather than as touch, pressure or light sensation. Substance P has increased the body's pain sensitivity significantly without any major trauma having occurred.

An optimally functioning enteric division of the ANS stimulates efficient function of the heart, lungs, uterus, bladder, brain, pancreas, and liver, as well as the digestive system of the gut. When there is dysfunction or imbalance of the enteric system every other organ system is at risk for dysfunction as well. The enteric nervous system communicates with the heart via the vagus nerve complex, with the pancreas which produces insulin via enteric peripheral nerves and information chemicals, and with uterus and bladder much the same way. If the enteric nervous system is in a high activation mode the gut will transfer food from mouth to anus faster than usual. Additionally the uterus and the bladder could be more irritable, the heart could beat faster, and the pancreas could produce and dump increased amounts of insulin into the blood stream.

The entire body is affected when the enteric nervous system of the gut is dysfunctional. Back, abdomen and pelvic muscles are affected

through the autonomic nervous system. Increased muscle resting tone leads to inefficient muscle action and fatigue. Increased substance P alters pain perception within muscles. To improve pain and fatigue as well as efficient muscle function gut production of substance P must decrease and the production of serotonin must increase. When the dysfunctional chemical and electrical messaging system of the enteric nervous system is understood the gut becomes an essential focus of assessment and self-care in the management of chronic pain symptoms.

Who Is The Boss?

The head, heart and gut all have control centers described as both intrinsic and extrinsic (figure 4-8). Intrinsic control describes the ability to regulate their organ system without external input. Extrinsic control describes the ability to influence other organs and systems in addition to their own. The subcortex regulates the heart through the vagus nerve composed of 2000 parasympathetic nerve fibers. The gut's enteric nervous system influences the heart through the same vagus nerve. The gut can change heart rhythms and in extreme cases stop the heart. This influence on the heart is significant but the heart also has its own intrinsic nervous system which keeps it functioning independent of outside control centers.

The heart will continue to beat in isolation just as the gut will continue to push food from the small intestine through the large intestine when there is no input from the human brain. Therefore symptoms of high heart rate, low blood pressure and abdominal pain are not necessarily mediated from the brain rather they can be greatly influenced by the heart's intrinsic control system "brain" and the gut's intrinsic control system (enteric) "brain."

The heart and gut's primary connection to the head is through the vagus nerve, an electrical messaging system. Messages from the brain to the heart and gut slow the heart rate and speed up the gut peristalsis (rhythmical contractions). The enteric and cardiac control centers transmit messages to the brain via the vagus nerve informing and cajoling the brain centers in the head to provide necessary management of vital functions.

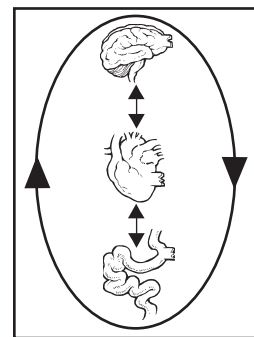


Figure 4-8:
Three Bosses

The heart, gut and head also communicate with each other via chemical messengers. These chemical messengers move through the blood stream to every cell of the body including muscle cells, finding body cells with receptors that attract the messengers like a magnet. The chemical messengers attach and make significant changes in cell structure and organ function but in a slower method than the neurotransmitters. Therefore, dysfunctional messaging systems can be both electrical and chemical in chronic pain.

In the past, primary treatment focus has been to alter the brain's function. Now we begin to look at possible dysfunction in the heart and gut because they too can direct other body functions in a significant way.

As Melissa, a 21 year-old college student, said to her physician, "This condition is manic depression of the body not the mind." She was describing the erratic, unpredictable behavior of the gut and heart control centers that resulted in her pain, fatigue, and associated symptoms. To better explain the influence on the whole body, take the example of the lungs and breathing.

The Last Breath....

One of the major functions of the head, heart and gut control centers is to regulate the breathing diaphragm which is essential for both life and health. The breathing diaphragm functions under subcortex and ANS control to expand the lungs, filling them with oxygen and then collapsing them to expel carbon dioxide. The breathing diaphragm does not have its own intrinsic nervous system so it cannot function in isolation from the head, heart and gut control centers. Rather it has dual innervation from the ANS and the voluntary nervous system. With ANS dysfunction individuals exhibit abnormal diaphragmatic breathing patterns. The breathing diaphragm action decreases and/or becomes shallow and ineffective. It is unable to automatically tighten and relax effectively, at times remaining in a semi-contracted, tight state for long periods. This causes shortness of breath, chest, abdominal and back pain. Accessory muscles of the neck and upper chest take over much of the breathing activity. Breathing effectiveness and efficiency is compromised.³

The internal organs, i.e., stomach, liver, pancreas, intestines, bladder, uterus and bowel are all suspended from the breathing diaphragm either directly or indirectly by fascial "strings". With every breath the

breathing diaphragm is gently, rhythmically moving the abdominal organs up and down. This movement with 12-14 breaths per minute is essential for the health of each organ structure. This internal organ movement is significantly decreased when accessory muscles take over breathing patterns and results in organ dysfunction.

The breathing diaphragm has a direct impact on cellular pH, the acid-base balance, of each cell of the body. It also regulates the carbon dioxide-oxygen balance throughout the body, essentially bringing needed oxygen to the cells and getting rid of waste carbon dioxide. The body pH becomes more acidic and waste products accumulate with accessory muscle breathing compared to diaphragmatic breathing. Twelve to fourteen times per minute each minute of each day every day of the year the breathing diaphragm performs its essential function, directed by the ANS. Breathing changes can be precipitated by dysfunctional head, heart and gut control centers and leads to pain, fatigue, and associated symptoms of chronic pain.

The Reproductive Hormone Axis (RHA)

The Reproductive Hormone Axis includes the ovaries and uterus in females, the gonads in males, the adrenal glands and fat in both females and males. These organs produce both male and female steroid chemical messengers derived from fats broken down into essential fatty acids. Female hormones include estrogen, progesterone, relaxin, and oxytocin. Testosterone is the most familiar male hormone. Both sexes produce all steroid chemicals but the levels and fluctuations differ depending on the sex. Men have more stable hormonal levels than women until the reduction of testosterone occurs with age. Women experience significant hormonal changes monthly, during puberty, pregnancy and menopause.

Estrogen, Progesterone, and Testosterone

In females, estrogen and progesterone (chemical messengers) are produced primarily in the ovaries and effect all organ systems including the brain, gut and muscles (figure 4-9).

Pain perception is influenced by sex hormones.⁴ Women experience pain conditions related to the cyclical hormonal changes more than men.⁵ Progesterone is associated with decreased pain as seen during pregnancy and lactation when progesterone is high. Estrogen is associated with change in pain conditions but is more related to its

Female Reproductive Hormone Function

Estrogen

- increases blood pressure
- improves sleep
- increases well being
- increases energy
- increases endorphins
- increases serotonin
- increases brain blood flow
- increases thyroid function

Progesterone

- decreases blood pressure
- decreases digestive activity
- increases appetite
- increases sex drive
- increases water retention
- increases breast engorgement
- decreases well being

Figure 4-9: Reproductive Hormone Function

effect on tissue circulation and consistency. The ratio of estrogen to progesterone to testosterone levels is a consideration in pain levels. Testosterone, the male hormone, facilitates muscle definition and strength and modifies pain perception. Its decrease in aging men is related to an increase in pain symptoms. Estrogen, the female hormone, facilitates regular menstrual cycles, alters fat distribution, affects joint stability, alters muscle and ligament laxity and modifies pain behavior. An imbalance in the ratio of estrogen to progesterone to testosterone in females can aggravate muscle spasms and increase pain perception.

Daily, Monthly, Yearly Cycles

Estrogen and progesterone vary on a monthly/28 day cycle. They also vary during the year, the highest level is April through July and the lowest from October through January. When individuals with CPP and LBP complain of increased symptoms during the winter months it may be that the estrogen/progesterone levels have fallen excessively, much like at the end of the monthly cycle.⁶ If increased symptoms occur in the spring it may be an over-abundance of estrogen/progesterone. Supplementing with phyto-estrogens/progesterones in natural food or cream form or using hormone replacement therapy on a temporary or permanent basis may assist the organ systems in maintaining balanced function. In a clinical trial, pain and fatigue, bowel, bladder and menstrual cycle dysfunction improved in a small group of women who used

phytoestrogen (plant based) and phytoprogestosterone during the winter months and again in the spring.

Mary described becoming incapacitated with pain, fatigue, abdominal bloating and gut dysfunction around Thanksgiving every year. She would be in bed, unable to work or go to school. No dietary changes seemed to help. She would gradually recover over a 4-6 week period. Using the phytoestrogen and progesterone creams she was able to work and attend school. She did not become ill or need to limit her activities any more than other times of the year. She is now confident that her life is under better control and balance.

Hormone levels vary on a daily cycle in males. It is typical for the levels to cycle up to eight times a day. Each of these cycles has the potential to affect pain symptoms particularly when there are imbalances or variations in the cycle.

RHA-HPA-ANS

The Leg Bone is Connected to the Hip Bone...

Reproductive hormones help to regulate the HPA (hypothalamic-pituitary-adrenal axis) and vice versa. During chronic stress, there is a decrease in function of both the HPA and the RHA. Individuals under chronic stress exhibit diminished reproductive capability as well as fatigue, sleep disruption and illness. If there is dysregulation of the RHA there will likely be an associated dysregulation of the HPA axis. For example, if estrogen, a part of the RHA, is chronically elevated, the HPA axis may be significantly depressed. If RHA is in dysregulation the HPA opioids are decreased. Internally produced opioids are the natural analgesia in the body. Opioid receptors are present at all levels of the nervous system. Increased HPA axis dysregulation can increase pain perception throughout the body. ANS influences HPA; HPA influences RHA; RHA influences ANS. The loop never ends and it can be affected at many junctions.

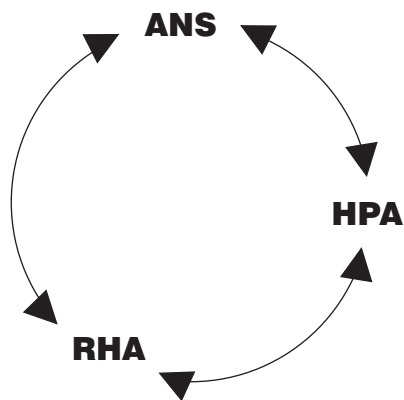


Figure 4-10: RHA-HPA-ANS

SECTION TWO

What is the Anatomy of Chronic Pelvic and Low Back Pain?

CHAPTER 5

Anatomy and Function

PELVIC AND LOW BACK PAIN can originate from striated muscles of the trunk, pelvis, back and hips or from smooth muscles of bladder and bowel. Striated muscles may elicit pelvic pain symptoms from trigger points, tender points, elevated resting tone, dysfunction during a contraction or from secondary ischemia and/or irritation of associated structures.^{1,2} The striated muscles include:

breathing diaphragm

abdominals

{ rectus abdominus
internal/external obliques
transverse abdominus

pyramidalis

iliopsoas

pectineus

adductors

{ adductor longus
adductor brevis
adductor magnus

quadratus lumborum

gluteals

{ gluteus maximus
gluteus minimus
gluteus medius

sphincters

{ external anal sphincter
external urinary sphincter

piriformis
gracilis
sartorius

deep external rotators { inferior and superior gemelli
quadratus femoris
obturator internus and externus

hamstrings biceps femoris

pelvic diaphragm { pubococcygeus
iliococcygeus
puborectalis

urogenital diaphragm { transverse perineal
bulbospongiosus
ischiocavernosus

coccygeus

Muscle - Location - Function - Pain Pattern

Breathing Diaphragm

Location – Breathing diaphragm attaches to ribs, sternum, and upper lumbar spine.

Function – Breathing diaphragm functions include:

- oxygen/carbon dioxide exchange,
- Ph level determinant in all body cells,
- blood/lymph pump from lower body to heart,
- thoracic-lumbar spine mobilization,
- internal organ motility, mobility,
- sympathetic/parasympathetic nervous system balance.

Pain Pattern – Breathing diaphragm dysfunction leads to pain patterns in the head and neck, thoracic spine area, abdominal/chest region.

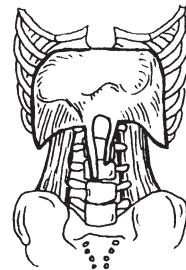


Figure 5-1:
Breathing
Diaphragm

Abdominals

Rectus Abdominus

Location – Rectus abdominus attaches to the symphysis pubis distally and to the xyphoid process of the sternum and the costal cartilage of ribs 5, 6, 7.

Function – Rectus abdominus flexes the trunk and supports the internal organs.

Pain Pattern – Rectus abdominus refers pain to the back in a horizontal pattern between the scapular angle and the iliac crest. Pain in the lower right quadrant can imitate appendicitis. Dysmenorrhea pain can be significantly increased from trigger points in the rectus abdominus.

Note – A condition known as rectus diastasis is separation of the fascia, called the linea alba, between the two rectus abdominus muscles. An excessive separation decreases visceral organ support and can initiate abdominal trigger points and pelvic and low back pain.

Internal and External Obliques

Location – Internal and external oblique muscles attach to the ribs and costal cartilage proximally and the pubic bone, iliac crest, linea alba, and inguinal ligament distally.

Function – Oblique muscles rotate the trunk and flex the trunk depending which muscles are contracting.

Pain Pattern – Trigger points of the upper oblique muscles can lead to heartburn, belching and vomiting as well as pain in the mid to superior abdominal area. Lower oblique trigger points refer pain across the lower abdominal region to either side and can cause diarrhea.

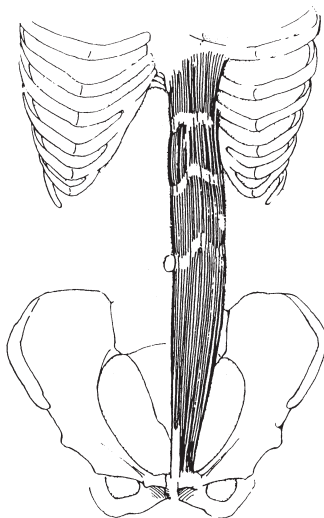


Figure 5-2: HPA Stress

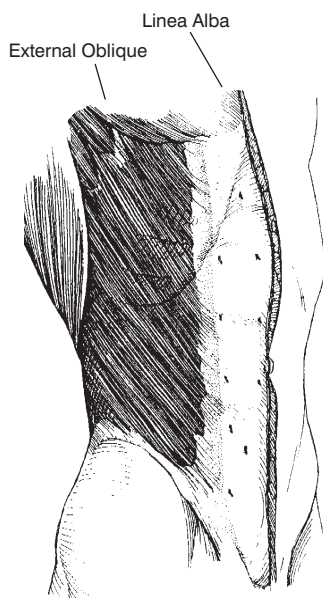


Figure 5-3: External Obliques

Transverse Abdominus

Location – Transverse abdominus attaches to fascia of the rectus abdominus, inguinal ligament, the iliac crests, thoracodorsal fascia, and the costal cartilage of the lower six ribs extending into the breathing diaphragm. It is the deepest of the abdominal muscles.

Function – Transverse abdominus functions to support the abdominal viscera, the low back and the sacroiliac joint. In conjunction with other muscles it works much like a girdle.

Pyramidalis

Location – Pyramidalis superior attachment is to the linea alba midway between the umbilicus and the pubis and its distal attachment is to the symphysis pubis, blending with the transverse abdominus, obliques and adductor attachments over the symphysis pubis.

Function – Pyramidalis functions to stabilize the symphysis pubis joint and to support the lower abdominal viscera.

Pain Pattern – Trigger points of the pyramidalis are superior to the pubic symphysis and the pain pattern extends to the umbilicus.

Iliopsoas

Location – Psoas muscle attaches to the vertebral bodies and transverse processes of T12 - L5, and to the diaphragm and blends distally with the iliacus. The iliacus attaches on the inner aspect of the iliac fossa, sacroiliac joint, and sacrum. There is distal attachment to the lesser trochanter and joint capsule of the anterior femur.

Function – Iliopsoas functions to flex the trunk on the hip and flex the hip on the trunk.

Pain Pattern – Trigger points of the iliopsoas refer pain vertically up the back from below the iliac crest and anteriorly from the anterior superior iliac spine into the groin and anterior thigh. The chronic pain posture is pelvic anterior tilt, hip flexion, and increased lumbar lordosis, a posture indicative of iliopsoas dysfunction.

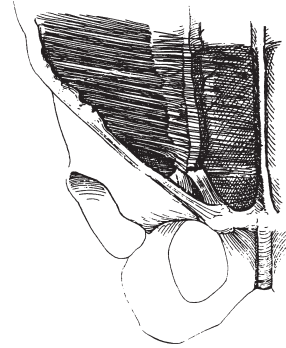


Figure 5-4:
Transverse Abdominus

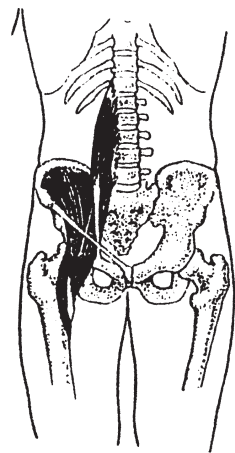


Figure 5-5:Iliopsoas

Pectineus

Location – Pectineus attaches to the superior aspect of the pubic rami and the anterior, superior femur.

Function – Pectineus adducts and flexes the femur on the pelvis.

Pain Pattern – Trigger points of the pectineus refer pain deep into the groin and anterior medial thigh. It is often described as a deep ache.

Adductors – Magnus, Longus, Brevis

Location – Adductor muscles attach proximally to the pubic rami and ischial tuberosity and distally to the shaft and medial condyle of the femur.

Function – The adductor muscles adduct and internally rotate the femur on the hip and anteriorly or posteriorly rotate the pelvis in standing.

Pain Pattern – Trigger points of the adductors refer pain deep into the pelvic region, proximally into the groin, and distally towards the knee. Pelvic pain is felt around the pubis, vagina, rectum, and bladder.

Quadratus Lumborum

Location – Quadratus lumborum attaches proximally to the 12th rib and transverse processes of the upper four lumbar vertebrae and distally to the iliac crest, iliolumbar ligament and fourth and fifth lumbar transverse processes.

Function – Quadratus lumborum elevates the hip and assists in stabilizing the lumbosacral junction.

Pain Pattern – Trigger points of the quadratus refer pain along the ipsilateral lumbar spine, from the sacrum to the inferior buttocks and laterally along the inferior aspect of the iliac crest.

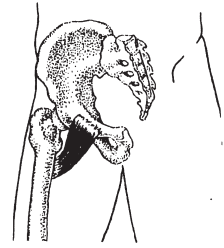


Figure 5-6:
Pectineus

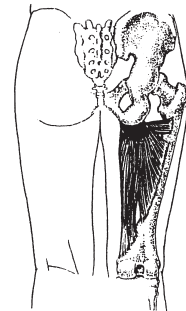


Figure 5-7:
Adductors

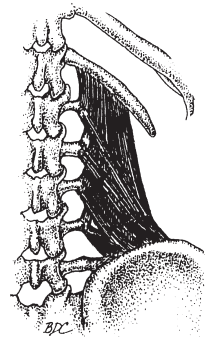


Figure 5-8:
Quadratus
Lumborum

Gluteals – Maximus, Medius, Minimus

Location – Gluteals attach proximally along the external aspect of the iliac crest and the sacrum. Distally they attach to the gluteal tuberosity of the femur and iliotibial band.

Function – Gluteal muscles abduct, externally rotate and extend the hip.

Pain Pattern – Trigger points of the gluteals refer pain into the sacral and buttocks areas. Pain can be referred down the lateral leg even below the knee.

Sphincters - External Anal, External Urinary

Location – External sphincters are circular muscle surrounding the anal and urinary outlets.

Function – External sphincters function like purse strings pulling shut to maintain closure of the anus and urethra.

Pain Pattern – Trigger points of the external sphincters refer pain into the pelvis in the area of the rectum and anus, urethra, bladder and vagina. There can be complaints of painful intercourse, bowel movements, and urination.

Piriformis

Location – Piriformis attaches proximally to the inner surface of the medial sacrum with distal attachment to the posterior aspect of the greater trochanter.

Function – Piriformis externally rotates the hip. In standing, it moves the sacrum on the pelvis.

Pain Pattern – Trigger points of the piriformis refer pain to the lower sacrum, buttocks, and posterior thigh.

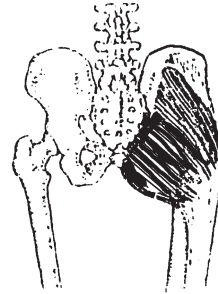


Figure 5-9: Gluteals

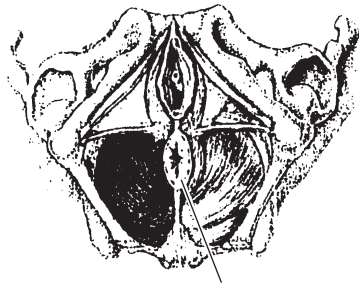


Figure 5-10:
External Anal Sphincter

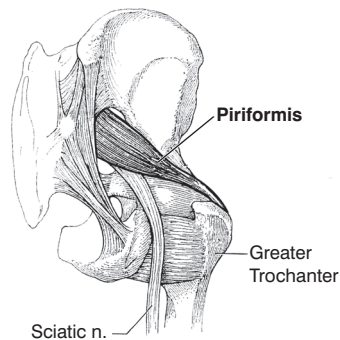


Figure 5-11:
Piriformis

Gracilis

Location – Gracilis attaches proximally to the pubic ramus and attaches distally to the tibia.

Function – Gracilis adducts and flexes the hip.

Pain Pattern – Trigger points of the gracilis refer pain to the groin.

Sartorius

Location – Sartorius attaches proximally to the anterior superior iliac spine and distally to the medial tibia.

Function – Sartorius flexes and externally rotates the hip and flexes the knee.

Pain Pattern – Trigger points of the sartorius refer sharp tingling pain into the groin. It can participate in the entrapment of the lateral femoral cutaneous nerve leading to numbness along the lateral thigh.

Biceps Femoris

Location – Biceps femoris attaches proximally to the ischial tuberosity and sacrotuberous ligament. It attaches distally to the proximal posterior fibula.

Function – Biceps femoris extends the hip and flexes the knee.

Pain Pattern – Trigger points of the biceps femoris refer pain to the posterior thigh, buttocks and sacroiliac joint.



Figure 5-12:
Gracilis



Figure 5-13:
Sartorius

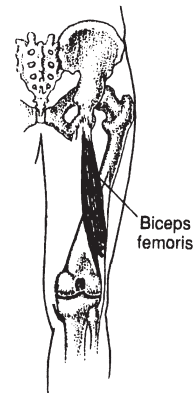


Figure 5-14:
Biceps Femoris

Deep Short Lateral Rotator Muscles

Inferior and Superior Gemelli, Quadratus Femoris

Location – Proximal attachment is to the medial aspect of the ischium and the distal attachment is to the greater trochanter.

Function – The short rotator muscles outwardly rotate the hip.

Pain Pattern – Trigger points are a source of deep hip and buttocks' pain.

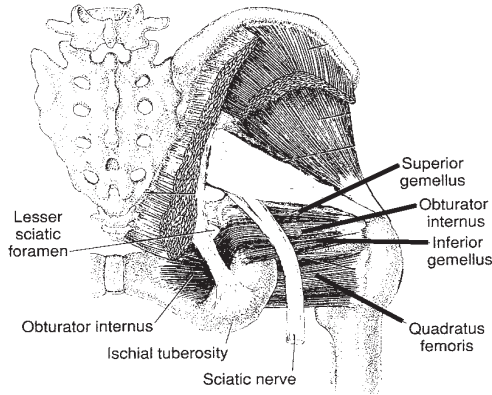


Figure 5-15: Short Rotators (Posterior view)

Obturator Internus

Location – Obturator internus attaches proximally covering the obturator foramen and blending with the arcuate tendon and pelvic diaphragm and distally to the greater trochanter.

Function – Obturator internus outwardly rotates the hip or horizontally rotates the pelvis over the femur with the foot planted.

Pain Pattern – Trigger points of the obturator internus refer pain into the deep pelvic region.

Pelvic Diaphragm/ Levator Ani

Pubococcygeus, Ileococcygeus, Puborectalis muscle loops.

Location – Pelvic diaphragm attaches to the symphysis pubis, blends with the arcuate tendon and obturator internus and via fascia/

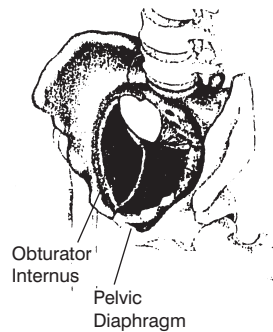


Figure 5-16:
Obturator Internus
& Pelvic Diaphragm
(Anterior view)

ligaments to the sacrum and coccyx.

Function – Pelvic diaphragm supports the bladder, bowel and uterus in a functional position and assists in closure of the bladder and bowel outlet. It moves the sacrum on the pelvis at the sacroiliac joints.

Pain Pattern – Trigger points of the pelvic diaphragm refer pain to deep pelvic organs.

Urogenital Diaphragm/Perineal Muscles

Transverse Perineal, Ischiocavernosus, Bulbospongiosus muscles

Location – Urogenital diaphragm muscles attach to the ischial tuberosities, pubic rami and perineal body.

Function – Urogenital diaphragm functions primarily to pump blood into the clitoris and penis and close penile veins. Secondly, it facilitates closure of the urethra.

Pain Pattern – Trigger points of the urogenital diaphragm refer pain to the proximal one third of the vagina and superficial area around the urethral opening.

Coccygeus

Location – Coccygeus attaches to the sacrospinous ligament and the coccyx.

Function – Coccygeus is called the tail wagging muscle. It moves the sacrum/coccyx on the pelvis.

Pain Pattern – Trigger points of the coccygeus refer pain to the region around the anus and rectum.

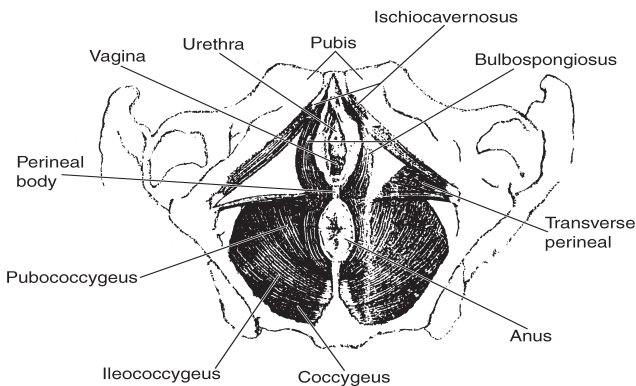


Figure 5-17: Urogenital Diaphragm & Coccygeus

Pelvic Fascia

The pelvic fascia surrounds the cervix of the uterus and attaches to the sacrum, arcuate tendon and pubis. It extends out like spokes on a wheel incorporating support for the bladder, uterus, and bowel. It consists of collagen, elastin and muscle cells so has contractile capabilities. In females it is estrogen dependent. Nerves and blood vessels run through the fascia to their end organs (figure 5-18).

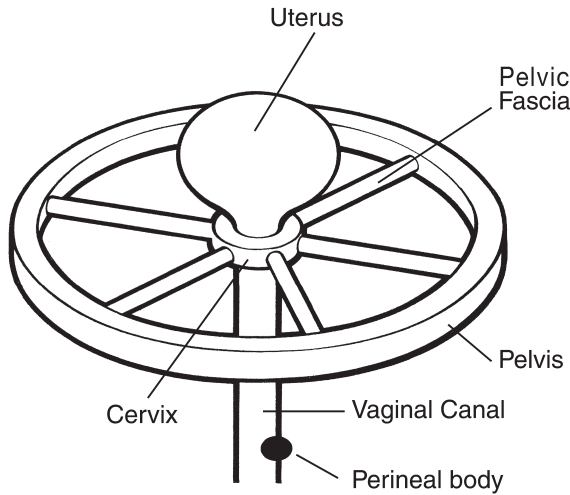


Figure 5-18: Pelvic Fascia

Pelvic Rotator Cuff Anatomy and Innervation

Muscles of the Pelvic Rotator Cuff

The Pelvic Rotator Cuff (PRC) is the most inferior muscle support system for the internal abdominal organs, lumbo-sacral and sacroiliac regions of the spine. It is also an essential part of the postural muscle system of the trunk¹.

The PRC is contained within the lower pelvis and finds its support and many of its major attachments on the pubic bone anteriorly and sacrum/coccyx posteriorly. Besides bony attachments, another major attachment for the PRC is the arcuate/obturator tendon. The arcuate tendon attaches anteriorly near the symphysis pubis and posteriorly to the ischial spine bilaterally. The obturator internus muscle attaches to the lateral aspect of the arcuate tendon and the pelvic diaphragm muscle attaches to the medial aspect of this tendon. The urethropelvic ligament and periurethral fascia that suspends the bladder and urethra blend with the arcuate tendon.

The PRC first described by Hulme(1994)² includes the following muscles:

- Obturator internus and externus
- Pelvic diaphragm (levator ani)
- Urogenital diaphragm
- External urinary and anal sphincters
- Adductors (figure 6-1)

The **obturator internus** muscle attaches within the pelvis along the lateral aspect of the arcuate tendon and substantially covers the obturator foramen attaching around its border. It exits the pelvis at a 120° angle through the lesser sciatic notch and attaches to the posterior superior aspect of the greater trochanter of the femur.

Typically, the obturator internus muscle is described as a midline outward rotator of the hip when the hip is in relative extension. With the hip flexed, the obturator internus outwardly rotates and slightly

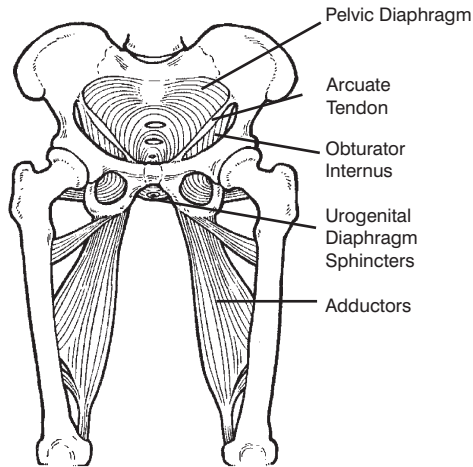


Figure 6-1: Pelvic Rotator Cuff

abducts the hip. A second function of the obturator internus is indirect support through the pelvic diaphragm of bladder, uterus and bowel. A third function is dynamic stability of the lumbo-sacral and sacroiliac joints in upright posture and walking.

The **pelvic diaphragm** (levator ani) muscle attaches within the pelvis anterior to the pubic rami, laterally to the medial aspect of the arcuate tendons, and posterior to the sacrum and coccyx. The pelvic diaphragm is bowl shaped and composed of loops running from pubis to sacrum. Pubococcygeus, iliococcygeus, and puborectalis are loops within the pelvic diaphragm muscle. These loops run in a sling-like fashion from the pubic rami, and arcuate tendon on one side to unite with fibers from the opposite side and then to connective tissue that attaches the loop to the sacrum and coccyx posteriorly.

The pelvic diaphragm muscle has a preponderance of slow twitch, type I muscle fibers. It functions as a postural muscle of the trunk and pelvis, maintaining consistent resting tone to support internal organs, close the outlets for bowel and bladder and assist in sacroiliac and lumbosacral joint alignment and upright stance. This resting tone helps maintain the anorectal and bladder angles necessary for bowel and bladder continence 24 hours a day (figure 6-2).

The pelvic diaphragm resting tone relaxes/inhibits during urination so the urethra is open for urine to pass through. When having a bowel movement the pelvic diaphragm sling relaxes/inhibits so the rectum

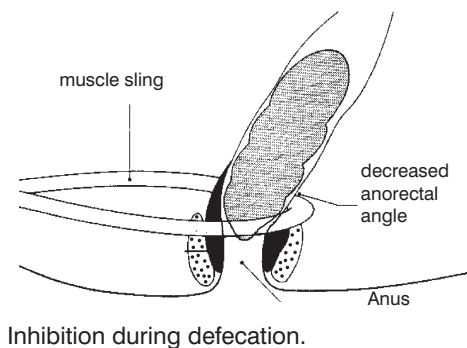
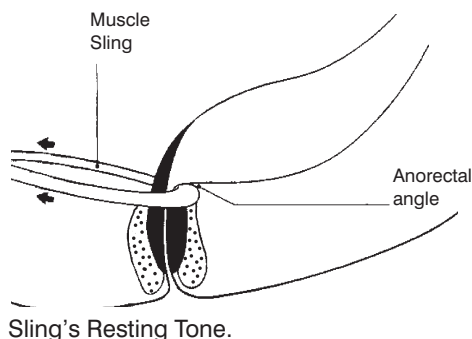


Figure 6-2: Pelvic Diaphragm Sling resting tone and during defecation

and anus are a straight tube to allow feces to pass through. The pelvic diaphragm functions as a postural muscle under autonomic nervous system and subcortical control.

Periurethral fascia evolving to ligament envelopes the bladder neck and proximal urethra and extend laterally across the levator ani to the arcuate tendon bilaterally. This ligament transfers force from the pulley system of the obturator internus and arcuate tendon to the urethra and bladder facilitating elevation and closure of the proximal bladder neck/urethra.

The **urogenital diaphragm** muscle group is positioned in the anterior two thirds of the region between the symphysis pubis and coccyx. It attaches to the symphysis pubis, pubic rami, perineal body, and ischial tuberosities. The muscles that form the urogenital diaphragm include the deep transverse perineal interconnected by fascial planes with the external anal sphincter and the smaller superficial transverse

perineal muscle. The bulbospongiosus and ischiocavernosus muscles are also included in the urogenital diaphragm muscle group. The bulbospongiosus muscle originates from the symphysis pubis and forms a sling around the urethra and vaginal openings to attach distally at the perineal body with the transverse perineal muscle. The ischiocavernosus muscles originate on the ischial tuberosities and attach on the symphysis pubis. This group of muscles interdigitate via fascia and connective tissue with the pelvic diaphragm and via the perineal body with the external anal sphincter.

The urogenital diaphragm has a preponderance of fast twitch, type II muscle fibers, which contract quickly and forcefully but also fatigue relatively quickly. Its primary function is to facilitate erection of the penis and clitoris during sexual activity. Secondly it closes the urethra at the distal end to prevent a few drops of urine from leaking out during coughing or sneezing. The external urinary sphincter is imbedded in the urogenital diaphragm and assists in maintaining its resting tone closure. It is not a primary postural support muscle.

The **adductor longus and brevis** muscles attach to the medial aspect of the femur and to the pubic rami adjacent to the urogenital diaphragm attachment. The adductor muscle attachment on the pubic rami juxtaposes the attachment of the pelvic diaphragm. The adductors do not interdigitate with the pelvic diaphragm muscle, so when they contract there is no direct caudal force exerted on the PRC. Instead there is an overflow of electrical activity from the adductors into the pelvic diaphragm during adductor contraction. Besides adducting and inwardly rotating the femur on the pelvis they facilitate pelvic diaphragm action to support internal organs, symphysis pubis and sacroiliac joints.

Function of the PRC. The adductor and obturator muscles function in alternating reciprocal action. At completion of the PRC “obturator action” phase the obturator internus muscles are in a shortened position with the hips in midrange outward rotation. The adductors reciprocate function during the “adductor action” phase to lengthen the obturator internus muscles and produce hip inward rotation to midline. Then the “obturator action” phase begins again. It is a constantly reciprocating “Roll for Control[®]” action at the hip from midline to midrange rotation and back to midline that enables the PRC muscle system to accomplish functions of organ support, lumbosacral and sacroiliac joint alignment and standing balance dynamic stability.

The pelvic diaphragm, urogenital diaphragm and sphincters are not isolated muscles that attach from bone to bone contracting to move one bone on another bone through joint action. Their structural attachments are muscle to fascia to tendon to muscle to ligament to other muscle before connections to bone. As such, they form a dynamic pelvic muscle force field, not a pelvic floor for postural function.

In summary, the PRC functions with a rhythmical balance of internal and external rotation involving the prime movers of obturator internus and adductors to provide organ support, outlet closure, sacroiliac alignment and standing balance stability. These muscles function as an interdigitated and interrelated synergistic unit for dynamic postural alignment.

To better understand how the PRC functions, quickly visualize:

The Bowl. The bowl is made of slings that run obliquely from front to back, forming the bottom and sidewalls of the bowl. There are 2-3 holes in the bottom of the bowl (figure 6-3).

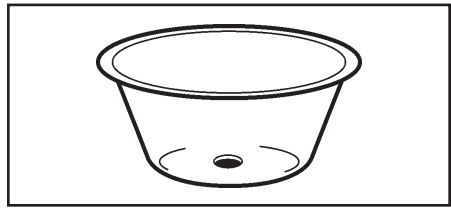


Figure 6-3: Bowl

The Clothesline. An old-fashioned clothesline is made of two uprights and two clotheslines. A sheet is attached between the two clotheslines and also attached to the two uprights. There are pulley ropes attached to the two clotheslines that are stabilized in the ground. When the day is very windy the lady of the house tightens the outrigger pulleys which pulls the clotheslines laterally and raises the sheet up (figure 6-4).

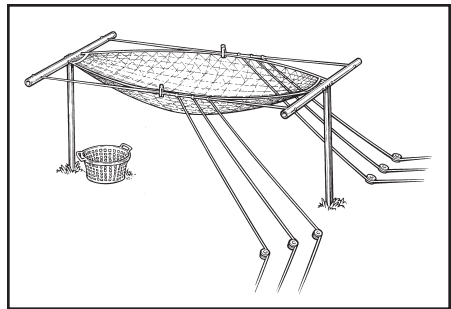


Figure 6-4: Clothesline

The Teeter Totter. Two individuals of equal weight sit on the teeter totter and it is balanced. When the teeter totter is balanced each end is at the same level. When one of the individuals eats too many ice cream cones she weighs more than the other and the teeter totter is no longer balanced. One side tips up and the other tips down (figure 6-5).

The core of the PRC is the bowl. It is the pelvic diaphragm, a series of muscle slings that run obliquely from the front to the back of the pelvis. The slings attach in the front at the pubic bone and on the side along the arcuate tendon. The slings attach via ligament and fascia at the back of the pelvis to the sacrum and coccyx. At the bottom of the slings are 2 openings in males and 3 openings in females, the vaginal opening, urethral and anal openings. These muscle slings have postural resting tone that maintains the shape of the bowl at all times. It maintains closure of the sphincters at the bottom of the bowl so nothing leaks out.

The pelvic diaphragm is interdigitated with the urogenital diaphragm and external sphincters. They function as one muscle system.

The pelvic diaphragm core is interdigitated with the obturator internus via the arcuate tendon much like the sheet is attached to the outrigger pulleys via the clothesline. The sheet is the pelvic diaphragm, the outrigger pulleys are the obturator internus muscles attached to the ground (the femurs), and the clotheslines are the arcuate tendons. When the outrigger pulleys shorten, the clotheslines are pulled outward and the sheet is elevated keeping the openings at the bottom of the sheet/bowl closed.

The PRC function includes alternating action of obturator internus and adductor muscles like a teeter-totter. If the bowl is the center of the teeter-totter, the obturator internus and adductor muscles are the individuals on each end of the teeter-totter. The obturator and adductor muscles alternately act, tipping the ends up and down but the central core maintains a stable supported position. Obturator and adductor muscles alternately tip the teeter-totter up and down in small but equal degrees of motion. If one is dominant there is imbalance in the teeter totter and dysfunction in posture, joint alignment, and bladder and bowel.

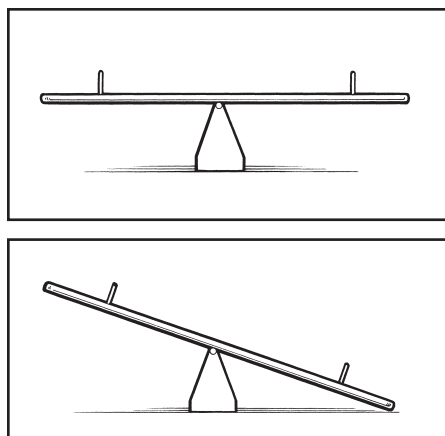


Figure 6-5: Teeter Totter

Innervation of the Pelvic Rotator Cuff

Nerves are essential to muscle function. They stimulate the muscle fibers to act. When nerve input to muscle fibers is destroyed the muscle cannot act and fades away much like a jellyfish dries up if left out of water on a hot beach.

Muscle fibers exhibit resting tone and contraction in response to nerve stimulation. When nerve activity at muscle junctions is constant at low intensity there is low level constant muscle activity called resting tone. When nerve activity at muscle junctions is more explosive and short duration groups of muscle fibers shorten in a more intense action called a contraction.

Muscle resting tone is controlled by the subcortex via the autonomic nervous system, sympathetic division. This nerve pathway sends messages to the muscle spindle setting the spring loaded spindle so the muscle has high, low or “just right” resting tone activity. In contrast, muscle contraction is controlled by the somatic, voluntary nervous system. This nerve pathway sends messages to the muscle fibers causing them to shorten in a contraction. Muscle contractions move joints and bones to accomplish an activity before the muscle relaxes or rests completely.

The Pelvic Rotator Cuff muscle system is a postural muscle system primarily controlled by the ANS- sympathetic division. Sympathetic nerve roots exit the thoracic and lumbar vertebral segments (Thoracic 11,12 Lumbar 1,2) to form the hypogastric plexus (bundle of nerves) which descends to the target organs and muscles. Sympathetic action sets the muscle spindle gamma bias of each muscle bundle which determines resting tone of the PRC. As a postural muscle system the PRC is always active at a low level to support internal organs, align sacroiliac joints, and facilitate upright stance balance. Nerve-muscle junctions alternate action and rest so some junctions are always active while others rest. This provides constant even postural support tone.

Parasympathetic division of the ANS is active stimulating the bladder and bowel to contract during elimination. It is relatively quiet at other times in the pelvic region. Parasympathetic nerve roots come from sacral vertebra 2,3 and 4 of the ANS.

The somatic, voluntary nervous system is active, stimulating the PRC muscles to act when there is a need to get to the bathroom in a

hurry. The individual, using the voluntary system, will consciously tighten the pelvic muscles to hold until reaching the toilet. It is also used during movement of the hips and back during walking and daily activities. The somatic nervous system innervation of the PRC is from sacral roots 2,3,4. They branch and bundle into the pudendal and pelvic nerves that innervate the pelvic muscles and obturator internus muscles.

Chronic pelvic and low back pain involves increased resting tone, muscle spasm and decreased circulation in the pelvic muscle region. Since ANS input to pelvic muscles directly controls circulation and elevated resting tone, to effectively resolve the pain pattern ANS rebalancing is essential. Q-Core Control exercises with Physiological Quieting® rebalance the ANS system, normalize muscle resting tone and increase circulation.

CHAPTER 7

Visceral Relationship to Pelvic and Low Back Pain

PELVIC PAIN AND LOW BACK pain can originate from internal organ dysfunction or positioning within the pelvic cavity. Visceral organ dysfunction can be from the genital, digestive or urinary systems. Organs and related structures include ovaries, Fallopian tubes, uterus and vagina in women, ejaculatory tubes and vas deferens in men, bladder, ureters and urethra, bowel, rectum and anus in both men and women. Pain sensation can also come from connective tissues such as fascia, ligament, blood vessels, nerve or parietal peritoneum.¹

Chronic pelvic pain is described as deep and nonspecific within the pelvis extending into the abdomen and low back. Pain can also be referred to the deep shoulder region. Interstitial cystitis (bladder syndrome), irritable bowel syndrome (IBS), constipation and uterine fibroids are just a few of the conditions linked to low back and pelvic pain.

Visceral organ position in the lower pelvis is also linked to back pain and pelvic pain. Pelvic organ prolapse is the descent of internal organs from their normal positions. In particular the bladder, uterus, small intestine, and rectum sink out of position as the fascial and pelvic muscle support deteriorates and descends. Prolapse becomes a support system failure affecting all organs, muscles and bony structures in the pelvis. Prolapse biomechanically alters the sacroiliac and lumbosacral joints through fascial attachments of the organs and muscles to the sacrum, coccyx and pubic bones. What happens inside the body is as important as what happens outside when alleviating CPP and LBP.

Bladder Connection to Pelvic and Low Back Pain

The bladder is composed of relatively unorganized interdigitating longitudinal, horizontal, and oblique smooth muscle. The bladder outlet is circular muscle externally and longitudinal muscle internally.

The body of the bladder expands to allow urine to accumulate. The bladder outlet's circular muscle remains closed to hold the urine in. Several times a day the body of the bladder contracts and the bladder outlet relaxes to let urine flow out (figure 7-1). The urethra is the tube that empties urine from the bladder. Blood vessels and mucous glands line the urethra so the lining is sticky with mucous and other fluids to help keep it closed. This closure is called coaptation.

The urethra is also lined with smooth muscle. The relatively high resting tone of this smooth muscle stimulated by the sympathetic division of the ANS maintains the urethra in a closed position.

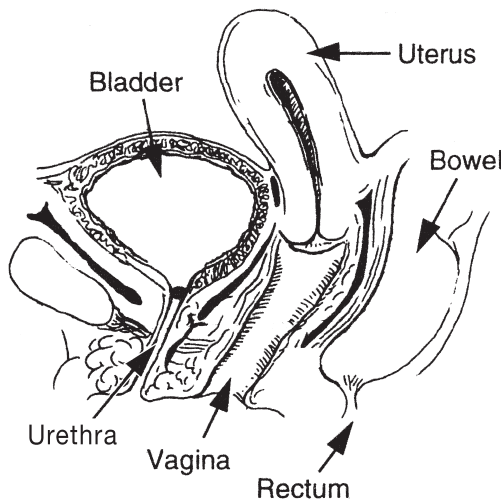


Figure 7-1: Internal organs - female

The bladder outlet is closed by PRC resting tone. The resting tone of pelvic diaphragm closes the urethra. The PRC pelvic loops help to maintain the bladder angle with the bladder tipped forward and the urethra directed down to keep the bladder outlet closed. Think of water in a straw. If the straw is bent the water stays in the straw. At the bladder outlet with the urethra the PRC pelvic sling maintains the bladder angle with the urethra. If the straw is straight (the bladder is in a straight line with the urethra) water runs out. The PRC slings release normal resting tone during urination so the urethra straightens and urine flows out.

The autonomic nervous system, sympathetic division, continually sends quieting messages to the bladder to keep it relaxed and filling

most of the day. The ANS messages enable the bladder to fill for 3-4 hours before telling the brain it is time to go to the bathroom.

Any PRC action sends reflex messages to the bladder and bowel wall to be quiet and content. The reflex inhibition principle is in effect between the PRC and the bladder and bowel.

An individual usually spends ten to twenty seconds 4-7 times/day urinating. The urethra opens during the few minutes that bladder emptying occurs. The bladder contracts during that time to push the urine out stimulated by the parasympathetic division of the ANS. The sympathetic division is inhibited during bladder emptying.

Painful bladder syndrome symptoms derive from spasm or irritation of the bladder, ureters and urethra. Symptoms include lower abdominal, pelvic and back pain, discomfort during urination, urinary frequency and poor urine flow. Urethral syndrome from hypoestrogenation is described as including pelvic pain and abdominal pain. Interstitial cystitis symptoms often include lower abdominal discomfort, pelvic and low back pain in conjunction with frequent urination day and night.² Bladder-sphincter dyssnergia often includes pelvic and low back pain in relation to urine retention and leaking. Spasm or irritation of the bladder reflexively alters pelvic muscle resting tone leading to potential trigger points and spasm in pelvic diaphragm and external urinary and anal sphincter muscles.

Bowel, Rectum, and Anus Connection to Pelvic and Low Back Pain

The intestines, small and large, are composed of a “tube within a tube” of smooth muscle. The smooth muscle tubes contract to propel food through the system, to facilitate the body’s absorption of nutrients and water and to eliminate waste products. This rhythmical automatic contraction sequence is called peristalsis. Contraction frequency in the colon is approximately 6 cycles per second.

The distal end of the intestines is the rectum and anus. Feces collect in the rectum while the anorectal angle is maintained by the puborectalis muscle and the external anal sphincter. Sympathetic division of the ANS enables the bowel to relax and fill with feces while the anus closes. When the bowel empties an individual usually spends a minute or two once a day having a bowel movement. At defecation, pressure

builds up in the rectum, the anorectal angle straightens with relaxation of the puborectalis loop of the pelvic diaphragm and feces descend, propelled by the colon contractions. The internal anal sphincter automatically relaxes with increased pressure in the rectum. The external anal sphincter tone automatically increases until the toilet is available. Then it releases to allow the bowel contractions activated by the parasympathetic division of the ANS to push the feces out.

Painful bowel syndrome symptoms derive from spasm or irritation of the small intestine, bowel, rectum or anus. Symptoms include recurrent deep abdominal and pelvic pain often associated with low back and sacroiliac discomfort. Irritable bowel syndrome (IBS), constipation, diarrhea, colitis, Chron's disease, anal-rectal pain syndrome and proctalgia fugax symptoms all include pelvic and low back pain as prominent symptoms.³ Pain magnification and biomechanical mechanisms are both factors in the transfer of symptoms to muscles and joints of the low back and pelvis.

Uterus and Vagina Connection to Low Back and Pelvic Pain

The uterus is composed of three layers of smooth muscle – longitudinal, oblique and circular. The body of the uterus is 3-4 inches long, and composed primarily of longitudinal and oblique muscle fibers. The outlet of the uterus, the cervix, has a higher concentration of circular muscle. It is connected to the vagina. The vagina is lined with smooth muscle except for the distal one third which contains striated muscle.

Painful uterus and vagina symptoms originate from spasm or irritation of the uterus and vagina. Symptoms include deep pelvic pain, low back and sacroiliac pain and discomfort. Dysmenorrhea, endometriosis, uterine fibroids, and uterine cancer exhibit symptoms of abdominal, low back and pelvic pain.⁴

Pelvic Organ Descent Relationship to Pelvic Pain and Low Back Pain

Pelvic Organ Prolapse (POP) Pelvic Organ Descent

Organ prolapse and general organ descent can be a major trigger for pelvic pain and low back pain in pregnant and postpartum women and women after 50 years of age. During pregnancy the weight of the growing baby and enlarging uterus leads to descent of the uterus,

bladder and bowel into the deep pelvis. The pelvic muscles thin and decrease in resting tone in preparation for delivery allowing the organs more room and less support. Since the pelvic organs and muscles attach to the sacrum, as they descend, alignment of sacrum, sacroiliac and lumbosacral joints is altered. This leads to pelvic and low back pain as well as potential hip, leg and foot pain. Most pregnant women have some pelvic, back and leg pain by the end of the pregnancy. Postpartum approximately 25% of women complain of pelvic and low back pain as well as bladder and bowel symptoms 3 months after delivery.⁵

During delivery the pressure to push the baby out also pushes the visceral organs into descended positions. The organs do not pop back into a pre-pregnant state automatically. Organ descent puts stress on the supporting connective tissue structures as well as changing joint alignment in the pelvis and back. The descending lumbar and pelvic nerve pathways can be stretched, compressed or irritated leading to pelvic, back and leg pain.

Women after 50 years of age experience pelvic organ prolapse and pelvic muscle descent at an increasing rate due to hormonal changes and aging effects on organs, muscles and connective tissue. Hypoestrogenation, the decrease in estrogen, related to menopause and aging, thins pelvic muscle tissue and decreases elasticity and moisture in muscle and connective tissue. Pelvic tissues thin, become dry and fragile and descend lower in the pelvis. Fifty-five percent of women between 50 and 59 years old had some degree of prolapse in a Swedish study.⁶ Over 80% of women by the time they are 70 have significant organ prolapse. The symptoms of prolapse include a heavy, dragging feeling deep in the pelvis, a feeling that the organs are falling out, fatigue in standing, low back and pelvic pain and foot pain sometimes misdiagnosed as plantar fasciitis.

Prolapse is defined by the visceral organ that is descending from its normal position in the abdomen. In reality, since pelvic organs are interconnected through connective tissue, if one organ prolapses the others will have altered positions in the pelvis too. Cystocele is descent of the bladder down the vagina. Rectocele is descent of the rectum down the vagina. The bladder or rectum push through a weakened area of the vaginal wall and slide down the vagina. Uterine prolapse is descent of the uterus down the vagina. First degree cystocele, rectocele or uterine

prolapse indicates the bladder, rectum or uterus have come through into the vagina but are still in an elevated position. Second degree indicates the organ has descended to just above the opening of the vagina. Third degree indicates the organ tissue is present outside the vaginal opening. This leads to dry, irritated and possibly ulcerated tissue that will be highly sensitive to contact during regular toileting. Uterine prolapse impacts bladder and bowel function, sexual activity and leads to an increase in urinary tract infections.

Repositioning pelvic organ prolapse through surgery has its own risks for pelvic and low back pain. In 2010 there were approximately 100,000 prolapse repairs using surgical mesh implants.⁷ Risks with mesh implants include pain from vaginal tissue erosion, infection, organ perforation and scar tissue. Pain during intercourse and bladder dysfunction may also be secondary to prolapse surgery using mesh implants. The mesh is a permanent implant so it may be impossible to completely remove it without additional complications. Organ realignment using Wonder W²edge[®] inversion techniques can relieve symptoms and sometimes prevent surgery and its potential complications.

Hernia Relationship to Pelvic and Low Back Pain

A hernia is a protrusion of tissue through a body cavity where it is normally contained. It is most often protruding through an opening or weakness in the muscular wall of the abdomen⁸. In men there is usually an obvious bulge on the outside. In women the protrusions are usually small and internal without an outward bulge. Sometimes in standing an abdominal exam reveals a small bulge. Risk factors for hernias in women include being overweight, multiple pregnancies and long labors during the delivery process.⁸ The symptoms can be debilitating pain from nerve or tissue irritation. In severe cases a piece of intestine is entrapped and gangrene occurs due to lack of blood supply. The most common is pain from entrapment of fat and compression of nerves. The individual may describe burning, pinching pain that shoots into the groin, leg and back. It is worse with exercise and prolonged standing, stair climbing, coughing and laughing. Relief often comes when the woman reclines.

Hernias are classified into three types, abdominal wall hernias, groin hernias and pelvic wall/ pelvic floor hernias. Pelvic pain can be experienced from pelvic wall/ pelvic floor hernias, abdominal wall and groin hernias. Pelvic wall/pelvic floor hernias include sciatic, obturator and perineal hernias. Sciatic hernia pain is described as one sided pelvic pain that can extend into the buttock and posterior thigh. Obturator hernia pain is located in the pelvis, into the hip and down the inner thigh to the knee. Perineal hernia pain is described as discomfort with urination or sitting rather than a specific pain pattern.

Abdominal wall hernias include epigastric, umbilical, spigelian and incisional hernias. Hernias of the linea alba, also known as epigastric hernias can cause colicky pain, nausea and vomiting. Umbilical hernias can lead to sharp and severe pain with coughing or straining. Spigelian hernias, within the abdominal muscle and fascial layers, can precipitate sharp constant or intermittent abdominal and pelvic pain and a dragging feeling. Incisional hernias lead to nausea, vomiting and intermittent abdominal, low back and pelvic pain. Internal pelvic hernias within the fascial and muscle support layers and the intestines lead to general abdominal pain, bloating and tenderness.

Groin hernias include inguinal and femoral. Inguinal hernia pain can be minor to severe in the pelvic and lower abdominal region. Often the individual has a sickening feeling in the pit of the stomach. Femoral hernias are rarely the cause of pelvic pain.

Diagnosing the specific hernia is essential and sometimes difficult if they are hidden and small. The small, deep hernias sometimes cause the most pain. An M.R.I. can reveal small holes in layers of muscle where fat or nerves can protrude. Since the holes may be very small sometimes it may require a trial of different positions to see the tissue protruding into the hole. Inguinal hernias can often be diagnosed through a vaginal exam with the symptoms reproduced by pressure on the internal inguinal area.

Surgical repair, often laparoscopic, of the hernia can provide significant improvement in symptoms. Exercise helps to maintain healthy abdominal and pelvic muscle tone to protect against hernias. Inversion on the Wonder W'edge[®] can realign internal organs and connective tissue. Then the correct exercise can provide improved support.

Fibroid Tumors (leiomyomas)

Fibroid tumors are benign tumors present within the uterus. They occur in up to 80% of women between puberty and menopause. Fibroid tumors are estrogen dependent growing larger when estrogen levels rise such as during pregnancy and with the use of hormone replacement therapy or birth control pills.⁹ They grow within the uterine wall or into the uterine cavity. Occasionally they develop on the outside surface of the uterus. Most women don't experience significant symptoms and may not know they have fibroids. Fibroids can grow to the size of a large grapefruit and there can be more than one in the uterus. Symptoms can interfere with daily function when large fibroids alter menstrual bleeding causing heavy and clotting bleeding and irregular bleeding cycles. There can be pelvic pressure and pain when the fibroids press on nerves or other innervated tissues. Their weight can lead to uterine descent with resulting bladder and bowel dysfunction such as urinary urgency and frequency and constipation. The uterine descent puts stress on the sacroiliac and lumbosacral joints leading to low back pain along with the pelvic pain. Painful intercourse can also be the result of fibroid tumors causing descent of the uterus and shortening of the vagina.

Foods high in phytoestrogens may increase fibroid growth in vulnerable women. Foods with chemical pesticides and growth hormones have zenoestrogens that can mimic estrogen in the body. Soy is a concentrated phytoestrogen product that may increase fibroid growth. Alcohol stimulates estrogen production and may increase fibroid growth. Eating a low fat and high fiber diet is the best recommendation for nutrition that will help and not stimulate fibroid growth.

Surgical options to remove the fibroids include a myomectomy (fibroid removal) or a hysterectomy. Both have potential for complications. A myomectomy may allow further childbirth but leaves uterine scar tissue at the site of the fibroid removal.

Post-Hysterectomy Complications

Chronic pelvic and low back pain can occur after a hysterectomy from circulatory, neurological or soft tissue structure dysfunction.⁹ Soft tissue dysfunction occurs when there is a problem with the vagina at the distal surgical site. It can be from an inclusional cyst, chronic stitch abscess, remnant endometriosis in the vaginal cuff, or vaginal prolapse.

Dyspareunia (painful intercourse) occurs after hysterectomy if there is inadequate vaginal expansion due to decreased sexual arousal from loss of nerve innervation to the vagina.

The uterus is attached to a major blood supply and nerve bundle. Along with the ligaments severed from the uterus, the blood vessels and nerve bundles no longer have distal attachments. This can disrupt the blood and nerve supply to the remaining vagina and ovaries as well as disrupt the lymphatic drainage in the lower pelvic region.

Pain from a residual ovary can be due to cyst formation in the ovary. This pain is most often cyclical following the hormonal changes of the menstrual cycle. Even when the ovary is removed, there may be a remnant inadvertently left that can exhibit itself as pelvic pain.

Postoperative adhesions are present after hysterectomy but they do not always cause pain. The pain from adhesions can be from the pull of the adhesions on the parietal peritoneum or from the adhesions themselves if they have developed their own vascular supply.

Hysterectomy surgical disruption of nerve tissue increases the incidence of ANS and sacral nerve plexus (S1-4) damage. This can lead to weakness and dysfunction throughout the pelvis, hip, knee and ankle. Sensory hypersensitivity, pelvic pain and low back pain can be experienced as sharp, burning pain as well as a deep aching pain.

CHAPTER 8

Postural Control and Breathing

Relationship to Pelvic and Low Back Pain

POSTURAL CONTROL THROUGH the trunk, back and pelvis is directly related to chronic pelvic and low back pain. Variations in postural alignment with chronic pain include abnormal axial rotation, poor pelvic control, stiff thoracolumbar motion and decreased hip extension and rotation.¹ The “control” in posture is through the autonomic nervous system and subcortex (primarily the cerebellum) at an automatic, unconscious level. Muscles of the posture system include the inner postural core cylinder of breathing diaphragm with the shoulder rotator cuff, abdominals (particularly transverse abdominus and internal obliques), multifidi and pelvic rotator cuff.² They function in an integrated system to promote upright postural support, lumbosacral and sacroiliac stability, balance during ambulation and bladder and bowel control. Secondary postural muscles include the outer core cylinder composed of abdominals (rectus abdominus, external and internal obliques), erector spinae, latissimus dorsi, and gluteals. These secondary postural muscles function during activities requiring maximum effort and when the primary system is imbalanced, injured or fatigued.

Postural muscles behave differently than “movement-through-space” muscles due to the number of nerve-muscle junctions in each muscle, the nervous system innervation and the system activation of postural muscles as a unit. Postural muscles have many nerve-muscle junctions compared to “movement-through-space” muscles. They are primarily innervated by the sympathetic division of the ANS with influence from the cerebellum. The sympathetic nerves automatically set and continually adjust the muscle spindle gamma bias throughout the postural muscle system for optimal alignment during functional activities. Posture is controlled at the unconscious level through proprioceptive feedback from joints and muscles and vestibular feedback from the in-

ner ear to the cerebellum. Visual feedback through the eyes is at a more conscious level through the cortex. Upright posture is made possible through the inner core cylinder of muscles acting as one unit to keep the body upright and balanced while accomplishing daily activities.³

Muscle Links

There are four muscle links to postural control. These four muscle links working together are essential for optimal postural control and pain free daily activities like walking, running, biking and weightlifting.

The 4 muscle links are:

1. abdominal muscles
2. back muscles (mulifidi and erector spinae)
3. breathing diaphragm muscle
4. pelvic core muscles- pelvic rotator cuff

Abdominal Muscles

There are four abdominal muscles that work as two cylinders during upright activities. The deep inner cylinder, the primary postural cylinder, includes the transverse abdominus and internal oblique muscles. The outer core cylinder, the primary movement cylinder and secondary postural cylinder, includes the internal, external oblique and rectus abdominus muscles. When abdominal muscles are weak and out of shape an individual may experience back pain, stitches in the side and bladder or bowel problems.

The transverse abdominus is called the “girdle” muscle and is deep below the obliques and rectus muscles. It wraps around the abdomen like a girdle from the ribs, pubis and linea alba to attach on the spine via the thoracodorsal fasciae. This is an important muscle that supports the lower spine and internal organs.

The external and internal oblique muscles are the largest muscle group of the abdomen. They run along the sides and front of the abdomen from the ribs to the crest of the pelvis and connect in the center through a band of tissue called the linea alba. The internal oblique muscles are deeper and function as postural muscles more than movement muscles. The external oblique muscles are more superficial and primarily movement-through-space in function. These muscles decrease the waistline as they improve in tone and strength.

The rectus abdominus muscles are long flat muscles running from the pubic bone to the ribs and sternum on either side of the belly button. The two sides of the muscles are connected by a band of tissue running down the middle of the abdomen and through the belly button, the linea alba. The rectus abdominus muscles support abdominal organs as they improve in tone and strength.

Back Muscles

The back muscles, multifidi and erector spinae provide support along the spine. The primary postural muscles are the multifidi, a part of the inner core cylinder. They are deep, short and run obliquely across the vertebral joints connecting with the abdominal muscles via the thoracodorsal fascia at the spine. The secondary postural muscles of the back are the erector spinae and are part of the outer core that is primarily involved in movement-through-space. These muscles extend and straighten the spine and secondarily provide help with postural tone.

Breathing Diaphragm and Pelvic Core Muscles

The breathing diaphragm and pelvic core muscles form the top and bottom of the deep postural cylinder. They are called “drivers” because they stimulate or jump-start abdominal and back muscle girdle action. These breathing and pelvic muscle groups automatically stimulate postural core power through their actions during breathing and walking.

When an individual is unable to walk or breathing is dysfunctional the postural support cylinder becomes dysfunctional and upright function is significantly altered. Breathing pattern and pelvic rotator cuff dysfunction increases sympathetic arousal altering motor control, triggers smooth muscle action leading to vasoconstriction and muscle spasm including colon spasm, reduces oxygen release to cells leading to ischemia, fatigue, pain and trigger points, and creates biomechanical overuse stresses that compromise core stability and posture.⁴

Breathing Diaphragm

The breathing diaphragm rests in a dome shape at the top of the postural cylinder attached to ribs, sternum and lumbar spine. It connects with abdominal muscles at the ribcage and connects with back muscles at the spine. It connects with pelvic muscles via the quadratus

lumborum and psoas major, two muscles within the abdominal cylinder. Abdominal organs connect to the breathing diaphragm through fascial attachments.⁵ The breathing diaphragm contracts and descends during inhale moving from its resting position at the fourth rib down to the sixth rib level. It relaxes and ascends to its rest position during exhale. In normal diaphragmatic breathing, it descends and returns to the rest position 12-14 times per minute each minute of each day.

Pelvic Rotator Cuff

The Pelvic Rotator Cuff forms the bottom of the postural cylinder. It rests in a dome shape attached to sacrum/coccyx, arcuate tendon, pubis and greater trochanter of femur. These muscles are the fourth link in postural power. They connect with abdominal muscles at the front of the pelvis on the pubic bone and connect with the back muscles at the sacrum. They connect with the leg muscles at the hip. When the pelvic rotator cuff muscles act they send electrical impulses into abdominal and multifidi muscles, automatically increasing transverse abdominus and multifidi muscle activity. As primary postural muscles they act in coordination with the breathing diaphragm to facilitate dynamic spinal stiffness and postural adjustments.

Function

Breathing diaphragm and pelvic rotator cuff coordinated action facilitates many body functions. They facilitate oxygen-carbon dioxide exchange in the lungs. They facilitate optimal pH of all body fluids through the oxygen-carbon dioxide exchange. They gently mobilize the thoracic and lumbar spine 12-14 times per minute. Breathing diaphragm movement massages sympathetic nerve roots as they exit the thoracic and upper lumbar vertebrae affecting organ function and pelvic muscle resting tone. Pelvic rotator cuff action mobilizes sacroiliac joints and massages sacral nerve roots as they exit. Together they function as a pump for blood and lymph circulation from the lower body up to the heart and within the pelvic organs and related structures. The major organs of the trunk are suspended from the breathing diaphragm either directly or indirectly so the rhythmical movement of the diaphragm helps maintain normal mobility of these organs. The major organs are supported from the base by the PRC.

The breathing diaphragm and pelvic rotator cuff in conjunction with the transverse abdominus and multifidi assists in spinal stabiliza-

tion by increasing intra-abdominal pressure during limb movement.⁶ Synergistic action of the breathing diaphragm, transverse abdominus, multifidi and pelvic diaphragm muscles is related to sacroiliac joint stability and pain free function.⁷ Diaphragmatic breathing is essential for spinal health, bladder, bowel health and continence. Altered breathing patterns are related to back pain, bladder and pelvic muscle dysfunction.^{8,9} Diaphragmatic breathing is the first exercise to implement to achieve lumbopelvic, sacroiliac and bowel/bladder health. The second exercise is Roll for Control[®], activating the pelvic rotator cuff muscles.

Restoring the automatic coordinated action of breathing diaphragm, pelvic rotator cuff, abdominals, and multifidi is essential to restoring health function. As the breathing diaphragm descends with each inhale the abdominal cylinder decreases in its vertical dimension and abdominal contents are compressed and pushed down on the pelvic musculature and the outlets. The automatic muscle synergy is designed to allow slight abdominal expansion front to back during inhale to modulate the increased intra-abdominal downward pressure. If the abdominal muscles are forcefully contracting during the inhale phase of diaphragmatic breathing (as in holding the abdomen tight for “good posture”) the organs are directed down and out through the pelvic muscle openings of the urethra, vagina, and anus. Additionally, when abdominal muscles are actively contracting during inhale, reverse breathing occurs and accessory muscles of the neck and chest become the primary breathing muscles leading to neck and upper back pain. This leads to significant alteration in pH and oxygen/carbon dioxide levels, pelvic circulation and pelvic muscle function.

When the pelvic muscles that attach to the sacrum act they dynamically align the sacroiliac and lumbosacral joints, facilitate spinal alignment and increase activity in the back muscles. Pelvic muscles facilitate abdominal muscle tone and strength with every step taken in walking. Restoring the automatic unconscious pelvic-abdominal-multifidii muscle link is the final step in pain-free postural control.

Postural core power is complete when the four links function as one unit in tone and function to automatically stabilize the head and trunk over the pelvis and legs during work, play, sports and health.

To more easily understand how this muscle system functions imagine Humpty Dumpty, a toothpaste tube and a wave.

The Egg Humpty Dumpty.

An egg like Humpty Dumpty sits on a wall. When the egg is balanced it stays on the wall. When it is imbalanced it falls off the wall and breaks to pieces (figure 8-1).

The Toothpaste Tube. A toothpaste tube can be squeezed from the bottom up, from the middle, or from the top down. The toothpaste would be squeezed up and out the top when squeezed from the bottom up. When squeezed from the bottom up. When squeezed from the middle the toothpaste would be pushed towards both ends. When squeezed from the top the toothpaste would be pushed to the bottom and out any holes or weakened areas.

The Wave. An ocean wave rises and falls as it comes in to the shore and goes back out to sea (figure 8-3).

Now correlate these everyday visuals with PRC function (figure 8-2).

The PRC acts synergistically with the transverse abdominus, multifidi and lumbo-pelvic fascia like the Humpty Dumpty egg balanced on the wall. When the PRC acts there is synergistic contraction of the transverse abdominus and vice versa. The transverse abdominus contraction tightens the lumbo-pelvic fascia and facilitates multifidus contraction to support the low back and internal organs. When the ratio of PRC contraction and transverse abdominus contraction is optimal Humpty Dumpty is balanced and functional. If the abdominal muscles, especially the oblique muscles and rectus abdominus, contract excessively Humpty Dumpty is imbalanced, and crashes to the ground in many pieces.

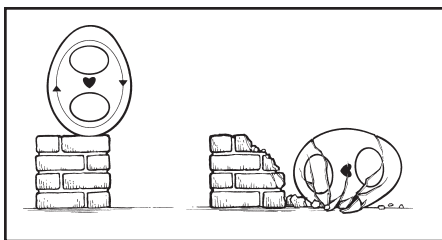


Figure 8-1: Humpty Dumpty

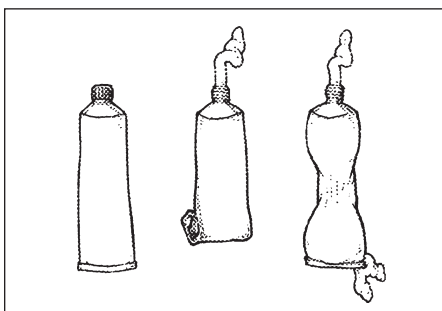


Figure 8-2: Toothpaste Tube

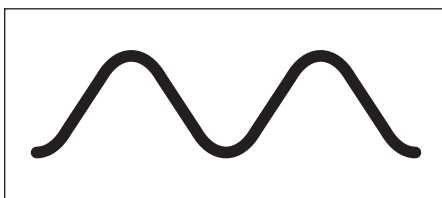


Figure 8-3: Wave

The top of the Humpty Dumpty egg is the breathing diaphragm. It functions much like an **ocean wave**. The breathing diaphragm moves up and down 12-14 times per minute. As the breathing diaphragm moves down with inhale intra-abdominal pressure increases and tends to push the bladder and bowel down putting pressure on the outlets of the bowl. The PRC must maintain its position and support of the bladder, bowel, and lumbar spine to counteract this increased pressure. It accomplishes this by lifting with the outrigger pulleys (obturator internus muscles) and facilitating action of the bowl (pelvic diaphragm) through overflow of electrical activity from the adductor muscles. On exhale the breathing diaphragm returns to a dome shape elevating the organs as much as 1-3 cm. and decreasing intra-abdominal pressure. The PRC can be at relative rest during the exhale phase if there are no outside factors that increase intra-abdominal pressure. When there are outside forces that increase intra-abdominal pressure, the PRC can use adductor muscles to increase the lift force of the pelvic diaphragm.

The PRC, abdominals, and breathing diaphragm work together like pushing on a toothpaste tube. When the transverse abdominus and PRC are synergistically acting during exhale, the toothpaste (internal organs) is pushed from the bottom up towards the top of the tube. When the oblique abdominals are acting from the top down as in a curl up or crunch, the toothpaste tube is squeezed from the top or middle pushing the toothpaste down and out the bottom of the tube. It is important to use muscles appropriately in support of the lumbar spine and internal organs in order to have optimal health and function. In other words it is important to have the toothpaste pushed from the bottom of the tube up.

Postural Control

Vleeming et. al. describe the interconnection of the latissimus dorsi muscle and the contralateral gluteus maximus via the thoracodorsal fascia.¹⁰ In function this outer core oblique system is effective in secondarily stabilizing the back and sacroiliac joint during rotational activities and load transfer, as reported by Mooney.¹¹ In theory, the

latissimus dorsi and gluteus maximus muscles coordinate with the obturator internus of the PRC to stabilize the sacrum and coccyx at the base of this internal chain. The abdominal and back muscles form a girdle connecting shoulders and ribs with spine and hips.

Working together postural core muscle power:

1. balances and aligns the head and trunk over the hips and legs in all standing activities,
2. dynamically stabilizes the spine as it twists and turns during daily activities,
3. normalizes nerve pathways,
4. assists diaphragmatic breathing,
5. lifts and supports internal organs,
6. pumps blood and lymph towards the heart,
7. improves pelvic core support and,
8. shapes the waist and flattens the lower abdomen.

Lumbo-Pelvic Function, Balance and Ambulation

Relationship to Pelvic and Low Back Pain

LUMBO-SACRAL-PELVIC alignment and function are directly related to or secondarily affected by chronic pelvic pain syndromes. Dysfunction in lumbosacral, sacroiliac, sacro-coccygeal and symphysis pubis joints refers pain into low back, pelvic, hip and thigh regions. Pelvic joint alignment influences surrounding pelvic ligaments and muscles that function to support and stabilize internal visceral organs. Withdrawal patterns secondary to pelvic joint dysfunction activate abnormal muscle patterns within the pelvis and influences pelvic circulation. Pelvic joint dysfunction facilitates neurologic mechanisms for peripheral pain sensitization leading to chronic pain syndromes. The lumbo-pelvic region is an integral part of a complex kinematic, neurologic and biomechanical system that includes the bony pelvis, internal organs and pelvic muscles.

Stability of the lumbo-pelvic region is important because of the need to repetitively transfer weight, movement and force of the upper body through this region to the legs and feet during upright activities. Stability implies the ability to effectively transmit weight, movement and force through joint structure.

Stability of the lumbo-pelvic region has been conceptualized by Panjabi as three fold:

- passive – ligamentous/osteoarticular
- active – muscle/fascia
- control– neural

Stability is accomplished through the neutral zone which is a small range of movement on either side and through the neutral joint position where there is the least resistance of bony or ligamentous structures.¹

The passive – ligamentous/osteoarticular component of stability includes:

- shape and cartilage of the sacroiliac, symphysis pubis, and lumbosacral joints
- ligaments supporting the sacroiliac joint including:
 - iliolumbar ligament
 - sacrospinous ligament
 - sacrotuberous ligament
 - sacroiliac ligament (long dorsal, ventral and interosseous)
- ligaments supporting the symphysis pubis joint including:
 - superior and inferior pubic ligaments
 - anterior and posterior pubic ligaments
- ligaments supporting the lumbosacral joint including:
 - iliolumbar ligament
 - thoracolumbar fascia

The active – muscle/fascia component of stability includes:

- muscles stabilizing the sacroiliac joint including:
 - transverse abdominus via the thoracolumbar fascia
 - multifidus via the sacroiliac ligaments
 - piriformis
 - biceps femoris via the sacrotuberous ligament
 - pelvic rotator cuff
 - gluteus maximus
- muscles stabilizing the symphysis pubis joint including:
 - abdominals
 - pyramidalis
 - adductor longus which attaches across the joint
 - pelvic rotator cuff
- muscles stabilizing the lumbosacral joint including:
 - multifidus
 - erector spinae
 - quadratus lumborum via the lumbosacral ligament
 - abdominals via the thoracodorsal fascia
 - psoas

The control – neural component of stability includes:

- autonomic nervous system- sympathetic division
- voluntary nervous system
- integration of the two systems in muscle function

The bony connection between the spine and lower extremities is the sacrum and pelvis. The sacrum is keystone shaped and wedged between the two ilium bones. The sacroiliac joints (SIJ) have closely fitting joint surfaces that allow small amplitudes of motion at each joint. Further limiting SIJ motion and preventing excessive vertical shear are forces produced by overlying ligaments, fascia and associated muscles.²

During upright activities including ambulation the sacrum rotates forward, nutates, to improve SIJ stability in anticipation of increased joint loading for one foot stance during walking or two foot stance during squatting or forward bending. This prepares the pelvis by tightening the appropriate ligaments which further compress the joints. A chain reaction of preparatory motion occurs through the lumbosacral joints into the lumbar facet joints.³

The sacrotuberous and long dorsal sacroiliac ligaments are an integral part of monitoring nutation and counternutation amplitude. Sacrotuberous ligaments tighten during sacral nutation. Long dorsal sacroiliac ligaments tighten during sacral counternutation, posterior rotation of the sacrum on the ilium. Simultaneously it limits excessive anterior rotation of the pelvis. Counternutation creates increased motion at the SIJ and is part of a flat lumbar spine pattern. Nutation creates optimal dynamic stability at the SIJ unless there is asymmetry, one SIJ in relative counternutation to the ilium compared to the other side. Pelvic pain and low back pain are symptoms of both patterns.

Lumbosacral joints are the only bony connections between the upper body and legs. They connect seventy percent of the body weight, carried in the head and trunk, with the mobile lower extremities. Fifth lumbar facet joints articulate with sacral convex joint surfaces, with support from lumbosacral ligaments, the strongest and largest in the pelvic region, These ligaments, in conjunction with multifidi, allow small amplitude movement while stabilizing this crucial connection.

Pubic symphysis is the joint connecting the two ilium. The joint is composed of two relatively flat surfaces connected by a fibrous disc called the symphysis pubis. The pubic joint sits under the abdomen and in a caudal position compared to the SIJ. The pubic ligaments interdigitate with the disc and abdominal and adductor muscles to provide dynamic support. Separation or malalignment of the pubic symphysis leads to joint pain, lower abdominal and pelvic pain as well as bladder

dysfunction. Osteitis pubis, a degenerative condition refers pain into the adductor muscles and hips and scrotum in men. Excessive or repetitive strain of the pubic joint during sports like kick boxing, hill climbing, or soccer can lead to pubic symphysis symptoms.⁴ Pregnancy with the resulting relaxation of connective tissue can lead to separation of this joint with excessive hip abduction.

Muscle and fascial support for the lumbo-pelvic region is conceptualized as two cylinders, an inner core stability cylinder and an outer core movement-through-space cylinder.

Inner core stability cylinder function is to maintain upright postural alignment during daily activities. It is composed of deep postural muscles as described in Chapter 8. Primary innervation is through the autonomic-sympathetic nervous system and the cerebellum/subcortex to nerve-muscle junctions set for postural tone.

Outer movement-through-space cylinder muscle function is to first move the trunk and head into functional positions so arms and legs can accomplish daily tasks. Secondly, this cylinder functions as a stabilizing assist system. It is composed of peripheral muscles of the trunk as described in Chapter 8. Primary innervation is through the voluntary nervous system and the cortex to nerve muscle junctions set up to create movement through space to accomplish a set task quickly and efficiently before resting completely. Outer core muscles serve stability functions for short periods and primarily during a need for overflow stability with an unexpected or overload task. When asked to function as primary stabilizers their lack of nerve-muscle junction sites results in pain and injury over the long term.

Pelvic muscles as part of the inner core cylinder significantly influence dynamic stability of the lumbo-pelvic and sacroiliac region during physical activity. Inner cylinder muscles work as a balanced unit as directed by the cerebellum for postural alignment and adjustment. Imbalance or dysfunction within the cylinder results in a system collapse rather than one muscle in spasm or with trigger points. Pelvic, low back and abdominal pain result.

The inner core stabilizer cylinder facilitates lumbo-pelvic and sacroiliac stability directly and indirectly:

1. Sapsford et. al. describes synergistic activity of the pelvic diaphragm and the abdominal muscles. Synergistic means

automatic and sequential action.⁵ Activation of pelvic diaphragm muscle tone increases abdominal muscle tone automatically. Thus when the PRC acts it facilitates abdominal action which increases thoracodorsal fascia tension and intra-abdominal pressure to stabilize the low back and sacroiliac joints. The transverse abdominus acts like a girdle squeezing around the lower abdomen and back, facilitating action of the multifidi and thoracolumbar fascia to support the lumbar spinal segments and lumbo-sacral junction dynamically supporting the spine. There is automatic stiffening of the spine and stabilizing of the pelvis.

2. Vleeming et. al. describe function of sacroiliac ligaments in stabilizing the SIJ for back, arm, and leg movements. They prevent excessive sacral motion. These ligaments are influenced by their attachments with the PRC and multifidi muscles.⁶
 - a. Pelvic Rotator Cuff - obturator, outward rotation phase - facilitates multifidi contraction to stabilize lumbar facet joints and sacroiliac joints. The obturator phase nutates the sacrum and creates posterior rotation of the ileum.⁷
 - b. Pelvic Rotator Cuff - adductor phase, inward rotation phase - facilitates transverse abdominus to thoracodorsal fascia tension to support internal organs and stiffen lumbar spine. Adductor phase counternutates the sacrum and creates anterior rotation of the ileum.
 - c. Together they reinforce ligamentous support of the sacroiliac joints through the balance point during functional activities.
3. Kapandji describes enhancement of symphysis pubis stability when bilateral adductor longus muscles cross over the joint to attach on the pubic rami and blend with the anterior ligament. Bilateral adductor longus and brevis muscle contraction compresses the symphysis pubis joint and decompresses the sacroiliac joints.⁸ Simultaneously they facilitate pelvic diaphragm action counternutating the sacrum and anteriorly rotating the ileum. The adductors are not attached directly to the pelvic diaphragm muscle, so when they contract there is no direct caudal force exerted on the PRC.

4. The chain of fascia and ligaments from the foot to the lumbo-pelvic region is continuous such that distal movements of the lower leg and foot can assist in the stability of the pelvis. The pelvic diaphragm connects to the obturator internus at the arcuate tendon, which shares fibers with the sacrotuberous ligament, which interconnects with the biceps femoris, which attaches to the head of the fibula and the fascial connections of the peroneal muscles, which attach on the navicular and the 5th metatarsal of the foot. Ankle and toe actions send a force through these interconnections to balance nutation and counternutation of the sacrum for back stability during gait and upper extremity activities.
5. The breathing diaphragm synergistically facilitates transverse abdominus action during inhale and exhale phases of breathing. As the breathing diaphragm ascends with exhale, elevating the internal organs 1-3 cm and decreasing intra-abdominal pressures, the transverse abdominus tone increases, further stabilizing the lumbo-pelvic region. As the breathing diaphragm descends and abdominal tone decreases during inhale, the internal organs are compressed and intra-abdominal pressure increases, stiffening the lumbo-sacral spine. The inner core deep stabilizer cylinder is integral to optimal pain-free function of the:
 - Low back and pelvis during daily activities,
 - Lumbosacral region during upright posture and walking,
 - Urogenital and gastrointestinal system continence.

It is integral to pain-free back and pelvic function after:

- Spinal Surgery
- Pelvic Surgery
- Abdominal Surgery
- Hip and Knee Surgery
- Stroke
- Multiple Sclerosis
- Parkinson's Disease
- Head Injury.

Standing Balance

The ability to stand and balance is an amazing accomplishment, the result of multiple factors including musculoskeletal, motor control (neurological), and sensory control. The ability to stand upright requires the u-joint of the sacral-pelvic-hip connection to be balanced in its midline rock and roll. Standing balance is weight shift in a figure of eight pattern between the two feet while the knees rotate around the anterior/posterior cruciate ligaments and the hips perform small outward and inward rotation. The PRC reciprocal action of obturator and adductor phases creates this automatic rhythmical action. At the same time the PRC is part of the postural muscle synergy to maintain spinal alignment over the pelvis during standing.⁷

The musculoskeletal factors in standing balance include hip stability and recovery from instability of postural sway movements. The presence of pain, alterations in joint range of motion, or alterations in muscle length or strength may produce dysfunction in balance. Muscle weakness, imbalance in muscle length or strength and/or lack of muscular endurance can affect balance. Motor control (neurologic) factors include components of the spinal cord and subcortical reflex arcs with higher levels of control utilizing the somatosensory, visual, and vestibular feedback loops. The brain integrates information, ultimately determining the appropriate motor response from the sensory system. As sensory and motor systems change with age, response speed and accuracy of feedback loop responses decrease. The result is slower and poorer balance response to outside perturbations.⁹

The PRC is a key component in standing balance. It provides essential stability and force transfer through the pelvic and hip regions. Postural sway is, in part, horizontal movement of the pelvis over the stance leg. Based on the ball and socket shape of the acetabulum and femoral head, postural sway has a significant rotational component around the two foot base of support. It forms a figure-of-eight motion over the base of support through the midline.¹⁰ Weight is transferred automatically from left heel, along the lateral foot border to the big toe, then diagonally back to the right heel, up the lateral border and across to the left big toe in response to internal and external perturbations. The PRC with its rotation components facilitates subtle smooth responses to outside perturbations. The PRC maintains sway within the midrange of

motion over the base of support. It sets the stage from which the pelvis responds and the torso remains upright.

Ambulation

Walking is reciprocal catching the loss of one foot balance through horizontal rotation of the pelvis. The pelvic rotator cuff creates the pelvic horizontal rotation during alternating one foot stance. It first brings the head and trunk forward and over the stance leg. Then pelvic rotation brings the swing leg and trunk forward to produce a smooth, efficient forward step. The low back and sacroiliac joints are alternating in the rotation and rocking. Repetitive, reciprocal, balanced PRC action is required for pain-free ambulation.

Each step during walking is a PRC action.¹¹ The trunk participates in gait by rotating in a horizontal arc around the hip joints. The trunk winds and unwinds on the weight bearing lower extremity during each walking cycle. From heel strike to toe off, the pelvis rotates clockwise and then counterclockwise and over the weight bearing femur. After heel strike weight is transferred along the lateral border of the foot increasing the longitudinal arch. The weight is then transferred across the transverse arch to the big toe for push off with simultaneous decrease in the longitudinal arch. The PRC is continually active during all phases of ambulation to accomplish the small amplitudes of midrange to midline rotation. Pelvic rotation is one of the major determinants of locomotion that serves to lessen the amplitude of the vertical excursion of the center of gravity of the body during each step, thus decreasing energy expenditure of gait.¹² Pelvic rotations elongate the step length.

Gait patterns change significantly with pelvic pain and low back pain.¹¹ Pelvic-hip rotation decreases with pelvic pain and low back pain. A positive Trendelenburg sign and waddling gait show inability to hold the pelvis in the horizontal plane.¹² Step length and walking speed decrease. Balance during one foot stance decreases.

The medial and lateral hip rotator muscles are active in gait. These two groups work together throughout gait to improve efficiency, maintain balance, and assist in transfer of force from the outside to the inside of the foot over even or uneven terrain. The lateral rotator group includes the obturator internus and externus, the superior and inferior gemelli, the quadratus femoris, and the piriformis muscles. The medial

rotator group includes the adductors, gracilis, pectineus, and to some extent gluteus minimus and medius muscles. If for any reason there is an imbalance in function between these two groups gait will be altered and balance will be compromised. For example, if there is shortening or spasm of trigger points in the adductors of the medial rotator group the resulting reflex inhibition of the lateral rotators will significantly alter movement above and below this axis. Pelvic and trunk rotation in the horizontal plane are altered. Significant midline rotation at the knee, ankle and foot that enable transfer of weight from heel to big toe for push off during walking is limited. Walking becomes stiff, slow and painful when midline rotation is lost. When the adductors dominate action over the outward rotators the base of support narrows during dual stance. In an extreme case the feet cross over one another. The PRC assists in effective stability during the stance phase and efficient mobility during the swing phase of gait. Thus the PRC functions as the dynamic rotator cuff of the pelvis through the entire lower extremity. When dysfunction occurs within the system efficiency and safety during standing and walking are significantly impacted.

Neurology of Chronic Pelvic and Low Back Pain

In most chronic pelvic and low back pain there is no ongoing inflammation, infection or peripheral tissue trauma even though brain centers responsible for interpretation of information from nociceptive (threat) nerve fibers are registering “pain”. Nociceptive nerve fibers transmit information from peripheral tissues in the pelvis and low back concerning threat of potential tissue damage. Pain is an interpretation of that message by the brain center. Pain is defined by the International Association for the Study of Pain (IASP) as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage”.¹ Nociceptive fibers transmit information about a threat while the brain center says “pain” and rates its intensity.

Pain travels via both somatic and visceral afferent sensory nerves (figure 10-1). Somatic afferent nerves transmit information from skin, subcutaneous tissue, skeletal muscle, and parietal peritoneum. When there are trigger points in muscle, pain can be referred through somatic afferent nerves from the muscle to the motor/sensory area of the brain via the dorsal horn of the spinal cord. The pain felt is sharp and localized. Visceral afferent nerves transmit information from abdominal and pelvic viscera, sweat glands, organs, visceral peritoneum, and blood vessels. When there is pain producing sensations in these structures it is transmitted to the dorsal horn of the spinal cord and then to both the limbic (emotional) system and prefrontal cortex of the brain. This pain is felt in a general area and described with an emotional component as terrible or dreadful.

In chronic pain the amplitude and affected area are not proportional to the injury or tissue damage. The relationship between pain description and organ/ tissue condition becomes weaker or nonexistent as longevity of pain continues. Lifestyle changes including withdrawal from work, recreational and social interactions, are excessive in relation to any tissue damage.² Changes in nociceptive transmission, from peripheral

perature and vibration as painless sensations. These sites can become hypersensitive as chemical changes in the tissues occur over time. These sensations are then transmitted as threats and picked up by the brain centers as pain.

Peripheral sensitization can occur when there are changes in peripheral tissue. Peripheral tissue changes include:

- Ischemia from decreased circulation,
- Waste product accumulation, and
- Biochemical changes within the nerve itself.

Ischemia, lack of circulation, to muscles and nerves leads to chemical changes including increases in lactic acid, potassium, histamine and bradykinin. Biochemical changes within nerves increase “threat” chemicals such as nerve growth factor (NGF), adenosine triphosphate (ATP) and substance P along with other neurokinins.⁴ These chemicals are involved in creating hyperalgesia and in lowering the set point for neuron activation.⁵ All these chemicals remain in the system and can be self-perpetuating long after any inflammation or trauma is resolved.

As the visceral or somatic nociceptive nerve fibers travel from threatened tissue through connective tissue and muscle to the spinal cord they spread their complaints to these non-involved tissues. Since nociceptive nerves are poorly myelinated or unmyelinated there is no insulation to keep their messages isolated to the nerve alone. Instead pain messages are told to every tissue they come in contact with. The ileopsoas is often irritated and in spasm from nociceptive nerve irritation as the pelvic sensory nerves travel through the ileopsoas to the spinal cord. These tissues remain affected long after the initial threat is gone. Ongoing nociceptive messages from the originating tissues and now from associated tissues are carried to the dorsal horn of the spinal cord which develops its own hyperalgesia called central sensitization.

Central Sensitization

Central Sensitization is self-perpetuating dorsal horn neuron hyperactivity in magnitude and duration at the spinal cord level. Nociceptive neurons spread their messages to other quiet nociceptive neurons waking them up to magnify pain perception at the spinal cord level. This is called “cross talk”. Nociceptive nerves also stimulate non-nociceptive neurons so light touch etc. is also perceived in the brain as pain.

Pain enhancing chemicals at the dorsal horn change with chronic pain (figure 10-2). Non-nociceptive sensory fibers typically have opiate influence as they connect with interneurons at the dorsal horn. The opiate receptors are stimulated by serotonin which modulates pain perception. If serotonin is depleted, the influence of substance P on the non-nociceptive sensory fibers increases. Substance P is a pain enhancer, so with chronic pain, substance P and other pain enhancing chemicals can become a predominant influence. Non-nociceptive fibers become nociceptive in nature: touch, pressure, temperature and vibration are perceived as pain by the brain when sensitized at the dorsal horn. Additionally, sensory messages are modulated in nociceptive fibers by opioids/enkephalins, so depletion of opioids or their precursor serotonin, results in increased pain perception. Biochemical changes at the spinal cord level begin immediately and form a self-perpetuating feedback

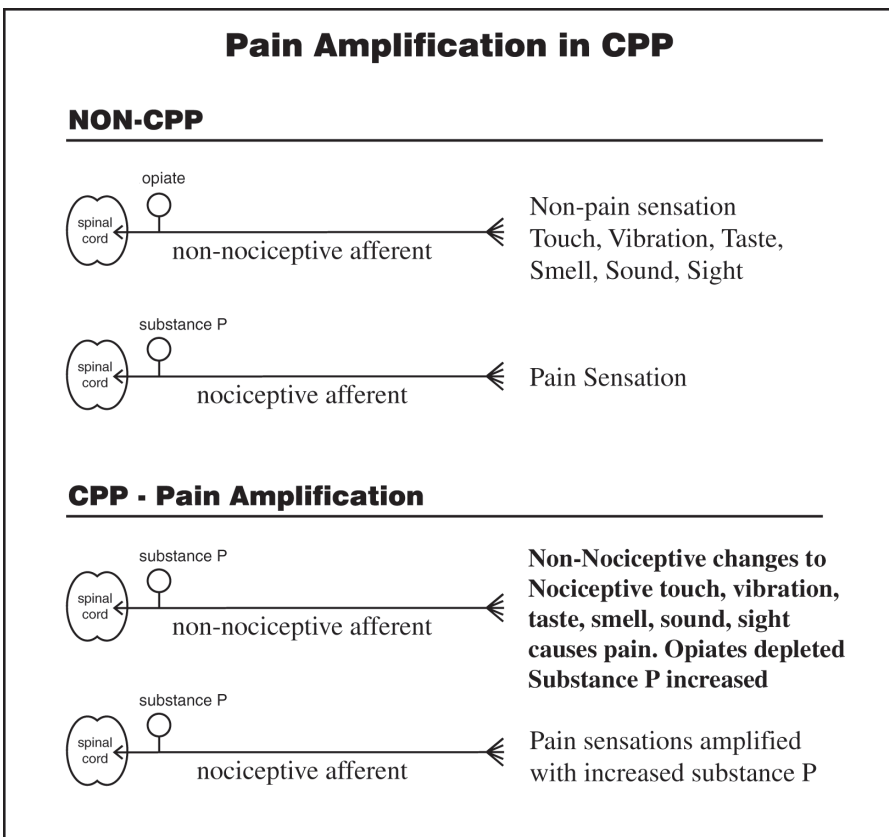


Figure 10-2: Pain Amplification

loop. Immediate neurotransmitter changes that can become long-term include increased glutamate and substance P which alter calcium channels and protein structures that create hypersensitivity.⁶

Visceral sensations that before would be undetectable become overbearing. Bladder hyperirritability in interstitial cystitis (bladder pain syndrome) is one example of sensitization without pathology present.⁷ It can spread to bowel and uterus causing them to be perceived as painful. It can cause the individual to toilet every 30 minutes and have discomfort in the pelvic, abdominal and low back regions. Somatic sensations of back spasm and pain that would be minimally noticeable now control the individual's life.

Visceral nociceptor fibers influence somatic sensory and motor fibers at the dorsal horn via interneurons. Somatic tissues include skeletal, joint, muscle, fascia, blood and lymph vessels and nerves. The somatic sensory and motor fibers can be sensitized by the visceral nociceptor fibers of the same spinal cord level. This is called viscerosomatic convergence and results in somatic muscle, subcutaneous tissue and skin hypersensitivity and pain.⁸ Viscerosomatic convergence and crosstalk enable visceral pain to be referred to striated muscle in the form of turgor or spasm in the same or related myotome spinal segment or to skin in the form of hypersensitivity, moisture or color changes in the same dermatomal pattern (figure 10-3). Individuals describe muscle spasm in specific shoulder, groin, back and buttocks areas in dermatomal patterns (figure 10-4).

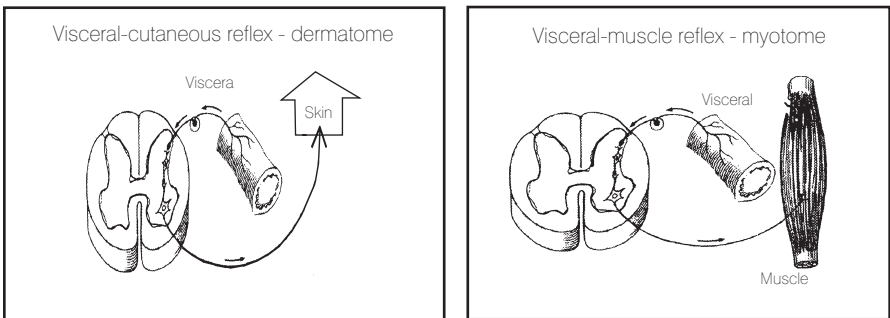


Figure 10-3: Visceral cutaneous and visceral muscle reflexes

Somatovisceral convergence is also a possible cause of pelvic and abdominal pain. Sympathetic nerve roots to bladder, bowel and

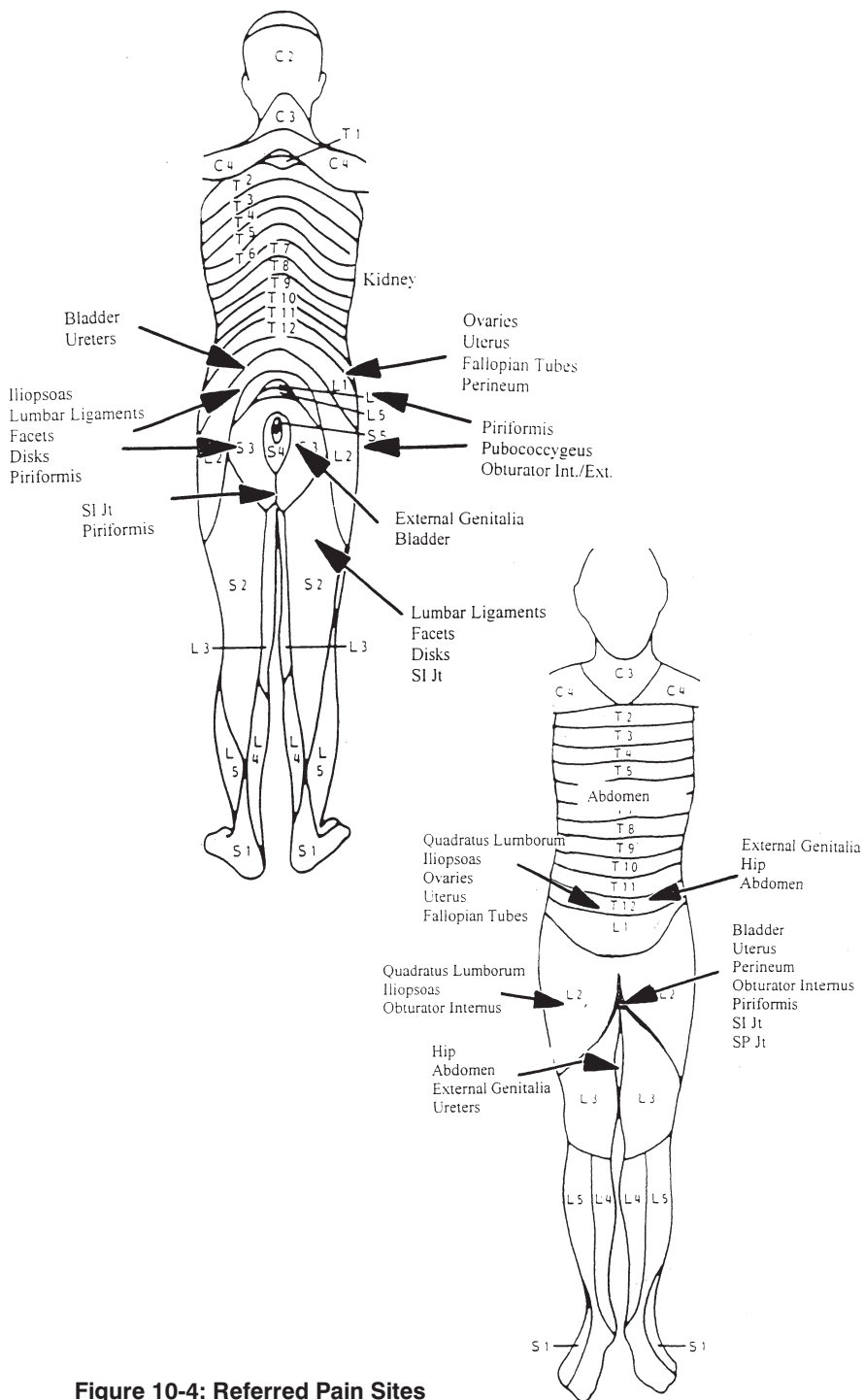


Figure 10-4: Referred Pain Sites

uterus exit from the thoracolumbar spine. Somatic (primarily breathing diaphragm, obliques and erector spinae muscles) dysfunction in this area can refer pain to the pelvic organs and connective tissue. The sensitization can be at the dorsal horn interneuron connection sites or directly to the sympathetic nerve roots as they exit the spine to form the hypogastric plexus.⁹ Somatic dysfunction around the sacrum, from pelvic muscles, nerves and blood vessels, can refer pain to the bladder or bowel through interneuron connections with the parasympathetic nerve roots innervating these structures.¹⁰

Addressing viscerosomatic reflexes can reduce symptoms in somatic structures that are the result of visceral problems. Realignment internal organs in the abdominal cavity and improving circulation to the pelvic organs are two approaches that can significantly improve chronic pelvic pain and low back pain coming from internal visceral problems.¹¹ Addressing somatovisceral reflexes and responses reduce symptoms in visceral structures that are the result of somatic problems. Normalizing skeletal muscle tone and facilitating diaphragmatic breathing instead of accessory muscle breathing are two approaches that can improve chronic pelvic and low back pain coming from somatic structure dysfunction.

Neurology of the Pelvic Muscle, Urogenital and Gastrointestinal Systems

Pelvic organs and pelvic muscles are uniquely innervated by both somatic and autonomic nervous systems. The autonomic system is primary for both pelvic muscles and organs in motor control. Sensory information is provided more equally by somatic and visceral fibers.

Autonomic Nervous System

The autonomic nervous system connecting with the subcortex and cerebellum controls micturition (bladder emptying), defecation (bowel emptying), sexual function and pelvic and back muscle resting tone. It is influenced by the limbic system controlling emotion also located in the subcortex of the brain.

Sympathetic division of the ANS controls urethral closure mechanisms, both smooth and striated muscle types. It determines pelvic muscle resting tone through its influence on the muscle spindle gamma bias set point. Sympathetic division facilitates relaxation of bladder

and bowel for filling. It stimulates internal genital contraction during orgasm to produce ejaculation and controls vascular constriction and dilation within the pelvis.¹²

Sympathetic nerve roots exit the thoracic- lumbar spine between T11 and L4. They combine to form the hypogastric plexus, a bundle of nerves that then combine with parasympathetic and visceral afferent (sensory fibers). Sympathetic division innervates bladder, bowel and uterus and related structures as well as the pelvic muscles' muscle spindle.

Parasympathetic division of the ANS stimulates bladder and bowel contraction for elimination. It controls clitoral and penile erection. Parasympathetic nerve roots exit from sacral foramen and form a bundle called the sacral plexus to innervate the bladder and bowel.

Visceral afferents (sensory fibers) travel with parasympathetic to the sacrum at S2-4. These include nociceptive nerve fibers from lower colon, prostate, seminal vesicles, vagina and cervix. Sensory fibers from bladder, ovaries and uterus follow sympathetic nerves to the thoracic-lumbar spine.¹³

Somatic Nervous System

The somatic nervous system connecting to the cortex of the brain controls voluntary contraction of pelvic muscles and other muscles related to pelvic and hip function. Somatic motor nerves for pelvic muscles exit through sacral foramen. The pudendal nerve (S2-4) innervates the pelvic diaphragm, urogenital diaphragm and external sphincter muscles. The coccygeal plexus (nerve bundle) innervates the coccygeus and part of the pelvic diaphragm muscles. There are direct branches from S3-4 innervating the pelvic diaphragm muscle.

Somatic afferents (sensory fibers) travel with the motor nerve fibers, iliohypogastric, ilioinguinal sensory fibers from L1 and genitofemoral fibers from L1 and L2 innervate skin of the lower trunk, perineum and proximal thigh. Lateral femoral cutaneous fibers from L2 and L3 innervate the lateral thigh. Obturator sensory fibers from L2-L4 innervate pelvic wall tissue and skin of the medial thigh and lower leg.¹⁴ Hypersensitivity progressing to severe pain are symptoms of somatic sensory fiber irritation.

Pudendal nerve carries both autonomic and somatic nerves affecting sensory and motor pathways. The autonomic fibers facilitate intestine

and circulatory changes in relation to the nerve being stretched, compressed or otherwise impacted. It sends messages from vagina, urethra, skin of labia, scrotum, penis and clitoris, anal canal, rectum and external anal sphincter and urogenital diaphragm.¹³ Pudendal neuralgia described as severe throbbing, stabbing pain in the pelvic region following the pudendal nerve pathway can be the result of compression, tension injury, or surgery.

Enteric Nervous System

The enteric nervous system, the gastrointestinal nerve plexus, is the third division of the autonomic nervous system. It is known as the “gut’s” brain.¹⁵ Located in tissue lining the esophagus, stomach, small intestine and colon, it is a complex neural network of electrical and chemical messengers that can function in isolation from the central nervous system. This complex of integrated circuits, blood brain barriers, and chemical and hormone production centers, acts interdependently with the central nervous system via the vagus nerve. The vagus nerve consists of 2000 parasympathetic nerve fibers transmitting messages to the heart and gut. There is dual innervation of the throat, and upper two-thirds of the stomach, rectum and anus. The small intestine and large intestine are innervated solely by the enteric nervous system. The small intestine contains 100 million enteric neurons, somewhat surprisingly more than exist in the spinal cord. The enteric system produces the same neurotransmitters found in the brain, including serotonin, dopamine, norepinephrine, nitric oxide, enkephalins, benzodiazapines, neuropeptides, and immune system cells. It produces 95% of the body’s serotonin. The gut brain effects the head brain as much or more so than vice versa. Much of abdominal and pelvic pain, difficulty swallowing, bowel problems and to some extent bladder problems originate from gut brain-enteric nervous system dysfunction. Treating the enteric nervous system is essential to improving CPP and LBP.

Neural Control of Lumbo-Pelvic Stability

Muscle control of lumbo-pelvic stability is affected by the neurology of lumbo-pelvic joints, which is significantly affected by the neurology of the muscular system surrounding the lumbo-pelvic area. Spinal segments lumbar 5, sacral 1, 2, 3 and 4 provide both autonomic and voluntary nervous system nerve roots which innervate the joint

structures and the muscles of the lumbo-pelvic area. According to Wyke mechanoreceptors of the joints and the muscles (muscle spindle) affect movement and stability through automatic reflex responses, postural and kinesthetic responses and pain responses.¹⁶ These mechanoreceptors have reflexogenic effects on muscle resting tone and the excitability of the stretch reflex in muscle action. They also have significant input to reflex inhibition of opposing muscles resulting in smooth, graded movement in joint structures. When dysfunction or injury to joints or muscles occurs, or their innervation or circulation is interrupted, the stability of the lumbo-pelvic region is compromised.

Any disruption in the neurology of the system results in changes throughout the system. Visualize a small pebble thrown into a pond with the resulting waves spreading to the far reaches of the pond's surface. Likewise, a small constriction of blood to the pelvic nerve innervating the obturator internus muscle will impact the entire PRC, the internal organs of bladder, bowel, uterus, in addition to the sacroiliac joint, symphysis pubis joint and low back.

The autonomic nervous system response to a small pebble in the pond is to send a system wide alarm, the intensity of which is determined by how dangerous the central nervous system perceives the danger. The goal of the ANS is to wall off the area to save the rest of the body, and then to repair the local area through protection and regeneration.

When it is understood that preservation of the rest of the body is paramount it is easier to understand why circulation is decreased to the injured site, muscles tighten around the site, and the nervous system sends vital nutrition to organs, brain, and other tissues to keep them functioning. Over the long term the local site often heals but the muscles and circulation surrounding the site continue to function in a pattern similar to the emergency edict. Circulation continues to be impaired, muscles continue to be abnormally tight during rest and they are uncoordinated during movement. The result is pain, postural changes, and abnormal body movement directed to a large extent by the ANS. In general, sleep is disrupted, total movement patterns are inefficient, and fatigue is a major complaint. More locally, circulation is decreased to muscles, tendons, joints, and nerves. Muscles have high resting tone controlled by the sympathetic input to the muscle spindle. There is accumulation of waste products in the tissues and decreased

oxygen and food product transport to the muscle cells. Joints become excessively compressed.

Physics teaches us that for every action there is an equal and opposite reaction. In the body this equal and opposite reaction includes an overactive reflex inhibition of opposing muscles, increased joint compression underlying these muscles, and depressed stretch reflexes above, below, or on the opposite side of the injury. Over the long term when the affected anatomy is located in the lower abdomen, back or pelvis, these dysfunctions lead to chronic low back and/or pelvic pain.

The goal of a program to improve neural control of lumbo-pelvic stability is to regain the balance between sympathetic, parasympathetic and enteric input to the associated structures using Q Core Control.

What are Trigger Points and Tender Points?

Trigger points are hypersensitive spots in skeletal muscle associated with palpable nodules in taut bands. Trigger points refer pain, tenderness, spasm and autonomic changes to areas distal from the original point of tenderness. The point is tender and the taut band prevents the muscle from stretching to its full length. Trigger points decrease functional strength of muscle.¹⁷ Pressure or stretch results in a contraction of the effected muscles. A primary trigger point can activate more peripheral secondary points as part of peripheral sensitization.

It is thought that trigger points are caused by dysfunction at the neuromuscular junction. Evaluated with electromyography, they appear as spontaneous electrical activity and the referred symptoms are mediated through interneuron connections at the spinal cord level. The tight bands in the muscle may be microscopic contraction within the endplates of the muscle fibers. Trigger points are characteristic of myofascial pain syndrome diagnosis.

Tender points are hypersensitive spots in skeletal muscle that do not refer pain or tenderness from the original point of tenderness. In both trigger points and tender points 3-5 kg of pressure elicits acute symptoms. Tender points are characteristic of a fibromyalgia diagnosis.

Trigger point and tender point nociceptive transmission can induce central sensitization.¹⁸ Light pressure or movement will increase pain perception. Sensations that are not normally related to pain such as light, temperature and vibration become pain related. Autonomic nervous

system imbalance is associated with trigger points and tender points. Sympathetic and enteric facilitation of hyperactivity at the neuromuscular junction accelerate and perpetuate regional pain patterns.

Perpetuating factors for trigger points and tender points include enzyme dysfunctions that interfere with muscle energy metabolism. Vitamin deficiencies that contribute to enzyme deficiencies include C, B1, B6, B12, and folic acid. Low levels of potassium, calcium, magnesium, and trace minerals also contribute to trigger points and tender point severity.

Hypoestrogenism (low estrogen levels), hypothyroidism, anemia, and hypoglycemia aggravate trigger point and tender point symptoms. Any myofascial therapy will be ineffective until these nutritional problems are addressed.

Postural dysfunction, repetitive motion at home or work, positional stretch or compression can be perpetuating factors as well. Excessive repetitive work patterns without balanced rest cycles stimulate trigger point symptoms. Extended periods in a stretched or shortened position without movement, for example during sleep or surgery, can also elicit symptoms of trigger points. Asymmetrical postures, scoliosis, leg length discrepancy, and foot deformity can perpetuate the pain and tenderness of trigger points.

SECTION THREE

What Are Effective Assessment Techniques?

The components of chronic pain assessment include:

History

Special Questions

Daily Diary

Functional Impact Questionnaire

Physical Assessment

Neuromuscular Assessment (Biofeedback)

CHAPTER 11

History and Special Questions

History

What are the questions to ask?

In taking the history, both general and specific questions will provide the basis for an appropriate physical examination and differential diagnosis. General questions include pain pattern characteristics, pain pattern perception, involvement of associated organ functions, daily functional alterations, medications, emotional aspects, and desired goals. Initially the individual completes the CPP and LBP Questionnaire Packet (page 108).

Chronic Pelvic Pain History Form

- I. Present Symptoms
 - A. Symptom Picture
 - 1. Draw a picture (figure 11-1)
 - 2. Location (figure 11-2)
 - B. Symptom Pattern
 - 1. Frequency of symptoms
 - 2. Daily and nightly patterns
 - C. Symptom Intensity
 - 1. Pain algorithm 0-10 scale 0= no pain, 10= extreme pain
 - 2. Do you feel you have high or low pain tolerance?
 - 3. What is the intensity during the last month, week, day?
 - D. Pain Description
 - 1. Sharp, dull, throbbing, shooting, cramping, colicky
 - E. Symptoms' Affect on Function (figures 11-3, 11-4, 11-5)
 - 1. Work, home, social, recreational activities?
 - 2. Describe your lifestyle before the onset of CPP.
 - 3. Is it easy or hard to have fun?
 - 4. Do daily activities increase symptoms? How?
- II. Symptom History
 - A. Type of onset
 - B. Duration since onset
 - C. Pattern since onset
 - D. Treatments tried – medication, surgical, counseling, etc.
- III. Bladder Symptoms (figure 11-6)
 - A. Frequency, urgency day/night
 - B. Discomfort with urination/ relief of pain with urination
 - C. Flow strength, ease of starting and stopping
 - D. Urine color, odor, blood
 - E. Uncontrolled loss of urine
 - F. Urinary tract infection frequency
 - G. Perception of complete emptying
- IV. Bowel Symptoms (figure 11-6)
 - A. Frequency of elimination

- B. Consistency and appearance of stool
 - C. Strain or urgency to eliminate
 - D. Change in bowel habits
 - E. Pain, discomfort or relief of pain with elimination
 - F. Anal discharge, leaking, uncontrolled loss of feces
 - G. Incomplete emptying
 - H. Bloating, distension, flatulence
- V. Associated Symptoms (figure 11-2)
 - A. Breathing pattern- shortness of breath, breath holding
 - B. Headaches, neck pain
 - C. Cold hands and/or feet
 - D. Premenstrual syndrome (PMS) symptoms
 - E. Sexual function-orgasm, libido
 - F. Depression, anxiety symptoms
 - G. Post traumatic stress disorder (PTSD)
 - 1. physical, emotional, sexual abuse
- VI. Sleep/Wake Patterns (figure 11-7)
 - A. Time to get to sleep
 - B. Frequency of awakenings
 - C. Perception of restfulness in the morning
 - D. Regular bed and awaken times
 - E. Total hours sleep/night
- VII. Other Medical Problems
 - A. Infections-yeast, vaginal, bladder
 - B. Allergies
 - C. Surgeries-hysterectomy, back, abdominal, pelvic, brain, laparoscopy
 - D. Radiation, chemotherapy
- VIII. Reproductive History
 - A. Menstruation
 - 1. Age of initiation
 - 2. Symptoms
 - 3. Length and regularity
 - B. Pregnancy
 - 1. Number of pregnancies, number of live births
 - 2. Number of cesareans, miscarriages, abortions

3. Episiotomies, forceps, suction, medications during childbirth
 4. Complications during pregnancy, childbirth
- C. Menopause
1. Age of first perimenopausal symptoms
 2. Age of menopause
 3. Symptoms noted and severity
 4. Interventions used
- IX. Family History
- A. Urinary, bowel, reproductive problems, pelvic, spinal surgery
 - B. Chronic pain
 - C. Childhood injuries, illness, pain, fatigue
 - D. Physical activity level from childhood to present
- X. Medications
- XI. Self Care Coping Strategies
- XII. Your Goals

Special Questions

There are specific questions that can be asked during the history portion of assessment that can lead to more specific tests and a more accurate diagnosis. The diagnosis and specific questions include:

Adhesions

1. Is there a history of pelvic surgery, pelvic inflammatory disease, irritable bowel syndrome, endometriosis, or deep dyspareunia?
2. Does the pain vary with movement or activity?
3. Is the pain sharp and intermittent?
4. Does the pain vary with the menstrual cycle?

Pain can originate in the parietal peritoneum and the adhesions themselves as both have been found to contain nerve fibers. The pain tends to increase with movement and be more sharp and intermittent than dull and constant. The pain may vary with the menstrual cycle and deep dyspareunia is often present.

Dysmenorrhea

1. Is the pain associated with menstruation?
2. Are there PMS symptoms before or during menstruation?
3. Is there a history of sexually transmitted disease (STDs)?

Dysmenorrhea is described by individuals as severe, cramping pain in the lower abdomen, low back and upper thighs during or just before menses. There is primary and secondary dysmenorrhea. Primary dysmenorrhea is present when there is no pelvic pathology. Secondary dysmenorrhea is present when there is pelvic pathology that is the cause of the pain, i.e. STDs. A widely accepted theory of the cause of primary dysmenorrhea is that there is an abnormal increase in prostaglandin levels that stimulates excessive, abnormal uterine contractions. Vasopressin, a powerful uterine muscle stimulant, increases fourfold during menstruation and may be a factor in dysmenorrhea.

Dyspareunia

1. Is there pain with intercourse?
2. Is the pain experienced before, at entry, during, with deep thrusting, or after?
3. What type of pain is experienced?

Causes of dyspareunia can include anal fissures, duct obstructions, hypoestrogenation, endometriosis, adhesions, ovarian or uterine pathology or malposition, or pelvic muscle dysfunction.

Endometriosis

1. Did the pain begin as menstrual cramps?
2. Is the pain worse just before or with menses?
3. Is there pain with deep penetration during intercourse? Does it continue afterward?
4. Is there rectal pain, especially with bowel movements?
5. Are there problems conceiving?
6. Is there irregular uterine bleeding, particularly between-period bleeding?

Endometriosis is the presence of endometrium located outside the endometrial cavity of the uterus. It has been found on ovaries, ligaments, appendix, peritoneum, bladder, lymph nodes, vagina, cervix, and fallopian tubes to name a few. The pain often appears initially as dysmenorrhea, being worse the first 2 or 3 days of the menstrual cycle

and may be present several days before menstruation begins. Pain with intercourse is common. Rectal pain often indicates involvement of the uterosacral ligament, rectum or vaginal areas. Between period bleeding is a common complaint.

Pelvic Varicosities/ Pelvic Congestion Syndrome

1. Is there pain on one side or both sides? Is there low back pain?
2. Is the pain dull and aching?
3. Is the pain increased by movement or walking?
4. Is the pain more severe premenstrually?
5. Is there pain with intercourse or after?
6. Are headaches, fatigue, or insomnia present?
7. Is there irregular or heavy menstrual bleeding or between-period bleeding?

In this condition pelvic veins are dilated and the valves are poorly functioning leading to pelvic vein varicosities, much like varicosities in the legs. Symptoms include dull, aching pelvic pain with acute periods of sharp pain, sacral pain, and deep dyspareunia. Pain often increases before and during menstruation.

Neurally Mediated Hypotension

1. Is there low blood pressure and/or high resting heart rate?
2. Do symptoms include feeling dizzy and weak in the knees when arising from supine?
3. Is pain more severe premenstrually?
4. Is pain relieved by lying down compared to being upright?
5. Are there problems with indigestion, swallowing and bowel movements?

In this condition the individual experiences chronic low blood pressure and often high resting heart rate. Heart rate can be 90-100 beats/min. at rest. Blood pressure can be 90/65 mm Hg or lower. Symptoms include mental and physical fatigue, chest and abdominal pain, swallowing and indigestion problems.

Reproductive Hormonal Deregulation

1. Are there monthly cycles of abdominal and pelvic pain?
2. Are there yearly cycles of increased abdominal/pelvic pain?
3. Are there menstrual irregularities?
4. Are there monthly cycles of bladder and bowel irritability?

In this condition the individual often experiences cyclic increased muscle pain, fatigue, sleep disturbance, menstrual irregularities, bowel and bladder irritability and depression.

Pelvic Floor Relaxation Syndromes

1. Are there feelings of pressure, heaviness, aching, and a falling out feeling in the lower pelvis when standing for any length of time?
2. Do symptoms include loss of urine with cough, constipation, pelvic pain, and urinary urgency?
3. Is there a history of vaginal delivery, extended length of second stage labor, large baby, complications, tears or episiotomies?
4. Is age over 50 and post-menopausal?

In this condition individuals experience pressure, heaviness, a “falling out” feeling, and back ache with standing. Uncontrolled loss of urine and constipation may be present. Inability to empty the bladder or bowel can be experienced. There may be pain during intercourse.

Vulvodynia/Vulvar Vestibulitis

1. Are there symptoms including vulvar hypersensitivity, itching, burning, vaginal pain, and dyspareunia?
2. Is pain aggravated by perspiration, semen, tight clothing, or sitting?
3. Is there pelvic aching after intercourse?
4. Is there a history of bacterial infections, diabetes, vulvar surgery or trauma?

In this condition individuals describe burning, stinging, irritation, and rawness in the area of the female external genitalia, and dyspareunia during intercourse.

Interstitial Cystitis (IC) (Bladder Syndrome)

1. Is there urinary frequency day and night?
2. Is there uncontrolled loss of urine?
3. Is there pain or discomfort with urination?
4. Is there pain with a full bladder and relief after emptying the bladder?
5. Is there a childhood history of infections, leaking or bed-wetting?

Unremitting frequency, urgency and nocturia are the primary symptoms of IC. Fifty to seventy percent of individuals with IC complain of pelvic pain, usually located suprapubically. It may radiate into the back and groin. Most women with IC also experience dyspareunia. In many individuals pain increases with bladder filling and decreases after voiding. Pain with urinating is occasionally present.

Nerve Entrapment

1. Is the onset of pain related to recent or past trauma or surgery in the pain region?
2. Is there any increase or decrease in sensitivity of the skin in the pain region?
3. Is the pain sharp, shooting and intermittent?

In this condition the individual can experience hyperesthesia, sensory loss, tenderness, and motor loss in the distribution of the specific nerve.

Hypoglycemia/Reactive Hypoglycemia Tendency

1. Are there symptoms including shakiness, weakness, pain and fatigue, irritability/irrationality soon after a meal?
2. Is there a craving for sweets or fat and protein?
3. Are blood glucose levels below 90 mg/dl?

In this condition the individual can experience shakiness, weakness, pain and fatigue, irritability and irrationality. If it occurs within 30-40 minutes after a meal it is called reactive hypoglycemia and is relieved by eating fat and protein at the beginning of each meal. If symptoms occur 1-2 hours after a meal it is called general hypoglycemia and eating complex carbohydrates at meals relieves the symptoms.

Hypothyroid Tendency

1. Are there symptoms of fatigue, pain, dry skin, heavy periods, hair loss, weight gain and constipation?
2. Are there complaints of cold hands and feet and/or being core cold?
3. Is basal body temperature at or below 97.6°

In this condition the individual can experience symptoms of fatigue and pain in addition to hair loss, dry skin, constipation and weight gain. Blood tests will be normal. Basal body temperature testing will indicate that T4 to T3 conversion at the cellular level is potentially deficient.

Post Traumatic Stress Disorder

1. Are there symptoms of sadness and/or tears most days?
2. Is there a significant loss of interest or pleasure in usual activities?
3. Is there significant weight change?
4. Have sleep patterns changed, i.e. can't sleep or sleep all the time?
5. Is there a lack of energy or fatigue daily?
6. Are there problems making decisions, thinking, or concentrating?
7. Are there significant changes in social, occupational or personal life style?
8. Is there a history of depression, chemical or drug dependency?

In this condition the individual can experience sadness and tears, with a loss of interest or pleasure in daily activities. Fatigue is present. Sleep is often disrupted. Some individuals sleep excessively. Concentration, decision making and learning is compromised. There is often a history of depression, chemical or drug dependency.

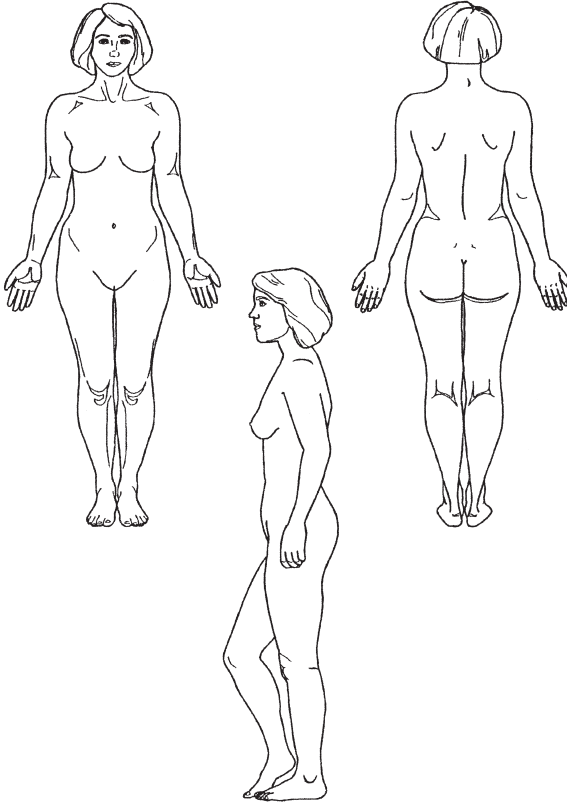
Chronic Pelvic Pain and Low Back Pain Questionnaire Packet

**Complete the following
questionnaires and bring them
to the first clinic visit.**

Name

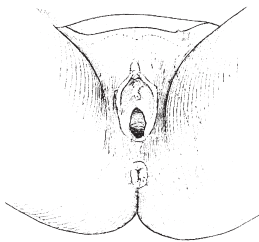
Date

Draw the location of your pain



Pain Level (0=no pain 10=excruciating pain)

0 1 2 3 4 5 6 7 8 9 10



Pain Level (0=no pain 10=excruciating pain)

0 1 2 3 4 5 6 7 8 9 10

Figure 11-1 Pain Patterns

Symptom Questionnaire

Check the appropriate boxes that describe you in the last two weeks.

General Characteristics

Yes	Pain	Location	Right	Left
	Abdomen			
	Back			
	Buttocks			
	Legs			
	Vagina			
	Anus			
	Other			

Yes	Fatigue
	Mental
	Physical
	Other

Yes	Sleep Disturbance
	Unable to get to sleep in <30 min.
	Multiple awakenings a night
	Awaken feeling tired

Yes	Daily Activity disturbance
	Self care List:
	Work List
	Social/Recreational List:

Associated Symptoms

Yes	Symptom
	Headaches
	Memory Problems
	Allergies

Yes	Symptom
	Cold Hands or Feet
	Bowel Irregularities
	Bladder Irregularities

	Dry Mouth
	Blurred Vision
	Neck Pain/Upper Back Pain
	Jaw Pain

	Restless Leg Syndrome
	Hearing Irregularities
	Heart Palpitations
	Shortness of Breath

	Stiffness
	Numbness/Tingling
	Swelling
	Clumsiness

	Anxiety
	Depression
	Sexual Dysfunction
	Other

Figure 11-2: Symptom Questionnaire

Symptom Pattern and Variation Questionnaire

Describe:
When do I feel..... the Best the Worst Symptoms

Days of the Month			
Days of the Week			
Times of the Day			
Activities			

Foods/Nutrients			
Other			

When I feel lousy what helps the symptoms?

Figure 11-3: Symptom Pattern and Variation Questionnaire

Work/Rest Cycle Report

Record the minutes of work time you can perform without increasing pain and fatigue. Then report the minutes of rest time needed between work cycles to keep pain at a minimum.

minutes	Work activity	Rest
1.		
2.		
3.		

Figure 11-4: Work/Rest Cycle Report

Chronic Pelvic Pain Functional Impact Questionnaire

Rate your overall quality of life.

0 1 2 3 4 5 6 7 8 9 10

Very Poor Excellent

(As bad as it can get) (As good as it can get)

Rate how much your pain interferes with each of the following:

1. Self care – dressing, bathing, hair care.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

2. Daily activities – cooking, cleaning, laundry, shopping, hobbies.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

3. Ability to work outside the home or go to school.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

4. Social interaction: visiting friends, social activities in or out of home, volunteer activities.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

5. Sleep: adequate sleep, feeling rested when awoken.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

6. Sexual relationships.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

7. Ability to enjoy life.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

8. Self perception: physical health, mental health.

0 1 2 3 4 5 6 7 8 9 10

Does not Interfere Completely Interferes

(With Permission – Penner, B.)

Figure 11-5: Chronic Pelvic Pain Functional Impact Questionnaire

Bladder-Bowel Diary

Name _____

Week of _____

Instructions

Insert the following symbols into the appropriate time spaces

- T = toilet
- B = bowel movement
- F = 8oz. fluid
- * = caffeinated
- L = small leak
- A = large leak
- P = pad

Day ____ Date ____
6-8 am _____
8-10 _____
10-12 _____
12-2 pm _____
2-4 _____
4-6 _____
6-8 _____
8-10 _____
10-12 _____
Overnight _____
Pads used (comments) _____

Day ____ Date ____
6-8 am _____
8-10 _____
10-12 _____
12-2 pm _____
2-4 _____
4-6 _____
6-8 _____
8-10 _____
10-12 _____
Overnight _____
Pads used (comments) _____

Day ____ Date ____
6-8 am _____
8-10 _____
10-12 _____
12-2 pm _____
2-4 _____
4-6 _____
6-8 _____
8-10 _____
10-12 _____
Overnight _____
Pads used (comments) _____

Figure 11-6: Bladder-Bowel Diary

Weekly Self-Care Report

Report your symptoms and activities according to the following guidelines.

Rate your pain on a 0-10 scale. 0 = no pain 10 = excruciating pain

Indicate activities and rest periods.

R=Rest

E=Exercise

W=Work

P=Play

Indicate hours slept and number of awakenings in the parenthesis ().

See the following example.

Date: 3/21/01

4 W 8 E R 6 W 10 (6 / 6)
awaken lunch dinner bedtime

Comments: _____

Date: _____

_____ (/)
awaken lunch dinner bedtime

Comments: _____

Date: _____

_____ (/)
awaken lunch dinner bedtime

Comments: _____

Date: _____

_____ (/)
awaken lunch dinner bedtime

Comments: _____

Figure 11-7: Weekly Self-Care Report

CHAPTER 12

Physical Assessment

Observe Affective Domain

Movement Patterns: walking, sit to stand, bending

Facial Expressions

Overall Appearance: dress, hair, make-up

Basic Physiological Tests

Blood pressure Blood Glucose levels

Heart Rate Basal Body Temperature

Standing Assessment

Observe For:

Posture

Alignment of:

Front:

Shoulders, umbilicus, linea alba, iliac crest, ASIS, patella, medial malleolus

Back:

Shoulders, scapula, spine, iliac crests, SI, knees, medial malleolus

Side:

Mastoid process, shoulder, hip, knee, ankle

Motion

Forward bend

Typical pelvic pain posture

Sidebend

Scoliosis

Rotation

Range of motion limits

One leg standing with hip flexion

Laxity of the pubic symphysis

Laxity of pelvic girdle

Weakness of hip and pelvis

Iliac Crest Symmetry

Short leg syndrome

March Test

Sacroiliac joint dysfunction

Cruising

Hip rotator muscle dysfunction

Plié

Hip and pelvic muscle synergy deficit

Gait	Short leg syndrome Herniated disc General musculoskeletal problems
Fibromyalgia Test	Tender points

Sitting Assessment

Observe for:

Posture	Back – general tone, paraspinal symmetry Lower trapezius symmetry, scoliosis Inferior angle of scapula Abdomen – muscle symmetry, linea alba integrity Skin color, texture, hair, defects
Sensory Testing (sharp, dull, light touch)	Visceral referral pain Herniated disc
Palpation	
Upper and Lower Back	Trigger points Myalgia
Iliac Crests	Symmetry Trigger points
Sacrum	Trigger points Sacroilitis
Leg Length Long sitting	Leg length discrepancy
Muscle Strength Test	Herniated disc Sacral roots 2-4

Prone Assessment

Observe for:

Alignment	Lumbar and hip position
Observe Condition (low back, Symmetry sacrum, gluteal, lower extremities)	Swelling, edema
Legs straight	Anterior/posterior tilt

Knees flexed	Anterior/posterior tilt
Palpation and accessory motion	
Iliac crests	Sacral tilt
Sacral base	Sacral torsion
Sacral angle	
Lumbar facets	Facet syndrome
Sacroiliac joints	Hyper/hypomobility
Palpation	Trigger point spasm
Gluteals	
Piriformis	
Hamstrings	
Erector Spinae	
Quadratus Lumborum	

Supine Assessment

Observe for:

Abdomen/Groin	Abdominal swelling, distension
Valsalva, cough	Femoral, inguinal bulges
	Scars, muscle asymmetry
Lower Extremities	Symmetry, swelling, edema, scars
Pelvic Posture	Lumbar and hip position
	Tilt - anterior/posterior
Abdominal/Groin	
Sensation	
Gentle Pinching	Referred visceral pain
Basic Sensory Test	Neuropathy
Light, dull	Nerve entrapment
Abdominal/Groin	Trigger points
Palpation	Myofascial pain
	Nerve entrapment
	Incisional scar entrapment
	Hernias
	Ovarian point tenderness
	Inguinal ring
	Tenderness, guarding, masses

Muscle Length Tests	see figure 12-1
Muscle Strength Tests	see figure 12-1
Head Raise, Leg Raise	Linea alba separation Abdominal muscle weakness Disc herniation Low back dysfunction
Knee to chest	Low back pain Abdominal muscle weakness Deconditioning
Obturator and Psoas Sign Tests	Shortening, dysfunction, spasm
Hip Clearing Test	Hip pathology
Sacroiliac Compression	Sacroiliac dysfunction Distraction
Pubic Symphysis palpation accessory motion	Trigger points Accessory motion limits Pain

Urogenital and Pelvic Muscle Assessment

Observe for:

Observe Labia and External Genitalia	Inflammation, abscesses, ulcerations Color changes, exudates, fissures, atrophy
Basic Sensory Tests	Nerve entrapment
Sharp, dull, light touch	Neuropathy Spinal cord lesion
Vestibule Test w/ cotton swab	Vulvar vestibulitis pain
Anal Wink Test	Reflex innervation High tone, decr wink
Single Digit Palpation Vulva, Pubic Arch	see figure 12-2 Trigger points
Introitus/ Bulbospon	Vaginismus, trigger points

Levator Ani	Resting tone
Arcuate Tendon	
Coccygeus	
Obturator Internus	
Piriformis	
Urethra and	Urethral Syndrome
Trigone area	Urethritis
	Cystitis, Trigonitis
	Interstitial Cystitis
Rectum	Irritable Bowel Syndrome / Tone
Observation	Enterocoele
With Valsalva	Rectocoele
	Cystocoele
	Uterine Prolapse

Neuromuscular Assessment with Biofeedback

Observe for:

PRC Functional Tests (with vaginal/anal/surface EMG) (figure 12-3)

Resting	Resting tone
Quick Contraction	Type II fiber function, Urogenital diaphragm
Ten Second Hold	Type I fiber function,
Isolated	Pelvic diaphragm
Obturator Assist	Obturator internus
Adductor Assist	Adductors
Release	Return to rest function
Valsalva	Reflex support
Standing Plié	PRC functional position

Note: Report on amplitude, duration, latency to peak and latency in return to rest of monitored muscles. Report accessory muscles used. Report resting level characteristics. Compare amplitude and duration of three types of 10 second holds.

Stress Tests (with surface EMG, thermal, and respiration) (Fig. 12-3)

Baseline	Resting tone
Math	ANS - muscle spindle
Stress Story	ANS - blood vessel
Pain Story	ANS - diaphragm/respiration
Rest Return	Return to rest level

Mobility Tests

Baseline	Resting tone
Flexion	Muscle symmetry
Rotation	Muscle asymmetry
Lateral Bend	Muscle asymmetry
Rest Return	Return to rest level

Posture and Breathing Tests

Sitting Posture	Muscle symmetry
Deep Breathing	Muscle activity level
Standing Posture	Muscle symmetry
Deep Breathing	Muscle activity level

Muscle Length, Strength, Condition				
	Length	Strength	Condition	EMG
Quadratus Lumborum				
Lumbar Paraspinals				
Abdominals				
Iliopsoas				
Pectineus				
Adductors				
Medial Rotators				
Lateral Rotators				
Adductors				
Piriformis				
Hamstrings				
Sartorius				
TFL				
Breathing Diaphragm				
Urogenital Diaphragm				
Pelvic Diaphragm				
Anal Sphincter				
Obturator Internus				

Figure 12-1: Muscle Length, Strength, Condition

Palpation Assessment

Name: _____ Date: _____

Grade

Comments

Resting: _____

Quick Contractions: _____

Hold Contractions: _____

Valsalva: _____

Other: _____

Observation: _____

Pelvic Muscle Strength Rating Scale:

	0	1	2	3
Pressure	None	Weak, feel pressure on side of fingers, but not all around	Moderate feel pressure all around	Strong, fingers compress/override
Duration	None	<1 Second	1-3 Seconds	>3 Seconds
Displacement in plane	None	Slight incline, base of fingers moves up	Greater incline fingers move up along total length	Fingers move up and are drawn in

Figure 12-2: Palpation Assessment

Pelvic Rotator Cuff EMG Evaluation

A. Use of a Sensor

1. Use a personal vaginal, anal or surface sensor.
2. The individual empties bladder, then applies a small amount of lubricant to the top of the sensor before inserting the sensor in the vagina or rectum while standing with knees bent or semi-sitting or sidelyeing. Redress with the cord end outside the clothing. If surface sensors are used, clean the area with an alcohol pad.
3. When session is completed, remove the internal sensor, wash and rinse the sensor for 3 minutes under warm running water using mild soap, then air dry in sterile baggie. If surface sensors are used remove the surface sensors and dispose of the sensors and leads in a hazardous waste disposal.

B. Evaluation Components

1. Resting Level – sitting, supine, sidelie or standing
2. Quick Contractions/Flicks
This is a strong-fast contraction followed by an immediate relaxation. It primarily tests the urogenital diaphragm, fast acting fibers.
3. Ten Second Hold – 3 parts
 - a. Isolated Hold of Pelvic Diaphragm – the average hold for someone who is leaking is 3-4 seconds without recruitment of accessory muscles.
 - b. Roll Outs / Obturator Internus – against resistance roll legs out 2-4 inches and hold for a count of 10.
 - c. Roll Ins / Adductors – against resistance bring legs together and hold for a count of 10.
4. Standing Plié – Bend the knees 2-3 inches for a count of 5 then straighten them for a count of 5 with feet pointed out.

C. Report:

1. Amplitude of contraction
2. Duration of contraction
3. Latency to peak of contraction
4. Latency to return to rest
5. Accessory muscles used: abdominals, gluteals, breath holding
6. Comparison of amplitude and duration of three types of 10 sec. holds
7. Resting level characteristics

EMG Assessment					
Name: _____		Date: _____			
POSITION: supine, sit, sidelie, stand		ELECTRODE TYPE: surface, vaginal, anal			
		Pelvic / Urogenital	Other		
		Diaphragm Muscles	_____		
		Comments			
		Gross	Net	Gross	Net
1. Resting:					
2. Quick Contractions:					
3. Isolated Hold Contractions:					
4. Assisted Hold Obturators:					
5. Assisted Hold Adductors:					
6. Standing Rest:					
7. Standing Isolated:					
8. Standing Plié:					
*Net contractions = gross contraction amplitude minus resting level amplitude.					
+Comments = observations of breath holding, associated muscle use, etc.					
Thermal Assessment					
Right: _____		Left: _____		Sensor Type: _____	
Breathing Assessment					
				Sensor Type: _____	
Description: _____					
Problem List					
1.	_____				
2.	_____				
3.	_____				
4.	_____				

Figure 12-3: EMG Assessment

Name _____	Date _____			
Age _____	Sex _____ Therapist _____			
<u>ELECTRODE PLACEMENT</u>				
Site 1 _____	Site 2 _____			
<u>STRESS PROFILE</u>				
	EMG1	EMG2	Temp 1	Temp2
Baseline	_____	_____	_____	_____
Math	_____	_____	_____	_____
Recovery	_____	_____	_____	_____
Stress Story	_____	_____	_____	_____
Recovery	_____	_____	_____	_____
Pain Story	_____	_____	_____	_____
Recovery	_____	_____	_____	_____
<u>DYNAMIC EVALUATION</u>				
	EMG1	EMG2		
Baseline	_____	_____		
Flexion	_____	_____		
Rest	_____	_____		
Ⓕ ROT	_____	_____		
Rest	_____	_____		
Ⓖ ROT	_____	_____		
Rest	_____	_____		
Ⓕ LAT Bend	_____	_____		
Rest	_____	_____		
Ⓖ LAT Bend	_____	_____		
<u>A.D.L.</u>				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

POSTURAL EVALUATION		
	L	R
_____ sit	_____	_____
_____ breathe	_____	_____
_____ stand	_____	_____
_____ breathe	_____	_____
_____ supine/recline	_____	_____
_____ breathe	_____	_____
PHYSIOLOGICAL QUIETING®		
_____ breathing	_____	_____
_____ support	_____	_____
_____ handwarming	_____	_____
_____ muscular - face	_____	_____
_____ head/neck	_____	_____
_____ back	_____	_____
_____ left arm	_____	_____
_____ right arm	_____	_____
_____ left leg	_____	_____
_____ right leg	_____	_____
_____ abdomen and chest	_____	_____
_____ final	_____	_____
INTERPRETIVE COMMENTS		

Pelvic Muscle Rehab Treatment Plan

Name: _____ Age: _____ Initial Visit: _____

Referring MD: _____ Treatment Plan Completed: Yes No

Chief Complaint: _____

Patient's Goals:

1. _____
2. _____
3. _____

History:

Assessment:

Intervention:

Outcome Criteria:

Discharge / Maintenance Evaluation:

Clinicians's Signature _____

Additional Tests and Considerations

Physiological Tests

Self-tests reporting the status of underlying physiological processes indicate how effectively the automatic control centers of the body are functioning to enable pain free, fatigue free work and daily activities. Tests include blood glucose, blood pressure, heart rate, breathing rate, basal body temperature and pelvic inversion. With repeated testing it becomes possible to minimize pain and fatigue. It is necessary to have testable signs that lead to appropriate intervention on a daily, sometimes even hourly basis for optimal outcomes.

Basic Self-Tests

- Pain Level
- Fatigue Level
- Sleep Patterns
- Work Duration
- Tender/Trigger Points

New Self-Tests

- Blood Glucose Level
- Basal Body Temperature
- Blood Pressure
- Heart Rate
- Breathing Pattern/Rate
- Pelvic Inversion

Combining Basic Self-Tests and New Self-Tests provides a compilation of data about the inner physiological processes of each individual with CPP and LBP. Using this information it is possible to respond specifically with appropriate interventions to prevent symptoms. When these tests are done on a frequent basis the interventions can occur before the physiological imbalances lead to limiting symptoms.

Baseline testing for 2-3 days can include all tests or only specific ones based on vulnerabilities from the history. Those tests indicative of imbalances are termed «Key Indicators» and listed in the Personal Profile Summary (figure 13-3). Each individual will have his/her own Key Indicator Tests. Mary's Key Indicators were sleep pattern and basal body temperature. Sue's Key Indicators were blood glucose and blood pressure. All individuals monitor pain and fatigue levels.

Follow Baseline Testing Procedure for Chronic Pain.

Baseline Testing Procedure

First complete the Symptom Questionnaire (figure 11-1 and 11-2). Include Symptoms, Patterns and Variations (figure 11-3). Then complete the Work/Rest Cycle (figure 11-4) for 1-2 days. Finally, complete the Functional Impact Questionnaire (figure 11-5) and Bladder & Bowel Diary (figure 11-6). Summarize the results. Next proceed to the Key Indicator Tests.

Key Indicator Tests of CPP and LBP Subcategories

The Key Indicator Tests provide information about the body's physiological status. Perform the Key Indicator Tests for one to two days. Record the results on the Daily Record Sheet (figure 13-2). Once this has been completed, interpret your results on the Personal Profile (figure 13-3).

Blood Glucose

Equipment: Use a blood glucose monitor. Follow the instructions on the unit. A blood glucose monitor can be purchased at a pharmacy.

Technique: Test your blood glucose level six times per day for 1-2 days and record the results on the daily nutrition and glucose level chart.

- on awakening each morning
- prior to each meal
- 1 hour after each meal
- 3 hours after each meal if another meal has not been eaten and
- prior to going to bed

It is very important that you record everything you eat and drink on the daily nutrition and glucose level chart and record the items on the hour when they are eaten. This enables a comparison of types of food eaten with glucose levels. Also, record how you feel mentally and physically at the time of each test.

Basal Body Temperature

Equipment: Oral thermometer.

Technique: In the morning before getting out of bed take your oral or underarm temperature for 3-5 minutes. Before lunch and dinner and at bedtime record your oral or underarm temperature.

Heart Rate and Blood Pressure

Equipment: A heart rate and blood pressure monitor. Follow the instructions on the unit. A blood pressure monitor can be purchased at a pharmacy.

Technique: Test your heart rate and blood pressure five times during the day. Test in the morning before you get out of bed, after breakfast, at lunch, at dinner, and before bedtime.

Breathing Pattern/Rate

Equipment: A watch with second hand, pen and paper.

Technique: Three times a day record your breathing pattern and rate for 1-2 minutes. For 15 seconds count the number of breaths and multiply by 4 to obtain the breaths per minute. Record where breathing occurs – in your abdomen, in your chest, in your neck or shoulders. Record all areas where you feel movement and when there are pauses or glitches during inhale and exhale on the Daily Record Sheet.

Pelvic Inversion

Equipment: Wonder W'edge® 6"- 7" high

Technique: Recline on the Wonder W'edge® for 3-4 minutes. Record your symptoms before and after pelvic inversion. Symptoms to monitor include pain, pressure, sensation and ease of movement. Position on the wedge is reclining on your back, hips at the highest end of the wedge and low back supported by the wedge. Shoulders and head are off the wedge and supported by bed, mat or other supportive structure. Head, shoulders and hips should be aligned (figure 13-1). Place feet on the floor with knees bent or place feet on the wall with the knees straight but unlocked. Adjust your hips and legs until you find a comfortable position. Then focus on your breathing for 5 to 7 slow low breaths. Next let your knees roll out gently to hip width during inhale and roll in to midline on exhale for 5 to 7 slow breaths.

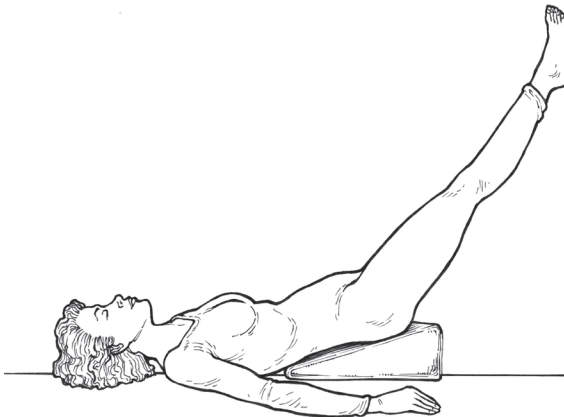


Figure 13-1: Pelvic Inversion

Daily Record Sheet

	Blood Pressure Rate	Blood Glucose Food Eaten	Basal Body Temp	Breathing Rate/ Location	Pelvic Inversion
Day 1					
Day 2					
Day 3					

Interpretation Record:

1. _____
2. _____
3. _____

Figure 13-2: Daily Record

INTERPRETING THE TESTS

Blood Glucose Level

Blood glucose level is the sugar level in the blood that is available to interact with insulin and then be used by all cells of the body for energy. Optimal body and mind function occur between these levels. Normal blood glucose level is 80-120 mg/dl. Each individual has an optimal range for best function. Individuals with hypoglycemic or reactive hypoglycemic tendencies often experience symptoms when blood sugars are below 90 mg/dl so their “normal range” is 95 to 120 mg/dl instead of 80-120 mg/dl.

To maintain a healthy blood glucose level throughout the day insulin from the pancreas must be given off into the blood stream at a variable rate in response to the amount and type of exercise, stress and food. If too much insulin is given off it breaks down excessive blood sugar and the blood glucose level drops below symptom-free levels. This is termed hypoglycemia or reactive hypoglycemia. If too little insulin is given off blood sugar levels rise above symptom-free levels and can be indicative of diabetes. The symptoms of low blood sugar or hypoglycemia include irritability, irrationality, physical fatigue and muscle weakness and pain. As the reaction progresses sweating, rapid heart rate, dizziness, light-headedness, mental confusion, emotional outbursts and extreme anxiety occur. Anger and resistance to others’ suggestions is common. These symptoms are the result of starvation, low glucose (sugar) levels available for the brain, voluntary and autonomic nervous systems and muscles.

Record the blood glucose levels in the daily record sheet using a glucometer and the blood from your knee or finger. Consult with your health care professional about the technique for using a glucometer.

Record the food you eat and the time you eat so a comparison can be made between the blood glucose reading and the type and amount of food you have taken in. During the days of record-keeping engage in your normal physical activity. Be sure to indicate when and how much you exercise and your stress level since these can affect blood glucose levels.

Interpret Your Results

Looking at the data, ask, “Is my blood glucose stable throughout the day or is there a large variation?” “Does my blood glucose level

tend to be in the 80s or below, 80s and 90s, or 95 and above?” “Does my blood glucose level ever go over 140?” “What do I feel like and what are the symptoms I am experiencing when my blood glucose test results are in the 80s or below? In the 90s, over 95, over 140?”

Basal Body Temperature

Basal body temperature is the heat created by the body’s metabolism (fire). Normal basal body temperature is 98.6° F. If the body’s metabolism is very low the body temperature will be lower. If metabolism is high the body temperature will be higher. Heat is created within each body cell and is the result of nutrient and chemical conversion into cellular energy. Even a small change in temperature can significantly affect cellular function. Blood releases oxygen to the cells more readily at warmer temperatures. Extreme temperature changes are life threatening. A decrease in body temperature to 97.6° F is significant enough to change physical and mental processes. The feeling of being cold, cold hands and feet, alternately feeling hot and cold, or sweating and shivering are common symptoms with low basal body temperature. Pain and mental confusion occur with chronic low basal body temperature. Symptoms associated with increased body temperature include sweating, fever, fatigue and lethargy.

Interpret Your Results

Record your basal body temperature at predetermined times on the Daily Record Sheet. Ask these questions:

“Is my temperature lower or higher than the normal 98.6° F? If it is different, is it consistently lower or higher or only at certain times of the day? How do I feel cold, hot, energized, fatigued, painful, pain free?” Record a summary in the Interpretation Record.

Blood Pressure/ Heart Rate

Blood pressure is the force of blood traveling from ventricles into the arteries and throughout the body. Normal blood pressure for adults younger than 60 years old is 120/80mm/hg. Consistent readings above 140/90mm/hg are considered high blood pressure. Consistent readings below 100/70mm/hg is considered low blood pressure. 120mm/hg is the pressure of the ventricle pushing the blood into the ascending aorta, 80mm/hg is the pressure in the blood vessel in between beats. Heart rate at rest averages 60-70 beats per minute (bpm) on the average.

Resting heart rate above 90 beats per minute is considered excessive. Blood pressure and heart rate are controlled to a large extent by the autonomic nervous system.

Interpret Your Results

Record your blood pressure and heart rate on the Daily Record Sheet. Answer the questions, “Is my heart rate above 90 bpm at rest? Is my blood pressure normal, high or low? Does my blood pressure and/or heart rate change with different positions? Does my blood pressure or heart rate vary greatly or remain stable?” Record your comments in the Interpretation Report including any symptoms you or those around you perceive as occurring when you take your blood pressure and heart rate.

Breathing Pattern/Rate

An individual’s breathing is automatic and the pattern and rate are generally similar for everyone. At rest 10-12 breaths per minute is within normal limits. Breathing is designed to provide oxygen for use by the body cells in burning fuels for energy and function. It is designed to excrete waste products like carbon dioxide. Oxygen and carbon dioxide are essential for function but are toxic when present in excess. The acidity of the body is largely determined by the level of carbon dioxide in the blood stream. Virtually all metabolic processes depend on adequate acid-base balance. Increased carbon dioxide is correlated with nervous system hyperexcitability – muscles are hyperirritable, pupils dilate, extremities are cold, and there is increased sweating. During hyperventilation (shallow breathing with loss of carbon dioxide), there is decreased blood flow to the brain, hands, feet, and intestines. This can affect thinking and memory, digestion and absorption of food as well as coordination and ambulation. Hyperventilation has been linked to a sudden dramatic decrease in blood pressure which may result in syncope or fainting. Breathing also affects heart rate and cellular metabolism.

Breathing is automatic, you do not have to think about each breath. If you had to think about each breath it would be hard to get anything else done during the day. During exercise your breathing rate increases and during meditation or sleep it decreases. Diaphragmatic breathing is the most efficient form of breathing. During diaphragmatic breathing, as you inhale your diaphragm descends and the abdomen will rise or

move outward. As you exhale the diaphragm will return to the dome shape and the abdomen will move inward. The diaphragm is descending into the abdominal cavity with inhalation and ascending or rising towards the breastbone with exhale. During diaphragmatic breathing the upper chest and shoulders are quiet and the abdominal muscles are relatively relaxed. The jaw is released, the teeth separated, and the tongue is relaxed at the bottom of the mouth, the tip of the tongue resting lightly behind the top front teeth. Hyperventilation is characterized by rapid chest breathing. Irregular breathing cycles, sighing, and interrupted breathing (apnea) can also occur.

Interpret Your Results

Record on the Daily Record Sheet the interpretation of your typical breathing. Record where breathing occurs – in the neck, shoulders, chest, abdomen or diaphragm. If you noticed movement in your upper chest and/or shoulders during breathing the accessory muscles of neck and chest are being used for each breath. Then record the pattern of your breathing. Normal breathing pattern is equal inhale and exhale with slight rest between each. Ask yourself, “Do I inhale and exhale equally or is my inhale longer or shorter than my exhale?” “Do I yawn a lot? Do I feel out of breath at rest or doing quiet activities?” “Do I yawn, breath hold or feel shortness of breath?”

Is your breathing rate average, slower or faster than the average? Do you breathe using the breathing diaphragm or using the neck, chest and shoulder muscles? What is your breathing pattern – the inhale to exhale ratio? Record your comments about breathing pattern, rate, and location on the Interpretation Record.

Pelvic Inversion

Pelvic Relaxation Syndrome, Pelvic Congestion Syndrome and Bowel Dysfunction are conditions leading to pelvic and low back pain. Pelvic Muscle Relaxation Syndrome includes symptoms of pelvic and low back pain related to descent of internal organs and pelvic muscles. As the pelvic muscles descend they pull on their sacral/coccygeal attachment altering the sacroiliac and lumbosacral joints. Internal organs of bladder, uterus, large and small intestine descend into the pelvic cavity through the vagina. When one organ descends all other organs follow. Internal organ and pelvic muscle descent affects pelvic joint

alignment, nerve transmission and circulation to pelvic, hip, knee and ankle regions.

Pelvic congestion syndrome is a medical condition in women caused by varicose veins in the lower abdomen. These weak walled uterine and ovarian veins accumulate pooling blood which results in stasis, blood pressure changes and chronic pain. The condition causes pelvic and low back pain, often described as a constant dull aching pelvic pain present much of the time and aggravated by standing. It is usually absent or minimal first thing in the morning, but increases in intensity when the patient has been up and around for a period of time. It tends to get worse as the day goes on, worse in the evening, and significantly exacerbated by prolonged standing.

Constipation includes symptoms of left abdominal discomfort or pain, low back pain and pelvic pain due to pressure on pelvic muscles and other soft tissue structures. The descending colon's ligamentous attachment to the left side of the sacrum/coccyx leads to realignment of the sacroiliac and lumbosacral joints when the constipated colon descends into the pelvic cavity. Hemorrhoids are associated with constipation. Nerves and blood vessels are also implicated in this chronic condition.

Anorectal Pain Syndrome is a condition with persistent or recurrent rectal pain and anal sphincter spasm. The pain can be severe because of the many nerve endings in the perianal region. There is usually related bowel dysfunction, the most common being constipation and eventually impaction. It can be related to hemorrhoids (bulging veins at the anus) or rectal prolapse. In many cases anorectal pain is secondary to deterioration of supporting pelvic muscles and soft tissue structures.

Interpret Your Results

Record your symptoms of pain, pressure, sensation and ease of movement. “Is my pain diminished?” “Is there a relief of pressure in my pelvis and/or low back?” “Can I move, bend etc. with less pain and more ease?” Record your comments in the Interpretation Record.

List the Key Indicator Tests that deviate from normal levels. Identify the physiological subcategory(ies) that are closest to your characteristics using the Key Indicators and the Physiological Subcategory Symptoms.

Personal Profile Summary

My Major Characteristics and Associated Symptoms

1. _____

2. _____

3. _____

4. _____

5. _____

My Key Indicators:

1. _____

2. _____

3. _____

My Subcategories:

1. _____

2. _____

Figure 13-3: Personal Profile

Physiological Subcategories

Neurally Mediated Hypotension Tendency

Symptoms

Individuals with Neurally Mediated Hypotension Tendency (NMH), also called vasomotor syncope, describe low blood pressure and high resting heart rate. Heart rate is often 90-100 b/m at rest when 60-70 b/m is considered normal. Blood pressure is often 95/65 mm Hg when 110/70 mm Hg is considered normal. These individuals in addition to experiencing chronic pelvic and low back pain describe feeling weak in the knees, dizzy and light headed, especially when getting up from reclining or sitting. They describe mental and physical fatigue. They can also experience chest pain that so closely imitates heart problems a physician may do a complete cardiac workup, yet find nothing. They describe problems with swallowing and indigestion, shortness of breath with minimal exertion, and abdominal pain that closely imitates pain from gall stones, interstitial cystitis, endometriosis, or cancer.

Neurally Mediated Hypotension Symptoms

- Low Blood Pressure
- High Resting Heart Rate
- Dizzy / Light Headed
- Weak
- Mental Fatigue
- Chest Pain
- Difficulty Swallowing

Case Studies

Linda had six abdominal surgeries in three years for extreme abdominal pain and fatigue. She had her gall bladder, loops of her intestine, her uterus, ovaries, and scar tissue removed. Nothing helped and she was worse after the surgeries at the end of three years. Clearly something else was producing the abdominal pain.

Melissa described her legs melting from under her while she was shopping. She felt her heart racing even when she was resting. She tired easily and quickly during her attempts to exercise or during recreational activities. She experienced such extreme discomfort and bloating in her abdomen that she could not wear clothing that touched her stomach. She had bouts of constipation and diarrhea. She burped unpleasant gas and experienced indigestion and stomach pain to a point

that she was afraid to eat. Changing her diet did not help. Abdominal pain increased in the week prior to menstruation. She would be in bed for several days with pain, weakness, nausea and vomiting. During her menstrual cycle uterine cramping was intense. She described frequent feelings of urgency to toilet, getting up 1-2 times nightly and toileting every 1-2 hours during the day. Yet, at other times Melissa felt great, energetic, athletic, and pain free.

Etiology/Cause

Neurally mediated hypotension is often overlooked as a possible cause for the symptoms of abnormal heart rate and blood pressure, back and pelvic pain, chest and abdominal pain. The ANS-HPA-RHA messaging systems are not working together effectively to regulate heart rate, blood pressure, muscle and organ function in NMH. There is nothing structurally wrong with any of the organ or muscle systems. Rather it is the regulatory messaging systems that are dysfunctional. These dysfunctional messaging systems affect blood flow to organs and muscles which leads to ischemia at the organ and muscle level.

Melissa and others like her give us clues about how to improve the symptoms. She told us, “When I feel terrible, if I go to McDonald’s and have french-fries I feel a lot better even though I know they are not good for me. My energy improves, my weak knees disappear, and my diarrhea improves.”

Before we knew much about the heart and gut regulation centers and their potential effects on the rest of the body, Melissa’s comments were baffling. To understand why McDonald’s french-fries helped Melissa and others with CPP and LBP it is necessary to understand some facts about the heart and gut control centers.

Gut Absorption and Heart Function

The body’s serotonin, 95% of which is produced by the enteric nervous system in the gut, affects all cells of the body with receptor sites for serotonin. When the gut produces an abundance of serotonin it flows not only in the gut influencing the function there, but also to the brain, to extremity muscles, to the heart, blood vessels, uterus, bladder and bowel. In the gut serotonin facilitates peristalsis, in the heart it increases the pumping rate, in blood vessels it stimulates constriction, in the uterus, bladder and bowel it induces contraction, and in the brain

it facilitates sleep and decreases pain perception. When not enough serotonin is produced in the gut the opposite responses occur. Thus, the gut's enteric nervous system is an essential component in treating and controlling CPP and LBP symptoms.

The gut's function is to digest food, absorb the digested nutrients into the blood stream and defend against poisons. The enteric nervous system controls the efficiency and effectiveness of these functions. It determines to a large extent what nutrients and how much of each nutrient is absorbed and how much is excreted in the feces/bowel movements. If salts from food are excreted in excess rather than being absorbed into the bloodstream, every cell of the body is affected in their ability to function optimally. Salts affect the dilation or constriction of blood vessels and the energy produced in muscle cells. Sodium chloride deficiency leads to blood vessel dilation with pooling of blood in the lower extremities and pelvis, rapid and ineffective heart rate, and dysfunctional skeletal muscle tone and function. Increasing sodium chloride levels improves heart, blood vessel, and skeletal muscle function.

Increasing sodium chloride in the diet of individuals experiencing symptoms of high resting heart rate, low blood pressure, and abdominal pain can significantly improve the symptoms. When there is adequate sodium chloride, blood vessels constrict increasing blood pressure. Heart rate slows and becomes more regular and efficient. Skeletal muscles of the trunk, arms and legs are able to contract and relax effectively. Muscle and organ cells receive needed nutrients and eliminate waste products through the blood and lymph streams. Weakness, fatigue, pain, and stiffness decrease when there is adequate sodium chloride available to the cells.

Serotonin and Gut Pain

The enteric nervous system in CPP and LBP oscillates between extremes of activity and inactivity. Serotonin is released by the enteric nervous system when there is pressure on the intestinal lining cells. Serotonin circulates through the blood stream to be used by most organ and muscle cells. It excites peristalsis and thus elimination in the digestive system. When the release of serotonin is excessive peristalsis is initially increased leading to diarrhea, dehydration and abdominal discomfort. As serotonin continues its uninhibited flow it "drowns" the magnet receptor sites in the gut and other organs. As with any drowning

victim the receptor sites eventually cease to function so the gut shuts down. Excessive serotonin results in paralysis of the gut until the excess serotonin is broken down or otherwise incapacitated. Constipation, impaction and inflammation occur. Gut paralysis and enteric nervous system dysfunction leads to abdominal, back and pelvic pain, inability to stand up straight and a shuffling gait with quick fatigue. In severe cases, the individual cannot get up from a chair without help.

Improving enteric nervous system function in the gut of individuals experiencing symptoms of high resting heart rate, low blood pressure, abdominal, pelvic and back pain can significantly improve function.

When there is dysfunction or imbalance of the enteric system every other organ system in the body is potentially dysfunctional as well. The enteric nervous system communicates with the heart via the vagus nerve to influence heart rate. It communicates with the pancreas via enteric peripheral nerves to influence blood insulin levels and digestive enzymes secreted into the small intestine. It communicates with the uterus and bladder through enteric peripheral nerves to influence contractility.

When the enteric nervous system runs at high speed the gut transfers food from mouth to anus faster, the uterus and the bladder are more irritable, and the heart rate increases. Skeletal muscle metabolism changes, nutrition delivery and waste product removal is altered. Every cell of the body is affected when the enteric nervous system of the gut is dysfunctional.

Testing

The diagnosis of NMH tendencies is most often based on a medical history, symptom diary and heart rate/blood pressure tests. If the history is indicative of NMH and the heart rate relatively elevated and/or the blood pressure low, NMH is considered as a subcategory type in CPP and LBP.

There is a medical test to diagnose autonomic neurally mediated hypotension as this category is termed by cardiologists. It is the tilt table test. The individual is placed on a tilt table, a table that has a foot rest and can be tilted from horizontal to vertical position in varying degrees. The table is tilted 70 degrees from horizontal for 45 minutes. The blood pools in the feet unless the heart works adequately and the veins in the legs and abdomen have adequate tone to push the blood

back up to the heart and brain. When the autonomic nervous system is not responsive to the stress of the tilt the blood pressure drops and the heart rate does not increase adequately to keep the blood from pooling in the feet. The individual experiences widespread pain, fainting, nausea and even vomiting. Some individuals pass out. The sequelae may last several days after the test. Since the test is so aversive, it is not usually done until after the individual tries a self-care treatment approach using sodium chloride (salt) and still has significant symptoms.

To determine if a food sensitivity could be part of the problem the individual eliminates that food product from the diet for 7-10 days and documents any relief in symptoms. Gluten, milk, soy and latex food products are potential foods. If the relief is significant then a change in diet is recommended.

Hypoglycemic Tendency

Symptoms

Individuals with hypoglycemic tendencies experience a variety of symptoms including pelvic pain and low back pain, headache, depression, anxiety, sweets cravings, confusion, night sweats, and insomnia. These individuals can become aggressive and easily lose their tempers during a hypoglycemic episode. They describe feeling shaky, dizzy, irritable, irrational and weak. Hypoglycemia increases stress hormone production including insulin release for increased glucose utilization.

Even though the standard definition of hypoglycemia is a blood sugar level below 50 mg/dl, in recent years there have been several studies that suggest individuals have different set points for blood sugar. When there is a drop below the individual's specific set point the brain and body exhibit "I'm in trouble" signs. The set point varied from the 50 mg/dl to the 85 mg/dl.

The individual with an 80 mg/dl set point for hypoglycemic symptoms exhibits symptoms of muscle stiffness, cramping and weakness, fatigue, irritability, insomnia, and mental confusion due to "hypoglycemic tendencies" even though the medical diagnosis would not be hypoglycemia. When blood sugar levels are increased to between 90 mg/dl and 100 mg/dl by eating the appropriate food the symptoms disappear. The individual's history and symptoms in addition to blood sugar levels will provide the best indication of this subtype of CPP and LBP.

Hypoglycemia Symptoms

- Hunger Shakes/Tremors
- Fainting
- Heart Palpitations
- Irregular Heart Beats
- Panic Attacks
- Anxiety
- Sweats
- Fatigue
- Sleep Disturbance
- Blurred Vision
- Gut Pain, Gas
- Headaches
- Memory/Concentration Problems

Case Study

Linda's husband describes her as the sweetest, most giving person he has ever met, yet he comments that she has a tendency to snap and blow up at any little thing sometimes. He notes that she frequently complains of pain in her shoulders, neck and head, low back and pelvic area. She sometimes wakes him up at night in a sweat. These symptoms began after the birth of their first child so they assumed it was just a readjustment from pregnancy. Now two years later they are both concerned that the symptoms haven't gone away. Her physician diagnosed chronic pelvic pain and the medications have helped some but she still experiences fatigue, pain, and mood changes that have a rapid onset, i.e. one minute she's feeling good and the next she feels lousy.

Etiology/Cause

Hypoglycemia is a condition of low blood glucose (sugar) levels with resulting symptoms. Any or all of the symptoms may occur as quickly as 30-60 minutes after a meal or as long as 2-3 hours after eating. There is an imbalance between insulin and glucose in the blood stream which leads to the low blood sugar.

The two subtypes of hypoglycemia are:

- General Hypoglycemia
- Reactive Hypoglycemia

The two subtypes are differentiated by 1) the time frame between eating and the onset of low blood sugar and 2) the type of food that sets off the symptoms. In General Hypoglycemia the onset of hypoglycemic symptoms is usually 2-3 hours after a meal. In Reactive Hypoglycemia the onset of symptoms is more immediate, usually 30-60 minutes after eating. Foods that set off General Hypoglycemia symptoms include

simple sugars and carbohydrates but not complex carbohydrates. Foods that set off Reactive Hypoglycemia include complex carbohydrates as well as simple sugars and carbohydrates.

- General Hypoglycemia 2-3 hrs. simple sugars/carbos
- Reactive Hypoglycemia 1/2-1 hr. complex carbos
simple sugars/carbos

Both the time between eating and presenting symptoms and the type of food eaten relate to the release of insulin and glucose (sugar) into the blood stream. This model for hypoglycemia takes into consideration the timing of insulin release from the pancreas and the timing of glucose release from the small intestine and liver. The model also takes into consideration the amount of insulin or glucose released within a set amount of time, it could be a large amount (bolus) released in a short time period or smaller amounts (timed release capsules) over a 3-4 hour segment.

- General Hypoglycemia Bolus insulin and glucose released
in 1-2 hours symptoms
experienced
- Reactive Hypoglycemia Premature bolus of insulin released
Timed released glucose
1/2-1 hour symptoms experienced

Both hypoglycemia subtypes experience excessive movement of insulin and glucose into the blood stream (the sugar high) depleting the glucose available in a short amount of time in response to simple sugars/carbohydrates. The result is low blood sugar (the crash). Reactive hypoglycemia differs in that it is also sensitive to complex carbohydrates which stimulate excessive and premature release of insulin. Both hypoglycemia subtypes are stimulated by stress, excessive exercise, caffeine or alcohol.

The cause of General Hypoglycemia is based on a dysfunctional glucose absorption model. Glucose is absorbed abnormally from the small intestine and liver into the blood stream. The small intestine is the primary area of the gastrointestinal tract where nutrients are absorbed. If sugars are absorbed more slowly than insulin is released, low blood sugar results – hypoglycemia. The blood sugar and insulin are not balanced in the blood stream. The enteric nervous system controls sugar

absorption from the gut to the blood stream and release of insulin from the pancreas. When the enteric brake is “on” the gut slows or even stops the absorption of nutrients into the blood stream. When the enteric brake is “off” the gut speeds up the absorption of nutrients into the blood stream. The enteric brake is stimulated to be “off” when sugars and simple carbohydrates enter the stomach. In General Hypoglycemia the enteric brake is “off” so the gut sends sugars to the blood stream and the pancreas sends insulin into the blood stream more rapidly than normal. Within a 2-3 hour period the available glucose is utilized and blood sugar levels drop. The individual with general hypoglycemic tendencies exhibits symptoms that interfere with their daily life when blood sugar levels drop into the 70/80 mg/dl range or below.

The cause of Reactive Hypoglycemia is based on an abnormal insulin release model. Insulin is released prematurely and excessively by the pancreas. In Reactive Hypoglycemia, when simple or complex carbohydrates are chewed and swallowed, the enteric nervous system sends messages to the pancreas telling it to immediately release insulin into the bloodstream at a rapid rate and in substantial amounts. Meanwhile, the carbohydrate now in the gut is taking hours to be digested and then absorbed into the bloodstream. The insulin looks for the great quantity of sugar (glucose) that the enteric nervous system said would be waiting for it in the bloodstream and finds relatively little. It combines with any glucose available but finds little. This imbalance of insulin versus glucose in the bloodstream leads to a rapid depletion of blood glucose resulting in the symptoms of shakiness, confusion, pain, fatigue and agitation within 30-60 minutes of eating. The organ systems i.e., the brain, muscles, blood vessels are not getting the consistent level of glucose combined with insulin they need to function normally.

Testing

The first assessment is a review of symptoms by the individual with a close family member or friend (See Symptoms, page 143). The involvement of a family member or friend is important because the individual may not be aware of all the external appearances of symptoms if the hypoglycemia is moderate to severe. Individuals with long term hypoglycemia may assume the symptoms are normal feelings.

When the symptom review is completed the next step is to monitor blood glucose levels periodically throughout the day for 1-2 days. It is

important to also keep track of food eaten at each meal and snack and any symptoms you are experiencing at the time of the blood glucose reading. Blood glucose readings every one to two hours can differentiate between General and Reactive Hypoglycemic tendencies. Blood glucose readings should be done:

- on awakening each morning
- prior to each meal
- 1 hour after each meal
- 3 hours after each meal if another meal has not been eaten
- prior to going to bed

Optimal blood glucose range is 90-120 mg/dl. Below 90 individuals can begin to experience symptoms and by the time an individual reaches 80 they describe feeling significant symptoms. In the 60-70 range work and self care function is severely affected.

To differentiate between subtypes monitor blood glucose readings after a high carbohydrate meal and then after a high protein/fat meal. Assess how quickly the symptoms occur after eating each meal. Fatigue, pain and personality changes within 30 minutes to one hour after eating a high carbohydrate meal are more likely Reactive Hypoglycemia. Fatigue, pain and personality changes 2-3 hours after a meal are more likely General Hypoglycemia.

It is important to test immediately on awakening and just before you go to bed each night. Hypoglycemia can occur at night as well as during the day. If blood sugar is low as you go to bed at night and/or low when you first wake up in the morning the implication is that you are experiencing hypoglycemic tendencies during the night. Sleep disturbance and night sweats are common with night time hypoglycemia.

A glucose tolerance test (GTT) performed in a medical center can indicate clinical hypoglycemia. The individual is required to fast for 12 hours and then glucose is given in measured doses. The test is usually done over 5 hours, testing the level of glucose in the blood each hour. If glucose levels are low or erratic the diagnosis is clinical hypoglycemia. Some individuals will have normal test results but still experience symptoms. That is often termed hypoglycemic tendency.

Case Study

Mary, a 45 year old teacher, describes having pelvic pain and low back pain for the past 4 years since a hysterectomy. On awakening in

the morning she is stiff and sore so she immediately takes a hot shower and does some stretching to get ready for the day. Her usual breakfast before going to work is a bowl of oatmeal with raisins and brown sugar, 2 slices of toast with butter and jam, a large glass of orange juice and 2 cups of coffee. Her husband states she comes to the breakfast table in a good mood but after breakfast she usually has something nasty to say and sometimes forgets her keys and lunch as she leaves. Mary says that after breakfast she feels more tired physically and mentally than before breakfast. She doesn't understand how that could be.

In Mary's case the high carbohydrate breakfast stimulates an immediate and large release of insulin into the blood stream. The carbohydrates are still primarily in the stomach while the insulin pours into the blood stream from the pancreas and combines with any glucose it can find. Blood glucose levels drop significantly and quickly. Within 30 minutes Mary was feeling "lousy" because her blood sugar was too low.

Individuals like Mary have more energy and less pain when they eat protein and fat, like eggs and bacon for breakfast. Mary remembers times during the work day when she feels shaky and tired. If she stopped by McDonald's and got a Big Mac she felt better quickly. Was this just a break from work or did Big Macs have a miraculous quality? The high protein and fat in the Big Mac doesn't trigger the large insulin release. Blood sugar remains stable with insulin and glucose entering the bloodstream in a balanced ratio.

Hypothyroid Tendency

Symptoms

Individuals with hypothyroid tendency describe feeling cold, cold hands and feet, feeling core cold at times, weight gain, dry skin, heavy menstruation, PMS, constipation, fatigue, sleep disturbance, and stiff aching muscles and joints. Hypothyroid tendencies can be the result of a sluggish thyroid gland that is not producing adequate thyroid hormone or dysfunction of thyroid hormone at the peripheral cellular level. Thyroid hormone, T₄, produced by the thyroid gland is an essential information molecule for many body functions. To function at the cellular level T₄ must be converted to T₃, the active form of the thyroid hormone. The majority of T₃ is converted at the peripheral cellular level, ie at the muscle and brain level.

Hypothyroid Symptoms

- | | |
|------------------------------------------------------------|--------------------------------------------------------|
| <input type="checkbox"/> Muscle Weakness | <input type="checkbox"/> Menstrual Irregularities |
| <input type="checkbox"/> Excess Sleepiness | <input type="checkbox"/> Hoarse, Deep Voice |
| <input type="checkbox"/> Weight Gain | <input type="checkbox"/> Memory/Concentration Problems |
| <input type="checkbox"/> Constipation | <input type="checkbox"/> Depression |
| <input type="checkbox"/> Digestive Problems | <input type="checkbox"/> Hair Loss |
| <input type="checkbox"/> Cold Intolerance | <input type="checkbox"/> Dry Skin |
| <input type="checkbox"/> Body Temperature
Below 97.6° F | |

Case Study

Margaret, a 35-year-old mother of three, complained to her health care professional about severe fatigue, overall stiffness and aching, headaches, PMS, weight gain, and a core feeling of cold as well as pelvic and low back pain. She began to crave chocolate bars and coke. Her thyroid function tests were normal but her basal body temperature was decreased. Her thyroid hormone T4 to T3 conversion was dysfunctional at the cellular level.

Etiology/Cause

Many times an individual with CPP and LBP complains of these “hypothyroid tendency” symptoms but the thyroid function blood test is normal. There is another form of thyroid chemical dysfunction that occurs in peripheral cells and cannot be measured by a blood test. The active hormone, T3, is like a fire-starter, needed to keep energy production at the cellular level. The symptoms have been documented in the medical literature since the 1970s. For our purposes this dysfunction will be termed cell level hypothyroid tendency.

Cell Level Problem

Cell level hypothyroid tendency is abnormal cellular T4 to T3 conversion. In other words the thyroid hormone T4 flows from the thyroid gland into the blood stream and then to magnet sites on all body cells including muscle cells. There T4 must be converted to T3 to be of use to the muscle cell in energy production. If that conversion does not take place, or is sluggish or incomplete, cell level hypothyroid symptoms result. Inadequate T3 lowers cell energy production so not as much “heat” is produced in the body’s furnace. Low heat at the cellular level leads to low core body temperature, stiff and aching muscles and joints,

constipation and dry skin. T3 is essential for cell metabolism, lighting and maintaining the fire that produces energy in the cell. When the fire is hard to light, of low intensity or erratic, outward symptoms appear.

An individual may have dysfunction at the thyroid level and at the cellular level simultaneously. In this case treating the thyroid level deficiency will alleviate some symptoms but the cellular level treatment will be necessary for more complete relief of symptoms.

Basic Physiology

To review thyroid function and its hormonal importance to body function we begin with the brain. The hypothalamus stimulates the pituitary gland in the brain which stimulates the thyroid gland in the neck region to produce T4 (Thyroxine). T4 is the foundation chemical needed to make the active thyroid chemical messenger T3 (Triiodothyronine). Approximately 80% of T4 conversion to T3 occurs in the body cells not in the thyroid gland. T4 travels to the body cells via the blood stream so it can be measured in a blood test. T3 is produced primarily in the tissue cells so a blood test does not indicate its level of production or effectiveness. T3 instructs body cells how fast or slow to operate and how hot the burners should be set to fire up the cellular activity. As such T3 is a major determinant of body temperature. Normal core body temperature is 98.6 degrees. A cell's burner is set high or low by T3. The test for T3 is Basal Body Temperature, the internal temperature of the body. Low core body temperature, 97.6 degrees or lower, indicates inadequate T3 at the cellular level.

Metabolism and Temperature

Body temperature affects the overall metabolism of the body because the body's metabolism is the sum total of all the chemical reactions occurring in each cell. These chemical reactions are dependent on enzymes which are the "sparks of life." There are digestive enzymes and metabolic enzymes. Think of chemical reactions in cells as the fire that provides energy for the cell motor to run. Metabolic enzymes are the catalyst or stimulus that ignite the fire and help determine the intensity of the fire. When temperature is decreased the enzymes are cold and stiff so the motor doesn't start easily, it sputters and runs on one or two cylinders, quitting easily. When the temperature is increased, as when an individual has an illness with a high fever, the enzymes

are too hot so the motor function is abnormal, at times to the point of destruction. When temperature is decreased the cells go into a form of hibernation, when the temperature is increased greatly the cells burn up from an explosion of energy. The basal body temperature is designed to be 98.6°F, just the right temperature for the enzymes to act effectively and efficiently in the metabolic burn. In this state the cell motor can be active at a balanced steady state for long periods of time without fatigue, pain, or depletion of essential elements. The body is able to provide nutrients the cell needs for its motor function and remove the waste products at a rate that is conducive to long term function. The individual feels warm, feels energetic, and feels pain free and alert. The skin is in a healthy state, the nervous system is healthy and the reproductive system is able to function in a healthy state.

Changes in body temperature change body functions. The body goes into a conservation mode when body temperature decreases. It ceases to provide energy production except where it is needed for vital organs. The skin becomes dry, hair becomes brittle and falls out, and the reproductive system becomes dysfunctional. In the extreme, cells are destroyed and eventually organs die. Cell level hypothyroid tendency is a factor in determining body temperature.

Reproductive Hormones and Metabolism

The reproductive system affects thyroid function. Estrogen and progesterone facilitate thyroid function including the conversion of T4 to T3 at the cellular level. If estrogen/progesterone levels are decreased or the estrogen to progesterone ratio is abnormal there can be resultant changes in T4 to T3 conversion that will change the basal body temperature and also result in other cell level hypothyroid tendency symptoms.

ANS and Metabolism

The ANS significantly affects thyroid function. The enteric division determines the effective breakdown of protein, fat and carbohydrate nutrients to amino acids, fatty acids and sugars that the thyroid gland uses in its synthesis and conversion of thyroid hormones. The sympathetic and parasympathetic divisions affect head brain function of the pituitary and hypothalamus glands that send messages to the thyroid. Both sympathetic and parasympathetic divisions send messages directly to the thyroid gland itself.

The Amino Acid Necklaces

The thyroid hormones are amino acid necklaces. The protein we eat is broken down in the intestines into 20-30 amino acids some of which combine to form the thyroid hormones T4 and T3. Protein contains approximately 16 percent nitrogen while the other basic nutrients, sugars and fatty acids, contain no nitrogen. Amino acid necklaces form the chemical messengers that transfer messages between nerve cells as well as facilitate the metabolism, the motor in each body cell. Lysine is an essential amino acid that aids in production of enzymes within the cell body as one of its functions. Tyrosine is an essential amino acid that is a precursor to norepinephrine the parasympathetic nervous system messenger. It is a vital ingredient in the function of the thyroid gland, the adrenal glands and the pituitary gland. Tyrosine attaches to iodine to form active thyroid hormones including T3. Symptoms of low tyrosine can include low body temperature, weight gain, low blood pressure, restless leg syndrome, depression and anxiety.

Blood Sugar and Metabolism

Blood sugar levels also affect cell level hypothyroid tendency and body temperature. Low blood sugar, hypoglycemia, decreases body temperature and metabolism. A diabetic with low blood sugar experiences cold, clammy sweats and uncontrolled shivering. Some symptoms of hypoglycemia are similar to cellular hypothyroidism.

HPA Axis and Metabolism

Cortisol levels also affect body temperature. Cortisol is produced by the adrenal glands and is part of the “stress” hormone package. High cortisol levels decrease body temperature and inhibit the conversion of T4 to T3 leading to cellular hypothyroid tendency. Use of cortisone can also lead to the same symptoms.

Test

An initial review of symptoms should be completed by the individual and a close family member or friend (see symptoms, page 148). A blood test can determine levels of T4 and T3 produced by the thyroid gland. The blood test does not indicate the level of T3 available at the cellular level since the majority of T3 is converted from T4 at the site of metabolic activity.

To test for cell level hypothyroid tendencies use an oral thermometer and place it in your armpit or in your mouth for 5 minutes while you remain quiet. Temperature 97.6° F or below may indicate hypothyroid tendencies. Take the temperature on awakening before getting up from bed.

Then take it 3 times, approximately 3 hours apart, when symptoms usually occur. So if fatigue, pain, and coldness occur in the afternoon more than in the morning the tests would be done in the afternoon and evening.

Body temperature changes cyclically through the day in both sexes and through the month in females. It is usually lowest in the morning, highest in the afternoon and then decreases as the evening progresses. Additionally, for women, estrogen and progesterone, the information molecules from the ovaries, cause variations in body temperature as they cycle during the month. Body temperature rises at ovulation (day 14) and just prior to the menstrual period. Temperature change on the day of ovulation and three days before the menstrual period starts is not as indicative of hypothyroid tendencies.

Reproductive Hormone Imbalance Tendency

Symptoms

Individuals with Reproductive Hormonal Imbalance Tendency describe monthly and/or yearly cycles of muscle pain, fatigue, sleep disturbance, menstrual irregularities, bowel and bladder irritability and depression.¹

Mary, as we described in the introduction, experienced incapacitating symptoms of body pain, fatigue, abdominal bloating, and gut dysfunction by Thanksgiving every year. She would miss work and school and would be in bed much of the time due to weakness and fatigue. Mentally she was depressed and when she tried to work she found she made many mistakes. She tried different medications and food elimination strategies without help. Using phytoestrogen and progesterone creams she was able to return to work and attend school but still had periods of being incapacitated. A physician tested hormonal levels when she felt good and again when her symptoms started. Based on the results she was prescribed hormone replacement therapy. She was able to function more consistently without pain and fatigue. She

did not become ill or need to limit her activities any more than other times of the year. She states she has confidence that her life is under more control and balance.

Joann described extreme symptoms the week before her menstrual cycle. She experienced fatigue, muscle pain, shakiness, and sleep disturbances. The abdominal pain at the beginning of menstruation incapacitated her for 1-3 days. She began using ground flax seed in her smoothie each morning and used phytoestrogen during the first 14 days and progesterone during the end of the month. She exercised daily walking and swimming for 30 to 60 minutes. Her menstrual cycle became more regular and the pain and fatigue along with the sleep disturbance improved to the point she was not missing work or school. She described improved energy level and mood. She could plan activities during the week before her menstrual cycle was to begin.

Cause/Etiology

Estrogen and progesterone hormones (chemical messengers) produced primarily in the ovaries, affect all organ systems including the head brain, the gut brain, and the smooth and striated muscles. Estrogen facilitates the build-up of endometrium in the uterus. It increases blood pressure. It facilitates sleep, a sense of well-being, increased energy, increased endorphins (the natural body feel-good chemicals) and serotonin. Estrogen facilitates absorption of calcium through the intestine and increases blood flow to the brain and muscles. It facilitates thyroid hormone conversion of T4 to T3. Progesterone slows peristalsis in the digestive system, increases appetite, sex drive, water retention and breast engorgement. It decreases blood pressure.

Estrogen and progesterone levels vary on a monthly (28 day) cycle in females. Estrogen rises more than progesterone during the first 14 days of the cycle. At ovulation, estrogen and progesterone levels decrease for several days. After ovulation, progesterone rises more than estrogen for the last 14 days. Then both decline with the initiation of the menses (period). Dysfunction in hormonal cycles can facilitate pelvic and low back pain along with associated symptoms.

Estrogen and progesterone also vary on a yearly cycle. Estrogen and progesterone fall in the winter and rise in the summer, with transition times in the fall and spring. Estrogen and progesterone are at their highest level April through July and at their lowest from October

through January. This may help to explain reports of increased pelvic and low back pain during winter months. When individuals complain of increased symptoms during winter months it may be that the estrogen/progesterone levels have fallen excessively much like at the end of the monthly cycle. If increased symptoms occur in spring it may be an over-abundance of estrogen/progesterone or a ratio variation between estrogen/progesterone.

In one study, progesterone levels were found not to change throughout the month for individuals with chronic pain. There was a significantly higher incidence of galactorrhea (milky discharge of breasts), polycystic ovaries, endometriosis, uterine fibroids, and ovarian cysts. This imbalance may result in higher than normal levels of progesterone in relation to estrogen during the first part of the cycle and lower than normal progesterone in relation to estrogen levels the second 14 days. The imbalance could cause chronic immune system activation and eventually immune system fatigue and dysfunction.

The ratio of estrogen/progesterone to testosterone levels is another consideration in CPP and LBP symptoms. Testosterone, the male steroid hormone, facilitates muscle definition and strength and the distribution of fat around the waistline. An imbalance in the ratio of estrogen/progesterone to testosterone can aggravate muscle spasms and increase pain perception as well as weight gain.

When the ratio of estrogen to progesterone is abnormal the potential for sleep disturbance, fatigue, muscle pain, depression and confusion increases. When estrogen declines calcium absorption decreases. Decreased calcium is a factor in muscle pain and fatigue. Thyroid hormone T4 conversion to T3 drops with decreased estrogen which leads to metabolic abnormalities at the cellular level. Fatigue, sluggishness, hunger, and feeling cold are metabolic dysfunction symptoms. Decreased brain circulation, decreased potentiation of serotonin and enkephalins in the brain can lead to mental confusion, depression, and memory problems.

Reproductive hormones influence the circuitry in the central nervous system and the way the brain processes information. Hormonal changes that occur during the menstrual cycle can have profound effects on the way information is integrated in the central and peripheral nervous system. In one study testing ischemic pain (pain from lack of blood circulation), women expressed increased pain levels during the

last 14 days of the menstrual cycle compared to the first 14 days. The last 14 days of the menstrual cycle are associated with higher levels of estrogen, progesterone and lutenizing hormones (female hormones). The masculinizing hormone, testosterone, is minimized in its effect during this time. Male hormones minimize pain perception compared to female hormones. There was also suppression of opioid induced systems during the same period of time (the last 14 days of the menstrual cycle may be related to opioid levels).

Estrogen/progesterone levels can affect muscle strength. Some females lose as much as 9-10% of muscle strength during the week before the menstrual cycle starts.

Relaxin is a little known hormone present in both sexes that may also affect CPP and LBP symptoms. Relaxin is produced in the ovaries, uterus and breast tissues in the female. In the male it is produced in the seminal vesicles. Relaxin levels vary throughout the month in females in conjunction with the estrogen/progesterone cycle. It is measurable in the blood stream seven to ten days after ovulation in females but is difficult to measure in males. Relaxin affects the production, elasticity and remodeling of collagen which is a major component in muscle, ligaments and tendons. Through its effects on collagen synthesis and remodeling, relaxin causes ligaments and connective tissues to elongate and relax. It decreases smooth muscle tone in blood vessels, leading to blood vessel dilation and increased blood flow. During pregnancy relaxin is present at levels ten times higher than in the non-pregnant state. It is the third major pregnancy hormone, estrogen and progesterone being the other two. Imbalance of the steroid hormones estrogen, progesterone, testosterone and relaxin affect all brain and body functions in a cyclical pattern.

Trauma and Post-Traumatic Stress Disorder in Relation to Chronic Pain

Chronic Pelvic Pain and Low Back Pain occur frequently with trauma and Post-Traumatic Stress Disorder(PTSD). In a study of 713 females referred to a pelvic pain clinic 46.8% reported sexual or physical abuse and 31.3% screened positive for PTSD.² In a study of 1259 female veterans who received care through the Veterans Administration it was found that 22% screened positive for PTSD and that 33.5% of those

reported chronic pelvic pain.³ In several studies of traumatic childbirth with extreme pain PTSD was diagnosed and affected the women in their daily lives.⁴ Women with chronic pelvic pain had significantly higher prevalence of sexual abuse than the non-pain control group.⁵

There is no one test for PTSD. More commonly the diagnosis is made after a series of questions and background history related to symptoms the individual is experiencing in the present environment. More Information on PTSD is in chapter 20.

SECTION FOUR

What is Effective Medical Management and Self-Care?

CHAPTER 14

Medical Management and Medications

A physician who knows about chronic pelvic pain and low back pain is the keystone in an effective team which also includes the individual, family members, other medical and complementary care personnel, friends, relatives, and work acquaintances. Most frequently the physician is an internist, family practice physician, neurologist, obstetrician/gynecologist, urologist or gastroenterologist. Essential aspects for members of a health care team are: knowledge, interest and commitment to the concept of a self-care model for chronic pain.

The physician will take a complete history of present and past problems. He/she will review the results of blood tests and X-rays as well as the results of special tests used to eliminate other illnesses which could be causing the same symptoms. The physician will also perform a physical exam. The diagnosis of CPP and LBP is made after evaluation of all these factors.

Once a diagnosis is made, the physician recommends appropriate medications, follows up on the patient's response to treatment and evaluates any side effects. The physician coordinates the health care team in developing treatment strategies, including techniques for pain relief, sleep disturbance relief, daily self-care management, self-care crisis management, and quality of life restoration working toward a return to work and full function. The physician's ultimate role is to assist the individual in taking control of his/her illness, teaching self-care techniques for pain,

fatigue, and other symptoms. The physician assists the individual in knowing when and how the medical team can be helpful.

Obstetrician-Gynecologist

Abdominal and pelvic pain are predominant symptoms for CPP individuals. An obstetrician/ gynecologist (Ob/Gyn) is involved in differentiating the symptoms of tumors and infections of the reproductive organs and intestines from CPP. An Ob/Gyn recommends medication and performs surgical procedures to alleviate symptoms of CPP. During pregnancy, the biomechanical and hormonal changes may increase CPP. When the obstetrician is aware that CPP is a factor, care can be specialized to provide for optimum comfort and function. Obstetricians prescribe pessaries and vaginal dilators.

Urologist

Urologists diagnose and treat bladder problems. Since CPP affects smooth muscle and circulation in the bladder, symptoms of urgency, frequency, enuresis (uncontrolled leaking of urine), lower abdominal discomfort and flank or kidney pain in the absence of test findings of infection, obstruction or tumors are often linked to CPP. Interstitial cystitis includes symptoms of frequent urination (multiple times an hour during the day and more than two times at night), feeling the urge to urinate but having very little flow and a bloated feeling of discomfort/pain in the lower abdomen. Urethral syndrome symptoms (frequent urination and discomfort with urination) can be caused by CPP or fibromyalgia. CPP can be involved in stress, urge, mixed and enuresis types of incontinence. Since CPP symptoms include bladder and bowel symptoms, the effective treatment of urologic problems often significantly reduces the CPP symptoms or vice versa. Urologists perform special tests and surgical procedures for the specific bladder conditions.

Gastroenterologist

A gastroenterologist deals with disorders of the gastrointestinal tract including complaints of abdominal pain, constipation, rectal or tailbone pain. Tests done include anorectal manometry and colon transit. Anorectal manometry is a test to look at rectal sensation and internal and external sphincter function. Colon transit studies look at mouth to anus transit time of food.

Other tests include a flexible sigmoidoscopy, a test to look at conditions of the colon using a lighted tube; a colonoscopy or a barium enema, a test to look at possible pathologies followed by an x-ray, dependent on the severity of the pain and symptoms.

A general or colorectal surgeon will perform surgical procedures of the gastrointestinal tract.

Orthopedic Surgeon

An orthopedist is a surgeon who operates on bones and joints and is an expert in LBP. When multiple symptoms coexist with the core CPP and LBP symptoms many individuals look for more than one diagnosis. Symptoms such as numbness and tingling or shooting pain can bring about concern that other problems such as tendinitis, bursitis, or nerve compression, may be playing a role. Because CPP can be associated with all these myriad symptoms it is advisable to treat the CPP first and see how well the other symptoms respond. Many times the other problems are resolved with general CPP treatment. An orthopedic surgeon is consulted if unusual symptoms persist. An orthopedic surgeon who is familiar with CPP and LBP will ask the key questions, evaluate, and treat for the specific orthopedic problem. Treatments include medications and surgical procedures.

Neurologist

A neurologist evaluates and treats dysfunction of the nervous system. Diagnostic tests are performed to rule out diseases of the nervous system such as multiple sclerosis, Parkinson's disease or amyotrophic lateral sclerosis. A neurologist performs nerve conduction velocity tests to determine if the pain, numbness, and tingling the individual describes is a nerve compression or transmission problem.

Where there is a second diagnosis in conjunction with CPP and LBP, treating both diagnoses simultaneously is the most effective approach. Any physician an individual chooses should have a working knowledge of CPP and its implications.

As one individual said about finding a doctor. "I have looked long and hard for my doctor. The one I have now listens, always gives me options for treatment, involves my family, and encourages me to be independent and try new things. He is wonderful about keeping up on new medications that might help."

Naturopathic Medicine

Naturopathic medicine focuses on facilitating the body's innate healing abilities. Natural medicines support the body and work in conjunction with the immune system to restore health. Naturopathic medicine addresses the physical, mental, and emotional aspects of dysfunction. Treatment possibilities include nutritional analysis, dietary alterations, constitutional homeopathic remedies, botanical medicines, hormone therapy, counseling and hydrotherapy. Nutritional analysis includes food intake, digestive capacity, and elimination patterns. Dietary recommendations may include foods to avoid such as coffee, chocolate, vinegar, pickled foods, acidic plant foods, alcohol, carbonated drinks, shellfish, white sugar, white flour, artificial additives and preservatives, and processed foods. A detoxification diet is often recommended. Supplementation can include omega 3 and 6 fatty acids and multiple vitamins. Constitutional homeopathy can include an individually prescribed remedy to address symptoms and susceptibility of the immune system. Botanical medicines are used to affect inflammation, liver function, the digestive system, nervous system, endocrine and circulatory systems. Hormone therapy can include DHEA, melatonin and phytoestrogen and progesterone. Hydrotherapy includes herbal, Epsom salts, and mineral baths.

Medications

Chronic pelvic pain can be treated medically with the concept that long-term pain is an illness in itself. Other disease specific diagnoses should be treated appropriately as separate entities. These diagnoses may involve bladder, bowel or uterine pathology. Since the severity of CPP is not usually proportional to specifically identified tissue trauma effective medications are often directed at modulating pain through central as well as peripheral mechanisms. Goals in relation to medication effectiveness include: 1) relieve suffering, 2) restore sleep patterns, 3) restore daily activities and 4) improve quality of life.

Medications for Chronic Pelvic Pain and Low Back Pain

Medications can produce significant benefits for some individuals and be ineffective for others. Medications used over time may become less effective so a rotation of medications may be most effective. Medications are not a cure for chronic pelvic pain and low back pain.^{1,2}

Nonsteroidal Anti-Inflammatories – (NSAIDs)

- Function: Inhibits prostaglandin synthesis
Effect: Blocks pain and inflammation at local tissue level
Dose: 600-800 mg/day for analgesic level
Side Effects: Nausea, stomach pain, ulcers, fluid retention, renal toxicity in older individuals
Examples: ibuprofen (Motrin, Advil), naproxen (Naprosyn, Aleve)

Adjuncts

Tricyclic Antidepressants (TCA)

- Function: Increase CNS neurotransmitter levels (serotonin and/or norepinephrine)
Effect: Sedation, diminish fatigue, decrease pain, elevate mood
Dose: 5-75 mg often at bedtime - dose varies with drug
Side Effects: Racing heart, nightmares, dizziness, tiredness, dry mouth, urinary retention, constipation, weight gain
Examples: amitriptyline (Elavil)
nortriptyline (Pamelor)
doxepin (Sinequan)
desipramine (Norpramin)

Cyclobenzaprine (Flexeril)

A tricyclic amine, it is a muscle relaxant.
10-40mg/day

Zolpidem (Ambien)

- Function: Non-benzodiazepine sedative/hypnotic
Effect: Increased duration of sleep, decreased time to get to sleep
Dose: 5-10 mg
Side Effects: Memory problems, daytime drowsiness, dizziness, headache, nausea
Note: Short term treatment of insomnia only, 7-10 days, minimal dependency/addictive qualities

Serotonin Reuptake Inhibitors - SSRIs

- Function: Blocks destruction of serotonin so its effects last longer (controls food intake, temperature regulation, anxiety)
- Effect: Diminish pain, fatigue, and anxiety; mood elevation
- Dose: 20-200mg depending on agent
- Side Effects: Anxiety, nervousness, insomnia, tremor, dizziness, libido changes
- Examples: fluoxetine (Prozac)
sertraline (Zoloft)
paroxetine (Paxil)
venlafaxine (Effexor)

Serotonin - Norepinephrine Reuptake Inhibitors - SNRIs

- Function: Inhibits uptake of serotonin and norepinephrine
- Effect: Decrease pain, diminish fatigue
- Dose: 150mg/day - > 300 mg/day
- Side Effects: Loss of appetite, weight loss, suicidal thoughts, nausea, headaches, postural hypotension
- Note: Not to be taken with monoamine oxidase inhibitors
- Examples: venlafaxine (Effexor XR)
desvenlafaxine (Pristiq)
duloxetine (Cymbalta)
milnacipian (Savella)

Antiepileptics

- Function: May block flow of pain signals from brain
- Dose: 100-300 mg/day up to 2400 mg/day
- Side Effects: Dizziness, drowsiness, peripheral edema, weight gain, suicidal thoughts
- Examples: gabapentin (Neurontin)
pregabalin (Lyrica)
carbamazepine (Tegretol)

Central Acting Opioid Analgesics

- Function: Binds to opiate receptors in brain to alter brain perception.
- Effect: Decrease pain and anxiety, improve sleep
- Dose: Varies with agent
- Side Effects: Drowsiness, decreased physical activity, mood changes, respiratory depression, mental slowness, dizziness
- Examples: methodone (Dolophine), morphine, butorphanol \ (Stadol), fentanyl (Duragesic), hydrocodone (Vicodin, Lortab), meperidine (Demerol), morphine, oxycodone (Percodan, Percocet, Oxycontin), propoxyphene (Darvocet)

Tramadol (Ultram)

- Function: Increases serotonin and norepinephrine, bonds to opiate receptors; a synthetic analgesic
- Effect: Inhibits pain perception, decreases pain
- Dose: 50 mg, 2-4/day
- Side Effects: Dizziness, nausea, constipation, headaches, postural hypotension
- Note: Minimal dependency/addictive qualities

Antibiotics

Appropriate if chronic infections such as Pelvic Inflammatory Disease (PID), possible subacute genital tract infection, chronic urethral syndrome, or bladder infection is present.

Estrogen/Progesterone

Appropriate if female is over 40 and/or perimenopausal. Incontinence, irritation and inflammation of the vagina or urethra can be significantly improved using phytoestrogen or animal estrogen/progesterone. The estrogen/progesterone is most effective locally in the form of a patch or cream.

Medications for Bladder Incontinence

Stress Incontinence

Generic Name	Brand Name
Imiprimine	Tofranil

Medication increases tone of the bladder outlet/internal urethral sphincter to prevent leaking.

Urge Incontinence

Generic Name	Brand Name
Propantheline	Pro-Banthine
Flavoxate	Urispas
Dicyclomine hydrochloride	Bentyl
Imiprimine	Tofranil
Oxybutynin	Ditropan, Ditropan XL
Hysoscyamine	Levsin
Tolterodine tartrate	Detrol LA

These medications decrease bladder contractions when the bladder tends to be overactive.

Medications for Bowel Incontinence

Irritable Bowel Syndrome

Generic Name	Brand Name
Hysoscyamine	Bentyl,
Dicyclomine hydrochloride	Levsin
Tricyclic antidepressants	
Amitriptyline	Elavil
Nortriptyline	Pamelor
Loperamide	Imodium

Some individuals experience side effects from the medications used to treat incontinence. The side effects can be minor and last only a few days after initiation of the medication. If they significantly change the individual's behavior or ability to function or if the symptoms continue longer it is important to contact the prescribing physician and describe the problem. Often a change in dosage or a change in medication is pos-

sible. Side effects of incontinence medication can include dry mouth, dizziness, headaches, mental confusion, anxiety, nervousness, blurred vision, extremity weakness, joint or muscle pain, constipation or diarrhea, lethargy, somnolence, and insomnia.

Trigger Point Injections

Trigger points, when pressure is applied, are painful at the site and refer pain to other areas of the body. They are a sign of a myofascial pain pattern or syndrome. Tender points are exquisitely painful at the site of pressure only.

Injections into trigger points in CPP can be appropriate if there is myofascial pain in abdominal, low back or thigh muscles.³ The trigger points are injected with:

- Saline solution
- Lidocaine, procaine (local anesthetics)
- Cortisone – in small amounts, less frequently. There may be increased pain for up to 48 hours after the injection, then there should be a decrease in pain over the long term. Systemic side effects almost never occur if the volume injected is below 5 cc, but this is dependent on the potency of the steroid.

CHAPTER 15

General Self-Care Management

Self-Care Stabilizing Loops

The knowledge from your Personal Assessment in Chapters 11 and 13 enables you to begin an effective management program. The goal of any individual with chronic pain symptoms is to function efficiently and fully in daily work, social, recreational and family activities with pain-free energy. This goal, at the physiological level, requires efficient and effective muscle work and rest cycles. Muscles of the arms, legs, back, abdomen and neck – the voluntary muscles – must function efficiently and effectively. Additionally, smooth muscles of the heart, lungs, intestines, bladder and reproductive organs that are controlled by the autonomic nervous system must function efficiently to accomplish pain-free daily activities. To optimize the function of muscles it is necessary for them to receive and absorb the essential nutrients and oxygen needed for energy production (metabolism) within their cell structures and to effectively eliminate the waste products left after the metabolic process is completed. The goal is to achieve normal function in daily and work activities, in leisure time activities, and during sleep.

Treatment

Ideally the individual is working with a health care professional to set goals and monitor progress of each treatment approach. It is important to find a trusted and interested professional to be your coach and guide the recovery process. Treatment can include medication and self-care. No pill, surgery, or counseling has proven to be a cure. Medications can help but in most cases medication does not completely alleviate the symptoms over the long term. Self-care becomes the primary treatment to alleviate the symptoms of CPP and LBP and optimize functional and work activities.

It is common for an individual with CPP to comment, “I am too busy with my family and work to do all that self-care stuff,” or “I did the self-care routine for several months and got better but it didn’t last when I went back to my usual life,” or “My family (spouse) thinks I am being selfish and self-centered when I spend so much time on me.” With these comments it is no wonder that the best treatment is often ignored.

Self-care is a form of work, a job that must come first if the individual is to function optimally in the home, family and work place. It is a job that must be maintained over the life time. The individual brushes her teeth and washes her face every day as a given part of life. The self-care routine for CPP and LBP is the same as brushing and washing. It is forever and important. The individual deserves to include those self-care items that provide health and enable her/him to function in a healthy way with family and society.

Sometimes the individual is able to gradually integrate the self-care routine into life activities without changing the daily routine much. Other times it is necessary to interrupt the normal routine for a time and emphasize self-care to realize what being a healthy person can feel like. Then family, social and work activities are gradually added back when the self-care routine is effectively in place. It is important that the self-care routine remain at the core of daily life. It is not an add-on when there is available time.

Case Study

Mary tells of using self-care techniques, sleeping, exercising, using Physiological Quietening[®], and changing nutritional patterns in a concentrated way for six weeks. She felt much better. Then she was released to go back to work. Her family said they were glad she was well now and could start doing what she did before. Her co-workers welcomed her back and she returned to her same job. Within two weeks she was exhausted, aching and painful and expressed confusion and frustration about what to do now.

The answer to the scenario described above is continual self-care.

Self-care is the best solution to a chronic problem. It needs to be a deserved priority on a daily basis. There will still be ups and downs but the windows of “feeling good” will be larger and the crisis times will be less intense.

To discover the best self-care approach takes time and exploration for each individual. Each individual will be unique in his/her needs in spite of similarities throughout the population as a whole.

When a new aspect like exercise is started, it is important to start slowly and gradually increase the intensity and repetitions. As with any other sensory input, the CPP nervous system over-responds to the sensation and action of new events. That can exhaust the body and mind quickly or set off the teeter-totter imbalance within the many body systems. Floating through exercises, doing a few repetitions of each exercise, and emphasizing rest as much as work are the basic rules for all new endeavors. Work and recreational related activities must be approached the same way. Constantly quieting the systems keeps the balance and prevents increased pain, fatigue and dysfunction.

To get started on your program of healthy living remember you were created as a deserving human being and your most important job is to care for your body and mind in the ways it needs to be healthy. There cannot be a separation between the body and mind, the body is equal to the mind in value, intelligence and deservedness.

General Self-Care Stabilizing Loop

The General Self Stabilizing Loop includes the self-care spiral (figure 15-1).

- Sleep Routine
- Physiological Quieting®
- Nutrition
- Exercise
- Bowel Program
- Acupressure/Massage
- Positive Self Talk
- Rest/Work Cycles
- Pacing/Prioritizing
- Medication/Modalities
- Journaling

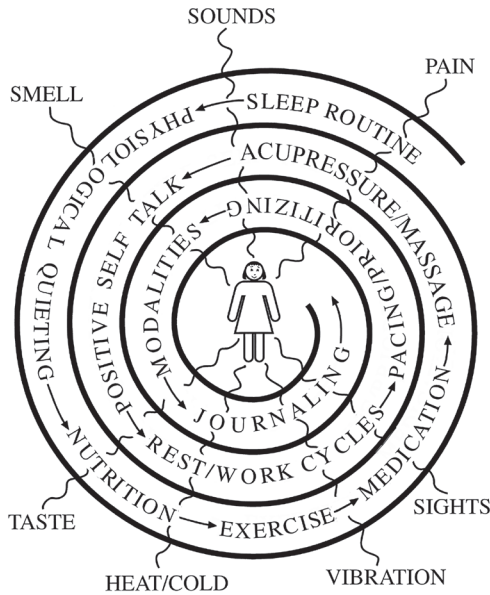


Figure 15-1: Self Care Spiral

The General Self Care Stabilizing Loop items are listed in order of priority. Sleep protocol, Physiological Quieting®, and nutrition are combined in the first step. It may take up to a month to incorporate these new behaviors. No one can expect to turn over a new leaf in a day or a week. Persevering along a path of small steps and positive actions will result in decreased symptoms. Check off the items as you progress through the First Step Protocol (figure 15-2).

General Self Care Stabilizing Loop								
	M	T	W	T	F	S	S	Comments
First Step Protocol								
Sleep								
Defined bedtime/rise time								
8-9 hours/sleep								
snack at bedtime								
remove caffeine								
PQ at bedtime								
appropriate bed clothing and pillows								
environmental stimuli stabilized								
Physiological Quieting®								
listen to PQ tape at night								
hourly PQ for 30 seconds								
Nutrition								
reduce/eliminate simple sugars								
caffeine								
alcohol								
6-8 glasses water daily								
vitamin / mineral food / supplements								
amino acid foods/supplements								
reduce/eliminate detrimental foods								
Second Step Protocol								
Exercise -								
Roll In and Out								
20-30 min. daily Aerobic								
Medication								
1.								
2.								
Massage								
Positive Self Talk								
1.								
2.								
Rest/Work Cycles								
Pacing/Prioritize								
Dress								
Modalities								
Journaling								

Figure 15-2: General Self Care Stabilizing Loop

Sleep Protocol

Sleep is the most important first step in health for individuals with chronic pelvic pain. During deep sleep there is replacement and repair of all cells of the body and brain. Sleep is a rejuvenation time.

During sleep it is important that the body systems remain relatively stable. For example:

- temperature needs to remain relatively stable,
- blood sugar needs to remain relatively stable,
- muscle tension/tightness needs to remain relatively relaxed,
- mind activity needs to remain relatively quiet,
- oxygen levels need to remain relatively stable.

To that end self-care techniques that help these systems remain stable will be the first ones to learn and integrate into daily life. These include:

- Physiological Quieting® (PQ) – diaphragmatic breathing, Q-Core Control, and PQ CD
- Eliminate nutritional stimulants – caffeine, alcohol
- Minimize environmental irritants – noise, odor, temperature, light
- Maintain a healthy bowel program
- Schedule regular and adequate time for sleep.

As these become regular habits in daily life, pain, fatigue, and associated symptoms can significantly decrease.

Since restful sleep is a top priority, planning an individual routine for sleep is important. “I want to be able to get to sleep, sleep through the night without pain and frequent waking. I want to feel rested and limber when I awake,” Jody tells her health care consultant.

To get to sleep:

- Stimulants can increase insomnia and restless sleep. Remove stimulants such as caffeine. This includes any coffee, tea, soda or chocolate that contains caffeine. Some headache and pain remedies contain caffeine and should be changed to another non-caffeine containing medication. Caffeine is a stimulant to the ANS, increasing pain perception, stimulating the brain’s arousal systems and facilitating wakefulness. It is also a bladder irritant so it can increase the times you need to go to the bathroom at night.

- Hunger and/or hypoglycemia can increase insomnia symptoms so eating a light carbohydrate snack like a piece of whole wheat toast or a banana along with a small amount of a milk product or protein just before bedtime can improve sleep. Milk products contain tryptophan, a natural chemical that has a calming and relaxing effect on the nervous system and is a precursor to serotonin. Milk products also contain calcium which helps with sleep and muscle relaxation. Carbohydrates help speed tryptophan to the brain.

A regular bowel program is essential for healthy sleep.

Constipation is directly related to sleep disturbance. A regular daily bowel movement can improve sleep quality and length.

- A regular bedtime and wake up time is important for individuals with sleep disturbance. Eight to ten hours of sleep each night is important. Growth hormone in individuals with CPP and LBP is often produced in greatest amounts during the early morning hours, so the best sleep is sometimes termed “sleeping in” by others. Growth hormone is essential for the growth and repair of all body cells. Shift changes at a job are not conducive to health since the body clock needs to practice the same routine over a long period of time and is hypersensitive to disruption.
- The hour before bedtime needs to be a time of winding down, a time for yourself and quiet enjoyment. It is not a time to be balancing the checkbook, paying the bills, or settling a family disagreement. Instead, try soft music, a hot bath, a good book, or writing in a journal. This is the time to use Physiological Quietening® in preparation for sleep.

To stay asleep:

- Use a supportive mattress that has its own soft pad or place an egg crate mattress under the sheet and mattress pad. Try different pillows until you find the best one for your head and neck, one that is most comfortable through the night and enables you to wake up with minimal feelings of stiffness and soreness in your neck and shoulders. Use a pillow between your knees and hug one when you sleep on your side. When

sleeping on your back, place pillows under your knees as well as supporting your head and neck. You may even want pillows to support each shoulder and arm. Sleeping on your stomach is not recommended because of the extreme position it puts your neck and low back.

- Wear warm night wear with long sleeves and long pants. Some people even wear socks, gloves and nightcaps to help maintain body temperature while sleeping.
- Warm the bed before you get in using a heating pad or electric mattress pad. Turn it off before you go to sleep.
- Eliminate environmental factors that can arouse a light sleeper. Black-out shades and a sleep mask keep out light. A sound conditioner which produces white noise or ear plugs block out the background noise of car engines, horns, and people talking. Essential oils such as lavender and eucalyptus can facilitate restfulness and block out other stimulating smells. Stabilize the room heat so the temperature is the same all night and use blankets which are adequate for the duration of sleep.
- Recline in bed for 20-30 minutes, then toilet before going to sleep. Reclining helps all body cells empty excess fluid into the kidneys and then into the bladder. An empty bladder helps maintain long term sleep.
- Exercise moderately 20-30 minutes some time during the day at least three hours before bedtime. Exercising in the evening stimulates the nervous system and may increase alertness and wakefulness.
- If you wake up during the night move to a comfortable position, then relax muscles head to toe into the bed and begin diaphragmatic breathing, Q-Core Control, and positive self-statements. Know that your body and mind are in a restful state even if you do not perceive that you are asleep.
- If you can't get back to sleep after a half an hour to an hour get up, read a book, write in a journal, or do some gentle exercise, and then try to sleep again later.
- Use prescribed medication consistently. Consult a physician about changes in sleep patterns.

The goal: sleep through the night, wake rested and limber!

Physiological Quieting®

An individual responds to events in daily life through chemical changes within the body and brain. The alarm in the morning is perceived by the ear, transferred to the brain center for hearing by chemical events within the nerve, then interpreted by the head and gut control centers which send messages to the rest of the body through additional chemicals saying, “open your eyes, jump out of bed, get dressed.” Chemical messages are different depending on how the event is perceived by the head and gut brain. If the event is perceived as an emergency, a fight or flight event, chemicals such as adrenaline, cortisol and testosterone are released in increased amounts; if the event is perceived as a normal, easy life event by the brain and body the chemicals released are different and give activating but calmer directions to all organs and tissues.

Brain centers and nervous systems experiencing chronic pain respond to life events with excessive fight or flight chemicals rather than quieting chemicals. The autonomic nervous system that controls heart rate, breathing, stomach and intestine activity, bladder function, and circulation tends to send out more fight or flight chemicals than quieting chemicals. We say it has a high idle at rest, always ready to jump. The on/off switch for full activation is hypersensitive. This means even normal daily events may activate chemical messengers that are meant to be used only during short periods of high stress. This constant activation of stress chemicals is destructive to the body over the long term. Circulation to muscles is decreased so muscles ache from lack of oxygen and accumulation of waste products. Breathing rate increases and breathing is shallow and irregular so the individual complains of shortness of breath and low endurance during aerobic activity. Heart rate increases and is often irregular, chest pain and pressure is experienced. Stomach and intestinal activity can vary from one extreme to the other. Excessive smooth muscle contractions can cause stomach and abdominal pain, diarrhea, and indigestion. Decreased gut motility leads to constipation. Disrupted sleep can prevent repair and replacement of body cells.

It is important to use management techniques that quiet the high idle or high resting level of the nervous system. It is important to use management techniques that assist the autonomic nervous system in

responding to daily events with “calm and alert” chemical messengers to organ systems and muscles instead of “fight or flight” chemical messengers.

Physiological Quieting® (PQ) exercises are designed to rebalance the nervous systems to lower the idle. It is an integral part of a successful chronic pain management system since nerves control all muscles and organs. The goals of Physiological Quieting® are:

- rebalance the ANS regulation of circulation, internal organ function (heart, lungs, intestines) and muscle resting tone,
- rebalance the release of chemical messengers from the head and gut control centers to the rest of the body, and
- equalize the feedback message loop from the body to the head compared to the message loop from the head to the body telling it what to do, what it needs for health and well-being.

See chapter 17 Autonomic Nervous System Exercises for the Physiological Quieting® protocol.

Nutrition

Nutrition is the next step in self-care for individuals with chronic pelvic pain and low back pain. The nutritional component in managing pain can be controversial. Mary is told by her dietician to “eat a normal diet based on the food group plate.” Jolene consults several traditional and alternative health care providers and uses nutritional supplements in addition to a balanced diet.

“You are what you eat” is a wise woman saying. The body is composed of millions of cells and each cell is an engine running on fuel. The fuel needs to be high grade and uncontaminated. Poor fuel leads to irregular function, inflammation, pain and fatigue.

Fuel comes from the food eaten and digested. Food contains nutrients, amino acids, fatty acids, carbohydrates, vitamins, minerals, enzymes and water. The digestive system, mouth through the colon breaks down and absorbs the nutrients so they can be transported to the cellular engines. The goal of good nutrition is to provide the needed food products that can be broken down and utilized for optimal body functions. It comes before exercise because without adequate nutrition the muscle cells cannot function to perform exercise.

Nutritional considerations include:

- intake of needed nutrients
- digestion of nutrients
- absorption of needed nutrients into bloodstream
- transportation of nutrients to cells
- metabolism of nutrients by cells for function
- elimination of waste products and poisons

Intake of needed nutrients can be different for each individual. There are general guidelines, but it is trial and error to find out what works best. General guidelines include:

- 6-8 glasses (8 oz) water daily and 1 glass for every 30 minutes of exercise
- 3 meals, 2 snacks daily
- vitamins, minerals, enzymes, essential fatty acids, essential amino acids through food or supplements

Adequate consumption of water and non-caffeinated fluids is important for an individual's health. Water is the medium for all cellular function. Dehydration is literally the "drying up" of body cells. The cell engines cannot function in a dehydrated state. There is also accumulation of waste products. The increased accumulation of waste products in muscle and connective tissues increases pain. Adequate fluid consumption, 6-8 glasses per day, helps the circulatory system and kidneys process waste products. Avoiding excessive diuretic-acting fluids like coffee and tea keeps cells healthy.

Some individuals with chronic pain try to eat pain and fatigue away. A common thought is, "If I just eat something I'll have more energy and not hurt as much." In other instances, when feelings of despair or depression are prevalent, the idea that food is a comforter leads to excessive calorie consumption. It is true that food can be quieting and comforting. Carbohydrates, for instance, tend to soothe the nervous system and gut. Yet it is important to recognize the symptoms and treat the underlying problem rather than numb the senses with food.

It is vital to eat and drink adequately while exercising. Before starting an exercise program eat a light carbohydrate meal and drink 6-8 oz. of fluid. During workouts drink fluids every 15-20 minutes. It is important to consume a carbohydrate and protein meal within 15-20 minutes after exercise to replenish energy stores.

Effective digestion of needed nutrients occurs from the mouth to the rectum and anus. Considerations include:

- chewing ability in the mouth
- swallowing and motility ability
- stomach digestion – breakdown of fruits, sugars
- small intestine digestion – breakdown of fats, carbohydrates
- colon function – absorption of water and nutrients
- rectum and anus – elimination of waste products

Some individuals with chronic pain complain of jaw/tooth pain which can change chewing habits. Chewing is the first step in digestion. It breaks down the outer walls of the food so the inner soft core can be digested. If a food is not broken down during chewing there is the possibility it travels through the system and is eliminated whole in the feces. Nutrient value is lost when the food is not digested.⁴

Swallowing difficulties are common complaints in chronic pelvic pain. The esophagus is one end of the tube we call the intestine. When there is dysfunction at one end it will affect the entire tube. Choking and pain with swallowing affects what foods are eaten. Peristalsis, the movement of digested food through the intestines, is an automatic action of the intestinal walls directed by the enteric, sympathetic and parasympathetic nervous systems. Spasm or paralysis of a section of intestine can affect the entire digestive system.

When stomach and small intestine digestion is affected, absorption of nutrients is a problem because the food is not being broken down adequately to enable its absorption into the blood stream. Chest pain, stomach pain, and burping can be symptoms of stomach and small intestine digestive problems. The same is true when the large intestine/colon is dysfunctional. Irritable bowel syndrome is a common complaint of individuals with chronic pelvic pain. The symptoms include abdominal, pelvic and low back discomfort, constipation, diarrhea, bloating and gas. Diarrhea and constipation indicates abnormal water absorption along with water soluble vitamins and minerals. This affects the nutritional status of all body cells.

Elimination patterns affect nutrition even though the function is at the end of the digestive tract. Elimination patterns indicate how well the entire system is functioning. Constipation and diarrhea can mean there is a problem with fluid intake or absorption. Color and composition of

feces indicates types of nutrients being eliminated. Pain can indicate a muscular problem or some type of irritation.

It is possible to swallow all the right nutrients but unless the stomach and intestines are able to digest the nutrients and allow optimal absorption into the bloodstream the nutrients cannot benefit the individual. The enteric nervous system directs the function of the stomach and intestines. With dysfunction of the enteric nervous system common in CPP and LBP there is often abnormal nutrient absorption.¹ Self-care and medications that normalize the enteric nervous system and gut function can lead to significantly less fatigue and pain. Foods and supplements that are more completely digested will make a difference in pain and fatigue as well. Any supplement should break down in water within 20 minutes to be effectively digested in the gut.² Some individuals utilize nutrients better if food combining strategies are followed, such as eating protein and vegetables together or avoiding protein and starches in combination.

Food does not cause chronic pain in most cases but individuals may find specific foods that appear to exacerbate symptoms and others that appear to help. In general, any food or drink that is an irritant to the nervous system may exacerbate symptoms. For example, the caffeine in coffee, tea, soda and chocolate is a nervous system irritant and aggravates symptoms of muscle pain, sleep disturbance, and bladder irritability. Gluten or lactose intolerance can cause systemic dysfunction, pain and fatigue. Elimination of gluten or milk products can change symptoms within 10 days. Eliminating artificial sweeteners and colors can sometimes have the same effect. On the other hand, food or drink that has a quieting affect may help decrease symptoms. Greek yogurt with active cultures or probiotics may quiet irritable bowel symptoms. Chamomile tea can have a quieting effect. Elimination of irritating nutrients like alcohol, caffeine and sugar can improve the ability of the digestive system in its job of producing the essential nutrients for cellular function.³

More specific information is available in Chapter 18 Nutrition and Chronic Pain.

Exercise and Postural Alignment

An effective management program for chronic pelvic pain and low back pain must focus on realigning and re-educating the entire musculoskeletal system from head to toe. Lifestyle patterns, work environment and chronic stress deconstruct our original upright posture and ease of rotational movement patterns. Chronic pain further alters skeletal alignment, muscle and fascial support, and internal organ function. Rigid holding patterns through the trunk and pelvis create circulatory stasis along with muscle fatigue and pain. Essential core midline rotation is lost, replaced by stiff, robot-like movements to accomplish daily activities.

Roll for Control[®] Exercises, Wonder W'edge[®] Inversion and In-Balance Postural Alignment, are the foundation of an exercise program for chronic pelvic pain and low back pain. The exercise series facilitates skeletal realignment, muscle and fascial support, internal organ alignment and function and circulation to the pelvic region. It restores normal resting tone and coordinated strength of essential muscles.

Roll for Control[®] exercises develop coordinated synergistic sequencing of pelvic muscles in conjunction with obturator internus and adductor muscle to restore midline, midrange rotation around the sacroiliac, lumbosacral and hip joints. Wonder W'edge[®] Inversion facilitates organ realignment and pelvic circulation. In-Balance Postural Alignment exercises restore the automatic dynamic upright stability from head to toe. Together they relieve pain, restore axial rotation, and improve musculo-fascial-organ-skeletal alignment for normal daily function. The goal is always pain-free normal daily function.

Start with the Core Exercises in Chapter 19. They are easy to do and have a powerful effect on pain. When they become easy and comfortable add the advanced Roll for Control[®] and In-Balance Postural Alignment exercises.

Massage - General Body

Massage can be helpful for pain relief, improved circulation, relaxation of muscles and removal of waste product build up. Massage needs to start gently; pain is not gain in chronic pelvic and low back pain. As the muscles release, deeper and more localized massage may be appropriate. Special techniques, including craniosacral and myofascial release

techniques, can be appropriate and beneficial. Massage therapists, physical therapists, occupational therapists, nurses, and chiropractors are all individuals trained in massage. Hiring a professional massage therapist for a weekly massage is also beneficial. Interview them first, to make sure they understand the needs of chronic pelvic and low pain.

Self-massage or having a family member massage areas can be effective using essential oils and light to moderate stroking over muscle areas that are painful or tight. Caring touch and essential oils relax muscles, increase circulation and decrease pain. Trying to “dig out” the pain with deep, intense massage techniques will often increase symptoms. The pain does not have to get worse before it gets better.

There are various canes and knobs on the market to help reach difficult spots. To reach hard to get areas use two tennis or racquetballs in a sock placed between the back and the floor or the pelvic area and the chair to massage a particular spot for 1-3 minutes.

Acupressure / Acupuncture / Dry Needling

Acupressure and acupuncture are non-medicinal ways to help control pain. Acupressure uses pressure rather than needles to treat key areas of the body. Acupressure can be performed by the individual or a friend by applying pressure with the middle finger or thumb to acupressure points. A physical therapist, massage therapist, chiropractor or physician may have the training for acupressure treatment.

Acupuncture is a form of Chinese medicine in which inserting fine needles into the skin of the ear, the feet or other body parts relieves chronic pain, fatigue or other neurological symptoms.⁴ Pain relieving brain chemicals called endorphins and enkephalins are released during acupuncture. These chemicals block the pain circuits from sending their message to the brain so “you don’t feel the pain.” Acupuncture has few side effects if disposable, standard needles are used and are administered by a trained acupuncturist. Pain relief should be felt within 5-10 treatments. Acupuncture can be used to improve associated symptoms as well as pain. Treating the Chinese organs or meridians of spleen, liver, kidney, lung and heart through acupuncture can be beneficial in relieving pain symptoms. Dry needling, also called intramuscular manual therapy, is the insertion of small needles into trigger points or painful tissue to elicit a twitch response. Ice or heat follows the nee-

dling. Clinical reports indicate relief of pain, improvement in sleep and decreased fatigue.⁵

Tender Point Pressure

Tender point pressure can be an effective self-care technique. Direct pressure using the thumb or a finger for 7-8 seconds can be done several times a day. Start with the foot and calf, then progress to the inner thigh, abdomen, back and sacrum. Focus on slow low breathing while applying the pressure. The amount of pressure should be comfortable not painful (figure 15-3).

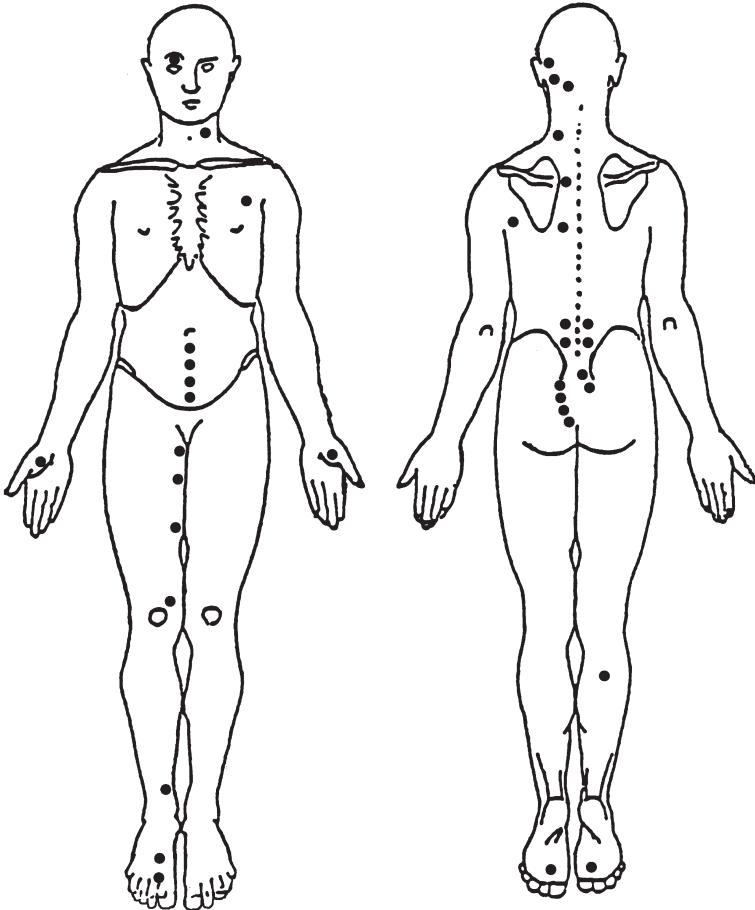


Figure 15-3: Acupressure Sites

Oils and Lotions

A number of lotions, creams and oils can be used externally to ease muscle pain and tightness. Especially for those individuals who are drug sensitive, oils and lotions don't cause stomach or gastrointestinal irritation or the side effects of some medications yet they can give relief from pain and muscle tightness.

Essential oil mixtures can be easily applied externally to painful areas by the individual or family member. Specific oils decrease pain, detoxify waste products and improve circulation. Some oils are relaxing and pain relieving while some are stimulating. Combining essential oils can improve symptom relief. Add two drops of essential oils to 1 tsp of carrier oil. Store the oil in a dark glass bottle.

Examples of essential oil blends are:

- Relaxation: geranium and lavender
- Pain and muscle spasm: juniper, lemon, rosemary and birch
- Carrier oil: almond oil

Extra virgin olive oil is beneficial for vulvadynia, vulvar vestibulitis and vaginitis. Olive oil is rich in vitamins including vitamin E, minerals and proteins as well as oleic acid, which are all beneficial to the skin. It is excellent for relieving pain and moisturizing skin. Olive oil is safe to use in and around the vagina and labia. It has been shown to relieve dry, irritated vaginal mucosa when applied on a daily basis.⁶

Lotions containing capsaicin are known to decrease Substance P. Capsaicin is derived from red peppers and produces a hot, burning sensation when rubbed into the skin. Repeated application to a specific area over a week can result in decreased pain. Capsaicin is not used over the labia, vulva, or scrotum area.

Bowel Program

Healthy bowel function is essential to decrease CPP and LBP. Constipation, irritable bowel syndrome, diarrhea, or flatulence can all increase discomfort and pain in the pelvic and back regions. Healthy bowel function is defined as bowel movements 3 times per week of soft-formed consistency that are eliminated without straining.

A bowel program for constipation includes:

- 6-8 glasses of fluid daily
- Eliminate caffeine and alcohol

- Fruits and vegetables 5-10 per day
 - One at breakfast
 - Two at lunch and dinner
- Bran or flaxseed and yogurt at breakfast
 - 1-2 teaspoons bran or 1-2 tablespoons flaxseed
 - 4-6 oz. Greek yogurt (active cultures)
- Fresh spinach salad with a tablespoon of extra virgin olive oil as dressing and a fresh pear each day will often solve constipation within 48 hours.

Self Talk – Positive Self Statements

The mind is always saying something positive, negative, or neutral as an individual goes through the day. Even while sleeping at night there are thoughts and dreams. Self-talk can be helpful or hurtful in relation to pain symptoms and an individual's accomplishments. To develop an awareness of what self-talk is like, for one or two days pause four or five times during the day and jot down what thoughts are present at that time in relation to what you are doing and how you are feeling.⁷ Are there primarily positive or negative thoughts? Are there repetitive thoughts? Now take the positive thoughts and repeat them throughout the day. Pair the positive self-statement with some event that occurs frequently during the day such as every time breathing practice is scheduled or every time you talk on the phone. If there is negative self-talk, substitute positive statements for the negative thoughts.

Examples of positive self-statements are:

- I am healing, I am healing more each moment of each day.
- I am trying, I am doing the best I can.
- I deserve to be healthy and happy, I am healthy and happy.
- I feel quiet and calm, I am quiet and calm.
- I love you, I will take care of you.

For some individuals positive self-statements seem like lies or half-truths. If that occurs, put "I am trying" or "I am beginning to" in front of the statement. Remember every thought stimulates biochemical and electrical events in the brain and gut which then flow to every cell of the body and affect all other body and mind functions.

Rest is Essential

Rest is a vital part of anyone's daily schedule, usually accomplished at an unconscious level. Relaxing into a chair for a few minutes between jobs, reading the newspaper or watching television and dozing off for a short period, sitting under a tree and gazing at the clouds during lunch time, or sitting at your desk stretching towards the ceiling while releasing two or three big sighs are all forms of rest the body and mind need and ask for throughout the day. Rest is necessary for energy conservation and a return to balance and slow idle before going on to a new task.

Both mind and body rest is important to accomplish during the slow idle periods throughout the day. Mind rest techniques can include meditation, positive self-talk, and breathing awareness to name a few. Body rest includes skeletal muscle release and internal organ system quieting using Physiological Quieting® techniques such as breathing and Q-Core Control. The need for supportive, comfortable chairs, couches and beds that enable the individual's muscles to let go into a relaxed state with minimal pain are important for body rest.

Mind and body rest needs to occur frequently throughout the day for short periods. Sometimes it will only be a minute or so of breathing and quiet muscle release, other times 5 minutes of focused meditation, and at least 20-30 minutes of extended body-mind rest using Physiological Quieting® techniques once a day. When setting up a schedule for the day, rest periods are as important as work periods. These rest periods help ensure that the chronic pain tendency for elevated muscle resting tone, imbalanced and hyperactive autonomic nervous system activity and hyperactive mental alertness and anxiety are frequently returned to more normal levels. They are returned to an In-Balance state of functioning. These rest periods are essential in maintaining decreased pain and fatigue levels throughout the day instead of the pattern of a small window of relief in the morning with escalating pain and fatigue levels for the remainder of the day.

Pacing – Energy Management

Pacing is the breaking up of the day into multiple work, rest, and play sections. To pace the day it is important to first make a list of the work related tasks for the day and prioritize the top three while putting the others off until tomorrow. Pacing is breaking each of those jobs or tasks into two or three parts with planned rest periods in between.

Pacing is never finishing one job before you start a part of another one. Instead it means performing the first part of job one, then resting, then going to the first part of job two, then resting, then completing the first part of job three, then resting, then going back to the second part of job one, etc. With this kind of pacing, different muscles and different body postures are used for each new job. Fatigue is less of a problem because parts of jobs are done with frequent changes in muscle action and postural alignment. Frequent short rest periods with conscious return to balanced mind and body activity enables the individual to accomplish more tasks with less fatigue and pain.

Daily Job List

1. Sweep floors
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Daily Priority Jobs

1. Sweep floors
 - a. part one: Sweep 1/2 kitchen floor
 - b. part two: Sweep 1/2 kitchen floor
 - c. part three: Sweep laundry room
2.
 - a. part one:
 - b. part two:
 - c. part three:
3.
 - a. part one:
 - b. part two:
 - c. part three:

Rest Activities

- Listening to music while reclining.
- Reading in supported sitting.
- Physiological Quieting®.
- Meditation

Initially the rest cycles may be longer than work cycles, but gradually the two will become equal and eventually the work cycle can exceed the rest cycle and still maintain the goals of decreased pain and fatigue. For example:

Rest Cycle

10 minutes

10 minutes

10 minutes

Work Cycle

3-5 minutes

increase 1-2 minutes/week

10 minutes

15 minutes

Play and Fun

Pacing means placing play and laughter into the work-rest routine throughout the day, not just when all work has been accomplished. Play and laughter are required treatments multiple times during each day. With that being the case, short periods of play will be scheduled into mid morning, mid afternoon, and evening. On some occasions, segments can be as simple and short as reading the funnies in the paper every morning and making sure to practice belly laughing. There needs to be a daily 20-30 minute play period with friends having tea, or spending 20 minutes in a hot bath or hot tub, going to the movie, or watching a favorite TV program.

Some individuals, when asked what they do for fun, respond “work.” It is necessary to begin making a master list of play and fun activities that are not work related so you can vary the play activities on a daily and weekly basis and continue to be on the lookout for a new play or fun activity to add to the list. Try to find a new one every week or two. Watch other people and catch them having fun, see what they are doing. It means that play and laughter have equal weight with work and rest in a daily schedule.

Pacing of work, rest and play can be easily monitored by using a daily journal. As part of the nightly routine fill in the day’s activities and summarize where pacing went well (figure 15-4).

DAILY JOURNAL OF PLAY, REST, WORK			
Date _____			
Time	Play	Rest	Work
A.M. 7:00-8:00			(ea. task = 3 parts) (3-4 tasks/day)
8:00-9:00			
9:00-10:00			

Figure 15-4: Daily journal of play, rest, work

Play Activity List

- Tea with friends ■ _____
- Favorite video ■ _____
- Reading the funnies ■ _____
- _____ ■ _____

Prioritizing

Prioritizing is making decisions – decisions that some work is more important to do today, that some work is more important to do next week and some work you should never do but rather give to someone else or let it go undone. Prioritizing is listing all the work titles you have and the roles you carry out under each of those, then making decisions as to which are important to be done on a daily, weekly, monthly or never ever basis. It needs to be emphasized that prioritizing is done in the context of the pacing schedule you have already planned. Prioritizing is more important than getting all your work roles accomplished. Figure out how the work roles can fit into your optimum pacing schedule.

Work Titles I Fulfill

- Parent to children
- Parent to elderly parents
(list specifics)
- Spouse
- Banker, teacher, teller etc.
- Volunteer
- Friend

Roles

Examples:

- Transporter
- House cleaner
- Listener/emotional support
- Money transfer, reaching, grasp

Dress

Dress has an impact on pelvic and low back pain. Clothing that is tight around the abdomen can put pressure on internal organs so they descend further out of normal position. Tight pant and skirt waist bands impact muscle resting tone and circulation. Pants and underwear can irritate the labia and vulvar area.

For improved comfort and healthy function loose, elastic waist bands or dresses that suspend from the shoulders are optimal. Underwear and pants that are cotton or other natural fiber without dyes provide the healthiest environment in the pelvic area. Artificial fabrics like nylon, polyester and acrylic contain polyvinyl chloride (PVC) that give off vapors when they warm against the skin. Some individuals with hypersensitivity in the vulvar area may be most comfortable and promote healing by wearing a loose dress without underwear.

Medications

Medications are often recommended as part of the total management approach for chronic pelvic and low back pain. See chapter 14 for a list of commonly used medications. Medications rarely eliminate all symptoms but can help with pain and sleep in 30%-50% of individuals. To find the optimum medication combination, it may take several trials of different medications in different amounts. If there is more than one physician prescribing medication it is essential that each physician knows all the medications being taken. There are prescription guides available in bookstores and at pharmacies to help the individual stay informed.

Medications that help are frequently needed over an extended period of time and on a daily basis. There is a tendency to quit taking

medication when symptoms improve. “I don’t want to be dependent on drugs to feel good. I’m not someone who uses drugs,” are commonly heard comments. This is short sighted. The medications help replace missing chemicals that allow the body to function optimally. Those chemicals are needed over the long term to minimize the symptoms. Medication is one of the many tools an individual with CPP and LBP can use to help manage the symptoms of the illness and speed recovery. Medication is rarely a cure. It is beneficial along with lifestyle changes and self-care strategies.

Pain Relieving Modalities

Pain relief is the number one priority for most individuals with chronic pain.⁸ Effective techniques may be different for each person. Examples of pain relieving modalities include:

Heat

The benefits from 20-30 minutes of heat include increased circulation and decreased muscle tightness. Moist heat pads are usually preferred over dry heating pads. The moist heating pad purchased at the drug store will often have little sponges that are moistened. Medical supply stores have heating pads that draw moisture from the air. They are more costly but are larger and conform better to body contours. A damp towel or commercial hot pack heated in the microwave or in hot water for a few minutes is another good way to get moist heat. Hot water in the form of a hot tub, hot shower, or whirlpool bath is always a good choice. Hot tubs need to be under 102° F to allow an individual to stay in the water comfortably and safely for 15-30 minutes.

Cold

Some individuals benefit from ice so it is worth a try even if it sounds uncomfortable. One form of treatment is an ice massage to a painful area. Freeze water in an 8 oz. paper cup, then tear away the top edge of paper so the ice can be moved around the palm size painful area for about five minutes. Initially it feels very cold but within five minutes the area will be numb. Use a towel to catch the drips. Some individuals find it more tolerable to use ice while in a hot tub or shower or while they have heat on another part of the body. If cold hands are a problem, use gloves and a styrofoam cup.

An ice pack is another form of cold application. Commercial ice packs and ice probes are available through medical supply stores. Ice packs can be homemade using a wet or dry towel wrapped around a package of frozen peas or corn or crushed ice. A frozen wet towel provides more intense cold. A ten minute application of an ice pack is usually adequate.

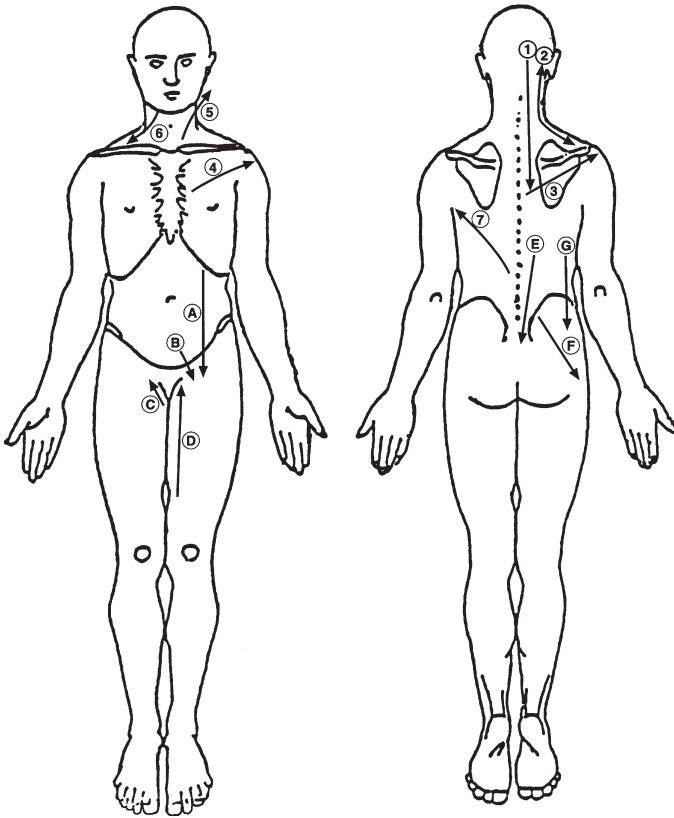


Figure 15-5: Vapocoolant Spray Techniques

Cold Spray – Heat

This technique is designed to obtain effective pain relief and increased motion in affected body areas. Vapocoolant spray is a cold, fine spray of gas under pressure. It is prescribed by a physician for clinic and/or home use. At home it is initially used for 7-10 days to decrease symptoms and then it is used as needed during acute exacerbations or

after exercise. For use with CPP and LBP, body segments are treated instead of one or two specific muscles and the body position during the treatment is more midline than stretched as it is when myofascial muscle shortening is being treated. The term “midline spray and heat” is used rather than the more common term “spray and stretch.” Initially a physician or therapist can use the technique as part of the office visit to evaluate effectiveness in improving pain and range of motion. If the technique is effective, the health care professional can demonstrate the techniques to a support person so a home program can be done 1-2 times daily during painful flare-ups (figure 15-5). When pain is primarily in the lower body, (low back, hips, buttocks, legs, abdomen) the spray techniques A-G are completed bilaterally. Genitals are always protected with a towel or washcloth during spray application.

Alternate – Heat – Ice

Some individuals get the most benefit from using a combination of heat and ice. Use heat (heating pad, hot tub) for 7-10 minutes, then cold (ice pack, ice probe) for 3-5 minutes, and then heat for 7-10 minutes.

Heat – Stretch and Ice – Heat

This technique is designed to obtain an effective stretch of a tight muscle group without setting off muscle spasms. Heat the muscle group for about three minutes, then put that area on a gentle stretch and hold the stretch while rubbing an ice cup or ice edge in lines about 1/2 inch apart parallel to the muscle fibers under the skin. Keep the stretch gentle and steady for 30-60 seconds then heat the area again for approximately three minutes.

Journaling

The habit of regularly writing in a blank book or on pages in a notebook can be helpful in tracking the ups and downs of chronic pain, in seeing small steps of progress that lead to improved health, and in relieving the “free floating” anxiety individuals describe.

Journaling is “stream of conscious” writing. There is no right or wrong way to do it. Just open the blank book or take some note paper and write whatever flows from the mind and hand. No one needs to read it or judge it. Let the mind empty all its thoughts, worries, and concerns on the paper. When the censor part of the mind tries to stop

the thought flow to the paper, remember this writing is not for judging, it is for releasing feeling and thoughts.⁹

In CPP and LBP the brain activity for thoughts, worries, and ideas can become excessive, getting in the way of everyday life just as the muscles become overactive causing pain and fatigue. The overactive brain leads to feelings of anxiety, confusion, indecision, and mental paralysis. Releasing any and all thoughts to paper assists in quieting brain activity.

Journaling can be done day or night. Keep notebooks on a bed stand and in a purse. Some individuals are not able to write so a computer or iPad is a better mode of communication.

A second type of daily journal is designed to give a picture of patterns and relationships between symptoms, work, exercise, rest, and sleep. On a longitudinal 24 hour scale the individual keeps track of pain levels, sleep hours, number of awakenings at night, work, rest, and exercise cycles. See the Weekly Self Care Report (figure 11-7). Progress or problems can be seen more easily with this type of journaling.

It is possible to pick up patterns and relationships between symptoms, daily activities and stressors through review of the journal. Pain, stiffness and fatigue levels are recorded during designated times in the morning, noon, afternoon and evening. Medication taken, menstrual cycle pattern, exercise level, and jobs done are also recorded and can be reviewed.

The goal is to achieve decreased pain, increased activity level and decreased fatigue through modifying activities and stressors that increase symptoms. The equilibrium is often not a completely pain-free state, nor totally fatigue-free, but interventions throughout the day prevent large swings in symptoms. A self-care routine with regular mini reassessments of mind-body function are essential to attain that steady state of equilibrium.

Crisis Management Program

Flare-ups or exacerbations are going to occur even with the best management program. A prearranged crisis management plan will help the individual deal with flare-ups (figure 15-6). The crisis -management plan is comprised of items that have worked in the past in order of priority, a list of support people to contact, and positive self statements that direct the mind and body towards health and healing.

Examples of Crisis Management Plan

Alter the day's plans to fit your needs!

- Use modalities such as hot shower or hot tub for 20 minutes.
- Take 20 minutes 2-3 times today for Physiological Quieting®.
- Use pain relieving oil or lotion on affected muscles.
- Do breathing and Q-Core Control every half hour to hour.
- Take a relaxing walk with a friend.
- Take medication as directed for crisis times.
- Increase rest cycle length in the daily plan.
- Emphasize positive self statements.
- Evaluate life stressors, i.e., environmental, emotional.
- Consult with therapist or physician if not improved in 48 hours.

My Crisis Management Plan

1.

2.

3.

4.

5.

Figure 15-6: Crisis Management Plan

Advanced Self-Care Management

Once the General Self-Care Stabilizing Loop has been successfully integrated into daily life additional, more advanced techniques can be of benefit to the individual with chronic pain. The Advanced Self-Care Techniques are designed to continue the progression towards independence and integration into daily activities without pain as a limitation. Begin slowly, using one advanced technique at a time. After using the new technique for several days to a week assess its benefits for the short and long term life goals. Continue to add other advanced techniques making sure each is integrated into life as a positive self-care behavior. Record and monitor the advanced techniques on the Master Tests and Self-Care Stabilizing Record (figure 16-1).

Advanced Self Care Techniques

- Physiological Quieting®
- Body-Mind Synchrony
- Pelvic Core Warming
- Positive Self Statements
- Dietary/Environmental Irritants
- Nutrition
- Acupressure/Massage
- Foot Massage/Exercise
- Healing Oils/Creams
- Modalities
- Myofascial Release
- Visceral Mobility

Advanced Physiological Quieting® (APQ)

Physiological Quieting® (PQ) exercises normalize the messages from the body to the brain, the brain to the body, and between different organs and tissues. The basic PQ techniques discussed in Chapter 15 include Q-Core control, Diaphragmatic Breathing, and Body-Mind Quieting. The Advanced Physiological Quieting® techniques include Body-Mind Synchrony and Pelvic Core Warming. All five exercises are designed to open the communication loop between the body and the brain, increase circulation and balance the autonomic nervous system.

My Master Test and Self Care Stabilizing Record												
Tests: Date												
1.												
2.												
3.												
4.												
Self Care Protocol												
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												

Figure 16-1: Master Record

Body-Mind Synchrony

The APQ exercise called Body-Mind Synchrony is designed to connect electrical activity of the body with brain activity. Fehmi describes synchrony of brain wave patterns as Open Focus®.¹ In contrast to left-brain hemisphere narrow focus processing, Open Focus® brain wave synchrony is a diffuse focus, an effortless awareness by the right brain hemisphere. Left hemisphere narrow focus is comparable to memorizing a list of anatomy terms. Right hemisphere open focus is comparable to a lion reclined on a hill, alert and relaxed and watching the plains below. This attention difference is reflected in brain wave changes. Narrow focus attention is 20 hertz, beta brain waves. Open Focus® attention is 8-12 hertz, alpha brain waves and theta brain waves 4-8 hertz. Open Focus® attention techniques are designed to broaden the brain's attention to peripheral awareness and to bring synchrony of energy in all parts of the brain. Advanced Physiological Quieting® takes Open Focus® concepts one step further. Advanced Physiological Quieting® is designed to bring synchrony of energy patterns to body centers in conjunction with brain centers. This is accomplished through focus on body systems and mind imagining. Fehmi's research describes the concept of "imagining space" as producing alpha waves in the brain. Advanced Physiological Quieting® is designed to integrate the synchrony of those brain waves with body system energy cycles. For example, the heart energy system and the gut energy system become synchronized with the head brain energy system.² This allows efficient communication between the body and brain for optimal health.

To practice APQ Body-Brain Synchrony:

- Imagine the space around your pelvis.
- Imagine the space within your pelvis.
- Imagine the space to the right of your pelvis, to the left of your pelvis.
- Imagine the space on top of your pelvis, below your pelvis.
- Imagine the space in front of your pelvis, in back of your pelvis.
- Imagine clouds of space within your pelvis.

Repeat this sequence using the organs of heart, lungs, uterus, ovaries, bladder, bowel, intestines, and stomach. Repeat this sequence using the skeletal structures of sacrum, low back, and hips. Repeat this

sequence using the soft tissue structures of pelvic muscles, buttocks muscles, back muscles, and hip muscles.

Pelvic Core Warming

Pelvic Core Warming is another APQ technique. When Q-Core Control becomes easy add Pelvic Core Warming. Pelvic warming is an effective way to decrease CPP and LBP pain when ischemia is a factor. Even a slight increase in internal pelvic temperature increases circulation and is related to decreased pelvic pain and muscle relaxation.

Practice Pelvic Core Warming several times a day:

- Use the surface PhysioQ placed in the leg crease area of the groin. Monitor the Q number at the beginning and end of this exercise.
- Focus attention in the lower pelvis.
- Think to yourself: “My pelvis and back are warmer and warmer. Warmth is flowing into my pelvis and back, warmer and warmer.”
- Visualize in your mind’s eye the warmest color surrounding the pelvis and back, penetrating deep into the pelvis and back. Feel the warmth of that color warming the area, warmer and warmer.
- Imagine your pelvis in the warmest, safest place. Feel the warmth of that place flow into your pelvic area, warmer and warmer.
- Think to yourself: “My pelvis and back are warmer and warmer.”

Advanced Positive Self Statements

Talking to Yourself

An individual talks to him/herself with an internal dialogue on a regular basis. What an individual says will determine to some extent the quality and direction of life.³ The mind is always saying something positive, negative, or neutral throughout the day. Even while sleeping there are thoughts and dreams. This internal dialogue influences every cell of the body, every organ function, and all pain and comfort levels.

When self-talk is analyzed the thoughts can be divided into three judging categories: commands (drivers), prohibitions (stoppers), and faulty thinking (confusers). The drivers include: “be perfect,” “hurry up,” “be strong,” “please others,” “try hard.” These drivers refuse to

allow an individual freedom to listen to internal needs and respond to them. These internal needs could include: “I’m tired, I need a nap.” “I want to try something new and learn by doing and making mistakes.” “I want to begin this activity but not necessarily finish it today.” When permitters are substituted for drivers in internal dialogue, freedom and health can return to the body and mind.

Stoppers include: catastrophizing, negative self-labeling, setting rigid requirements, and don’t statements. These stoppers refuse to allow an individual freedom to create new visions of the self, explore the interaction of others’ thoughts and ideas with their own, or experiment with being “different.” When permitters and the words “even if” are substituted for stoppers in self talk, freedom and health can return to the body and mind.

Confusers include: arbitrary inferences, misattribution, cognitive deficiency, over generalization, either/or thinking, vague language, and magnification. When actions are based on arbitrary, not fact based, evidence, internal dialogue can be negative, hurtful and simply not truthful. When either/or thinking forces one into a box of being either perfect or no good the impossibility of life creates stress that increases pain and organic dysfunction. Misattribution implies that someone else is to blame or is responsible for the individual’s feelings rather than the individual being responsible for his/her own reaction to an event. Cognitive deficiency implies a narrow perception of a complex situation. “I did not get the job because I wasn’t cute.” Magnification means amplifying the importance of an event or situation. A young woman loses her glasses in the lake and sobs uncontrollably for hours. When “I” messages state feelings and opinions, confusers are eliminated. “Bringing it down to size” and the technique of using the prefix of “right now, I feel” can eliminate confusers..

The language of self-support includes I messages, self-affirmations, buffers, and permissions.

“I love you, I will take care of you,” is an “I” message and an affirmation.

“I deserve to sleep when I am tired,” is an I message and a permission.

“I am learning with each small step I take. I can succeed.” is a buffer.

The first step in developing positive self-talk is taking an inventory of the internal dialogue that occurs on a daily basis (figure 16-2). Write down what goes through your mind. Then group these thoughts into positive and negative categories. For every negative thought determine if it is a driver, a stopper or a confuser. Then write a positive antidote for each negative thought. Now take the positive thoughts and repeat them throughout the day. Pair them with other activities such as every time teeth are brushed or the phone is answered.

Examples of positive self-statements include:

“I am healing, I am healing more each moment of each day.”

“I am trying, I am doing the best I can.”

“I deserve to be healthy and happy. I am healthy and happy.”

“I deserve to sleep through the night. I sleep through the night and feel rested.”

For some individuals positive self-statements seem like lies or half-truths. If that occurs, put “I am trying” or “I am beginning to” in front of the statement. Remember every thought stimulates biochemical and electrical events in the brain and gut which then flow to every cell of the body and affect all other body and mind functions.

Build a pyramid of self-statements. Begin with statements already present in the mind and gradually develop more positive and futuristic self-talk.

Inventory of Self Talk

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Positive Self Talk

1. _____
2. _____
3. _____

Negative Self Talk

1. _____
2. _____
3. _____

Pyramid of Positive Self Talk



Figure 16-2: Self Talk Pyramid

Dietary/Environmental Irritants and Substitutes

If CPP and LBP symptoms are related to dietary irritants, strict elimination of these irritants can bring significant relief within 10-14 days. If you want to double check the causative factor, reintroduce the eliminated food(s) and the CPP and LBP symptoms should return. Eliminate one food at a time.⁴ Always drink 6-8 glasses of water daily.

Dietary Irritants to the Bladder

Possible Irritants:

Alcohol	Citrus fruits	Cranberries	Tea
Apples	Coffee	Grapes	Tomatoes
Apple juice	Strawberries	Guava	Chocolate
Cantaloupe	Vinegar	Peaches	Vitamin B

Substitutions:

Low acid fruits	pears, apricots, papaya, watermelon
Coffee	Kava, cold brew from Starbucks, Pero
Tea	Non-citrus herbal, sun brewed tea
Vitamin C	Calcium carbonate co-buffered with calcium ascorbate

Dietary Irritants to the Bowel

Irritant	Substitute
Milk products	rice milk
Gluten products	rice flour, oat flour
Spicy foods	

Environmental Agents

Agent	Substitute
Hand and body soap	mild soaps without fragrance Neutrogena or Basis
Shampoo and cream rinses	wash hair in the sink so water does not run toward genitals
Detergents	no fabric rinses, no bleaches, mild soap
Douches	do not use
Feminine hygiene products	no vaginal deodorants, no scented tampons or sanitary pads

Clothing	avoid synthetic underwear, wear white, cotton underwear, wash in Woolite and double rinse
Contraception	avoid condoms and contraceptive jellies, foams and creams
Newsprint	wash hands after reading newspaper
Medication	drugs can cause allergic reaction so avoid or test
Toileting	wash hands before toilet time, use white toilet tissue, rinse Vulva with water after urinating

Nutrition and Subcategory Tendencies

Nutrition becomes more important as Subcategory Tendencies are assessed and integrated into the self-care program. Physiological balance and pain-free function is optimized when the gut and enteric nervous system can produce chemicals that minimize pain perception. When there is imbalance in gut, enteric and cellular function it leads to Subcategory Tendencies for chronic pain and fatigue. Ingesting basic nutritional components to be used at the gut level can improve pain and fatigue significantly. Guidelines for Subcategory Tendencies are described in chapter 18.

Advanced Acupressure/Massage Techniques

As described in the Basic Self-Care Techniques, acupressure applied for 7-8 seconds to appropriate tender points can be beneficial in relieving pain. Acupressure points in the abdomen, groin, leg, low back and sacral areas are accessible for external surface pressure (figure 16-3).

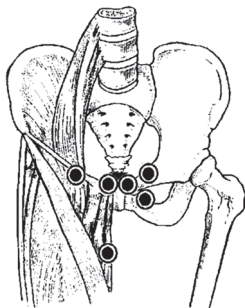


Figure 16-3: External Tender Points

Advanced acupressure techniques include more specific points in the abdomen and groin to target specific muscles. Additionally advanced techniques include treatment of tender or trigger points internally accessible through the vaginal wall. The technique is similar to external acupressure – firm but gentle pressure for 7-8 seconds over the tender or trigger point (figure 16-4).

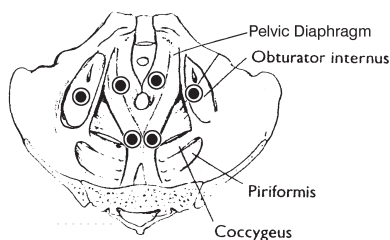


Figure 16-4: Internal Tender Points

Technique:

- Locate the tender point or trigger point through palpation.
- Maintain direct pressure over the point for 7-8 seconds with the muscle and fascia in a slack position. Use diaphragmatic breathing for improved release.
- Repeat 3-4 times throughout the day.

Treat the Feet-Improve Chronic Pelvic Pain

The Innervation Is The Same

The foot is connected with pelvic muscles and organs through common nerve innervation, fascial/ligamentous planes and functional movements such as ambulation. Intrinsic foot muscles function in coordination with pelvic muscle function via striated muscle innervation from sacral nerve roots 2-5. These nerve roots are responsible for sensory and motor innervation of pelvic muscles and foot intrinsic muscles.

The human embryo has a tail that is reabsorbed during weeks 5 and 6 of gestation. During re-absorption asymmetrical or symmetrical nerve loss may occur that affects sacral roots. Motor and/or sensory deficits in the feet occur simultaneously with pelvic muscle dysfunction and sensory loss as described by Galloway.⁵ In theory, exercising foot musculature and stimulating sensory nerve endings in the feet can improve pelvic and low back pain and pelvic muscle function. Ambulation has the potential to improve CPP and pelvic muscle function.

The Foot is connected to the Leg Bone... to the Pelvis...

The chain of fascia and ligaments extending from the foot to the lumbo-pelvic region is continuous such that distal movements of the lower leg and foot can assist in stability of the pelvis. The pelvic diaphragm connects to the obturator internus to the sacrotuberous and sacrospinous ligaments that interconnect with the biceps femoris which attaches to the head of the fibula and fascial planes which interconnect with the peroneals, navicular and fifth metatarsal bones of the feet. Dorsiflexion and inversion transmit forces through fascial interconnections to stabilize the sacrum. That improves lumbo-sacral stability during gait and upper extremity activities.

Foot Massage

Foot massage stimulates sacral nerves that innervate the feet and pelvic region. This is termed retrograde stimulation of pelvic muscles and organs. Massage the plantar aspect of the foot in a clockwise circular fashion using the knuckles. Begin at the heel, moving up the longitudinal arch to the transverse arch. Massage across the transverse arch, then down the lateral border to the heel, then up the center of the sole of the foot. Repeat 4-5 times (figure 16-5).

Massage each toe, grasping it and wringer-washing it gently from base to tip. Then massage between each toe with a finger.

Use an essential oil mixture or extra virgin olive oil to moisturize the feet and decrease pain when doing massage.

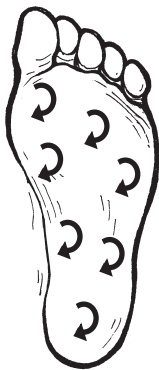


Figure 16-5: Foot Massage

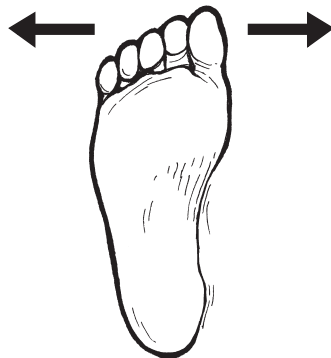


Figure 16-6: Foot Exercise

Foot Exercises

Foot exercises stimulate sacral nerve fibers in similar fashion to foot massage. Perform exercises one foot at a time sometimes and other times exercise both feet at once, 10-12 slow repetitions, with diaphragmatic breathing (figure 16-6).

- Toe curls/toe straightening
- Toe spreading/toe closing
- Foot circles - clockwise and counterclockwise

Walking

Wearing comfortable supportive shoes, walk 20-30 minutes daily. If there is significant foot dysfunction or gait deviation foot orthotics or special exercises may be beneficial.

Healing Oils and Creams

Plant oils have been used for many centuries to improve health and treat illness. Oil is absorbed by the skin and can reach other organs and tissues through the connective tissue and the lymphatic and circulatory systems. In the earliest healing practices plants were utilized by eating the raw leaves, berries, or bark. Later, burning or cooking the plant parts expanded the healing arts. Two to three thousand years before Christ the Romans, Indians, and Chinese were using plant oils for medicinal and religious purposes. The Rigveda of India states "...come, you wise plants, heal this patient for me." The Romans used plants in the form of pills, powders, suppositories, purees, ointments and pastes for external use. Ancient Greeks used plants and flowers for medicinal and cosmetic purposes. Hippocrates cited medicinal plants and stated, "Let your medicine be your food and your food be your medicine". Avicenna, the great Arab physician, describes over 800 plants and their effects on the human body. He also is credited with perfecting the process of distilling plants into essential oils. In more modern times, a French chemist Dr. Rene-Maurice Gattefosse coined the term aromatherapy and a French physician Dr. Jean Valnet used essential oils in treating war injuries during WWII to disinfect and heal. British and Italian scientists published research about medicinal qualities of essential oils in the 1920s and 30s.⁶

Essential oils come from plant parts. The oil is located in or on the surface of the plant tissue in the form of tiny sacs or globules. A famil-

iar fruit, the orange, has its oil in the rind that is peeled to arrive at the fruit. The functions of essential oils for the plant are to ward off harmful insects, attract beneficial ones, protect the plant from bacteria or fungal infections, and communicate to the rest of the plant and animal world.

The distillation method is much like distilling whiskey. Small amounts of the desired plant and water are placed in a container that is heated. The oil droplets are carried by steam into a tube cooled by cold water that carries the oil droplets into another container. The second container is filled with water. The oil separates from the water. In most cases it rises to the top, being lighter than water. In a few cases the oil falls to the bottom, the oil being heavier than water. In either case, it can be collected for use as essential oil.

Oils and creams have the potential to relieve pelvic and low back pain. A combination of essential oils in a carrier oil used on the lower abdomen, low back and inner thighs has been beneficial for some individuals with CPP and LBP. Lemon, rosemary, juniper and birch in almond oil as the carrier oil has pain relieving qualities and can increase circulation, decrease muscle spasm, and decrease congestion.

The most common oil to use in the vulva area is extra virgin olive oil. It has been used through the centuries as soothing, healing oil. It can be applied with fingertips in a gentle fashion.

Estrogen/progesterone cream applied intravaginally can increase lubrication and decrease pain. If steroid creams are used long-term they can thin the tissue creating more vulnerability. Phytoestrogen or progesterone cream applied to the lower abdomen or inner thighs can have the same pain relieving affect.

Nitroglycerin cream is sometimes used when other trials have been ineffective. It is applied to the vulvar area.

Modalities

Electrical Stimulation

Equipment using electrical current may assist in pain control.⁷ Modalities that can be helpful include high voltage galvanic stimulation, neuromuscular electrical stimulation, transcutaneous electrical stimulation, interferential current stimulation, and microamperage. Electrical stimulation in the form of high voltage galvanic stimulation or interferential cur-

rent stimulation is delivered through moist pads over muscle areas which are connected to a piece of equipment via wires. The electric stimulation causes pulsation and a “buzzing” may be felt during the treatment.

Electrical current in the various forms increases circulation and facilitates muscle relaxation as well as decreases pain and spasm. Contraindications include a heart pacemaker, pregnancy, cancer, severe musculoskeletal lesions, or active inflammation or infection. It can be appropriate for general pelvic pain syndromes including dysmenorrhea, coccygodynia, vulvodynia, perineal pain, and levator ani syndrome.

Parameters: High voltage galvanic stimulation is often effective at 50-100 volts, 80 pulses per second, negative polarity, 2.5 seconds reciprocal for 20 minutes. Interferential current stimulation is effective for chronic pain at 0-10 Hz, 15 sec. scan time, fast 90° vector auto intensity 0, carrier frequency 5 KHz, 20 minutes.

Transcutaneous electrical stimulation can be used in the conventional method at 60-100 Hz or in the acupuncture method at 2-10 Hz, 100-250 microseconds.

Neuromuscular electrical stimulation can be used at 100 Hz, 250-400 microseconds.

Microamperage is often effective in the same areas at .5 uv for 20 minutes using silver-silver chloride electrodes.

Electrode Placement: Electrode placements are usually in proximity to target nerves and muscles. Effective placements include bilateral sacrum and bilateral ischial tuberosity or bilateral ischial tuberosities and bilateral suprapubic region. If pain is primarily in the abdominal region placement can be bilateral upper and lower abdominal areas. Placing the large dispersive pad over the lower abdomen and the smaller pads over the lumbar paraspinals and sacral area is effective in treating deep muscles such as the iliopsoas. Placing two pads in the lumbosacral area and two small pads suprapubically in a pattern is effective in treating the pelvic muscles.

Electrical stimulation can be used with internal vaginal or anal probes. Intravaginal electrical stimulation to inhibit pain uses 5-20 Hz, 100-1000 msec duration, 1:2 work/rest cycle, 15-30 minutes, symmetrical or asymmetrical, 1-2 times per day. Turn the intensity up gradually to accommodate the new feeling. It should not be painful but instead a perceptible, comfortable feeling.

Ultrasound

Ultrasound has the potential to decrease muscle spasm and pain, increase blood flow to the affected region, and soften connective scar tissue. Contra-indications include infection, pregnancy, cancer, vascular disease and decreased sensation. It is not recommended to use ultrasound over ovaries. It can be appropriate for treating vaginismus, pelvic muscle pain, coccygodynia, and hemorrhoids.

Parameters: For trigger points use .5 w/cm² in a slow circle. For piriformis syndrome or deep pelvic muscle spasm/pain use 1.75 w/cm². For levator ani syndrome use 1-2.5 w/cm² around the anus for 3-5 minutes. For perineal pain use 1.5 w/cm² over a water or gel condom or with the perineal area submerged in water.

Myofascial Release

Myofascial release techniques incorporate three-dimensional stretching and inhibition techniques for balancing biomechanical and neurological dysfunctions of the musculoskeletal system. Muscle and fascia have inherent motion and visco-elastic properties. Muscle and fascial dysfunction is exhibited as fascial resistance to voluntary, passive or inherent motion.⁸

Myofascial release techniques include direct and indirect approaches to unwinding tissue tension. In the direct approach, pressure on tissues follows the direction of ease. In the indirect approach pressure on tissues is toward the direction of increased tension. The desired result is release of tissue tension – a softening (figure 16-7).

The application of myofascial release techniques for chronic pain includes:

- Contacting tissue surface with hand surface – the treatment hand is in contact with the tissues to be treated. This involves a molding and conformation of the treating hand to the treating surface.
- Identifying tissue quality, tension, tone, temperature, moisture, texture using the treatment hand contact.
- Facilitating active, passive and inherent tissue mobility with pressure from the treatment hand. Follow into the direction of ease (direct) or resistance (indirect). Hold at the balance point or barrier (still point). Feel the release and follow the release phenomena. Repeat until there is a three-dimensional balance.

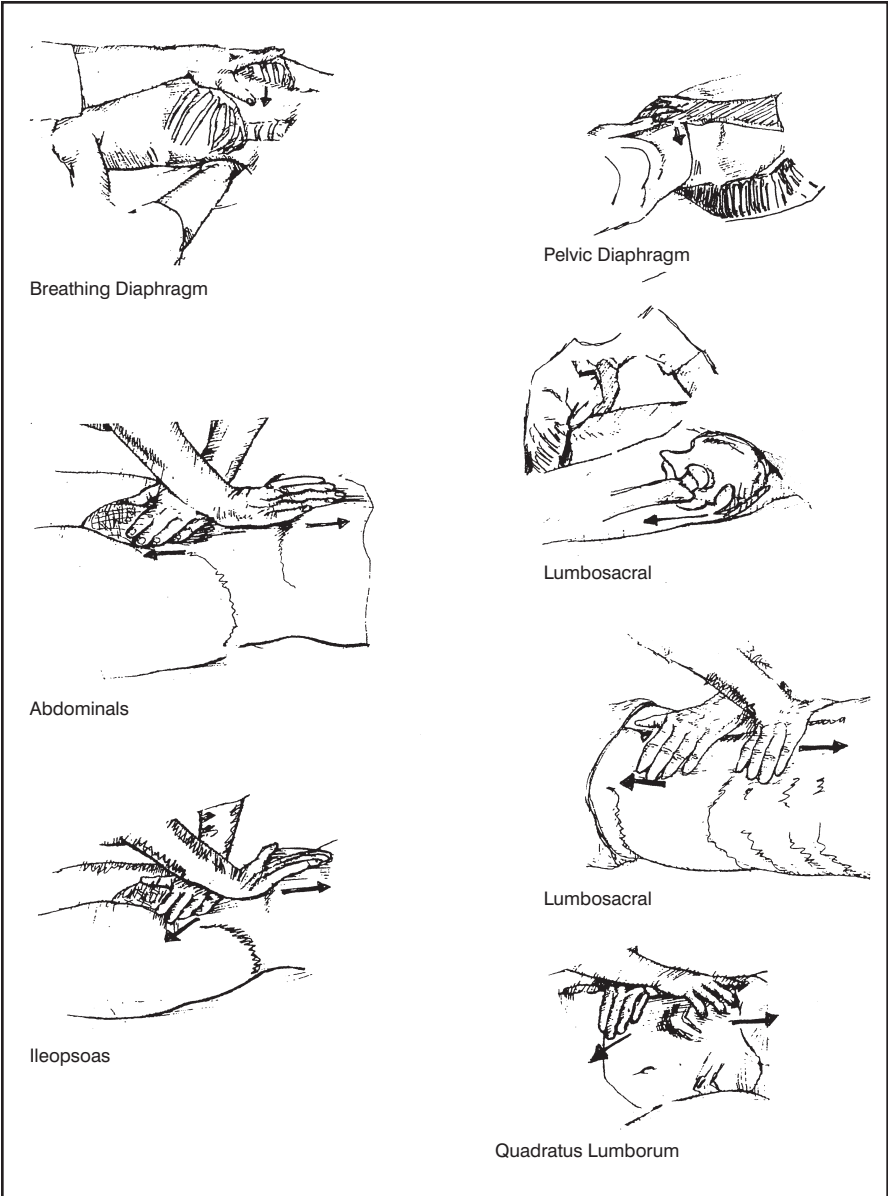


Figure 16-7: Myofascial Release

Visceral Mobilization

Visceral mobilization techniques therapeutically move organs to restore their inherent motion. Abdominal organs exhibit active and passive motion.⁹ Active motion is termed organ mobility and occurs in response to stimulation by the somatic nervous system or the breathing diaphragm. Passive motion is termed organ motility and is innate and intrinsic. Each organ has its own frequency and amplitude of motion. When the frequency or amplitude of an organ is altered illness occurs according to Barral.⁹ Chronic pelvic and low back pain is often seen in conjunction with limitations of urogenital motility or mobility. Facilitating a return to normal motion can improve symptoms (figure 16-8).

The application of visceral techniques include:

- Listening to determine the location of the organ restriction.
“Listening” is with hands located over the area and feeling the passive inherent motions. The hand attracts body motion to it. The hand is drawn to the area of dysfunction.
- Testing for mobility and motility of the urogenital organs.
- Treating for visceral mobility and motility by following the rhythmical motion of organs. Accentuate the part of the rhythmical cycle with the greater amplitude and gently stretch the organ motion.

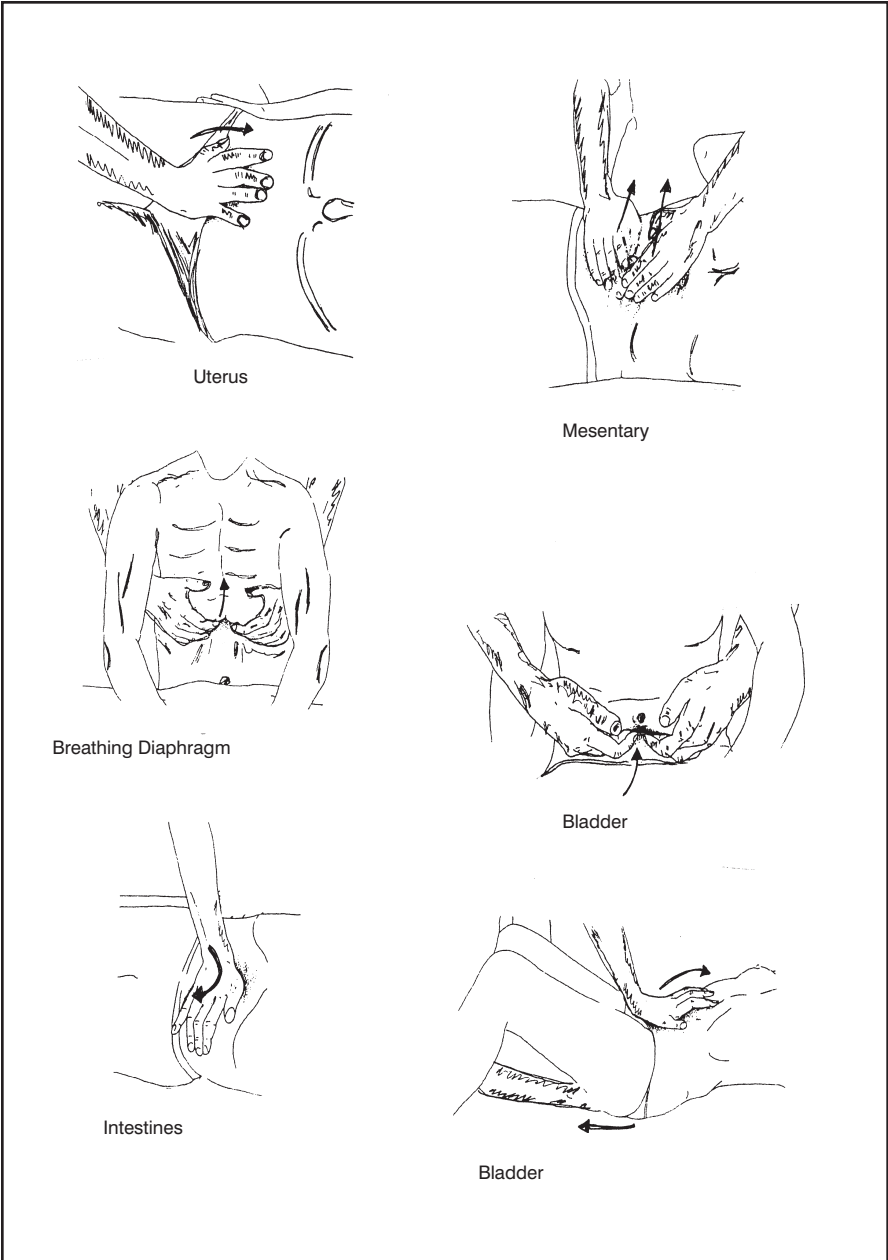


Figure 16-8: Visceral Mobilization

CHAPTER 17

Autonomic Nervous System Exercises

Physiological Quieting®

There are two major nervous systems directing behavior - the autonomic (automatic) nervous system and the voluntary (conscious) nervous system. An individual experiences “easy street” when the two nervous systems interact effectively and work together in balance. That means there is an effective connection between the left with the right side of the brain, between the conscious and the unconscious brain, and between the head brain and the body brain.

The two nervous systems function like two engines driving one vehicle. There is the “I have to move” engine and the “I have to think” engine. It is important that the two engines drive the body in the same direction and at the same speed - a safe and efficient speed.

Divisions of the autonomic nervous system (ANS) are sympathetic, parasympathetic, and enteric (gut). The ANS originates in the subcortex (unconscious brain) and gut. It directs and regulates activity of muscle resting tone and all organs and systems of the body without the individual consciously thinking about it. It happens automatically. When this “body-brain” feedback loop is balanced, the individual is in a state of health. When the body-brain feedback loop is unbalanced, the individual is in a state of disease. It is important to balance the body messages with the head messages, to balance the fight or flight messages with the quieting messages, and the gut (enteric) messages with the head messages to have optimal health. An overactive sympathetic nervous system leads to decreased circulation, increased muscle resting tone (both smooth and striated), and myofascial tissue thickening (figure 17-1) which results in pain, fatigue, and limitations of daily activities.

There are physical clues that can be measured to indicate the body’s health status - the health status of the core body control systems. One measure is blood flow through the blood vessels. Blood flow is directly

Hyperactive Sympathetic Nervous System

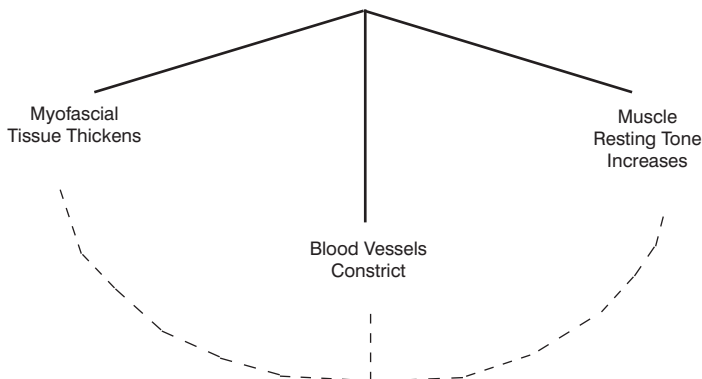


Figure 17-1: Hyperactive Sympathetic Nervous System

related to function of the nervous systems, heart, lungs and muscles. Another measure of the body control systems is breathing pattern - the speed, location and pattern of breathing.

A well-balanced ANS has effective feedback loops between body and brain that result in improved sleep, muscle function, circulation, pain and fatigue. Physiological Quieting® (PQ) exercises are targeted to rebalance the ANS and its feedback loops with the subcortex. The subcortex with the ANS is “the doctor that is always in” to keep the body’s basic functions healthy and functioning efficiently. Physiological Quieting® is the ability to reconnect the body with this efficient, effective doctor.

The three major techniques in Physiological Quieting® are:

- Breathing Balance
- Q-Core Control
- Body/Mind Balance

Breathing Balance

Natural breathing at rest will be located in the abdomen with the external abdominals released and able to expand. There will be diaphragm movement with each breath and minimal chest expansion. Lips will be lightly closed. Breathing rate will be slow, 12-14 breaths per minutes or slower, with few sighs. The breath is low and slow, low in the abdomen with the lower abdomen expanding slightly during inhale and releasing during exhale, at a slow and even rate. Dysfunctional

breathing occurs in the upper chest, is faster and shallower with sighs and gasps and often uses the mouth for air intake.

Some individuals with CPP and LBP have a sense of dyspnea (air hunger) even at rest. During exercise the breathing pattern is often irregular. The diaphragm, the major breathing muscle, becomes dysfunctional much as other muscles do in chronic pain. Accessory breathing muscles in the neck and chest take over for the diaphragm. Breathing affects tissue oxygen levels, body metabolism, heart rate and the body's acid base balance. Cardiologists using brief hyperventilation for diagnostic purposes report skeletal muscle becomes hypertonic, contraction thresholds drop, and muscles may twitch.¹ When breathing is erratic and the muscle action producing breathing patterns is changed, these physiological processes are severely altered. Heart rate is increased, muscle resting tone is elevated, and blood pressure changes due to breathing changes. Symptoms described by individuals with chronic pain that can be directly attributed to hyperventilation, the most drastic form of erratic breathing, include: shortness of breath, muscle pain and aching, chest pain, choking or smothering sensation, dizziness, numbness and tingling in hands and feet, hot and cold flashes, faintness, trembling, and fear or anxiety feelings. With this in mind, regaining breathing balance becomes an important aspect of chronic pain management.

Improved pain threshold related to slow breathing pattern is documented by Zen meditators. Fibromyalgia patients reported reduced pain using slow breathing - 6 breaths per minute.² Compared to a breathing rate of 16 breaths per minute, pain threshold and pain tolerance were improved at 6 breaths per minute in another study.³ Slow breathing is related to emotional calmness and cardiovascular efficiency and ANS balance.⁴

Basic Exercise

The diaphragm is a large sheet-like muscle that rests in a dome shape in the chest from the nipple area to the bottom of the rib cage and the spine (figure 17-2). As you inhale the dome flattens and pulls down to the bottom of the rib cage. During exhale the diaphragm moves back to the dome shape. When breathing correctly, the shoulder and chest areas remain quiet, the

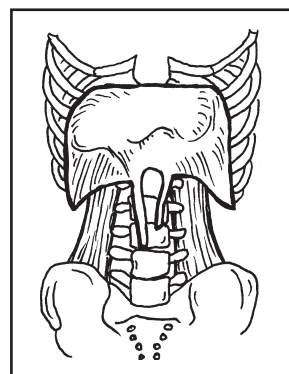


Figure 17-2:
Breathing Diaphragm

jaw is relaxed, and the teeth are separated. Inhale, let the abdomen rise, exhale, let it fall. There is equal time for inhale and exhale. Inhale through the nose, exhale through the mouth or nose. Exhale is passive and quiet.

Diaphragmatic breathing eases and reverses the biochemical effects of hyperventilation and makes it easier for air to flow into the lungs. Practice diaphragmatic breathing initially in a reclined position, then in sitting and standing. Practice 7-8 breaths each hour during the day.

Awareness

Focus on your breathing for 10-20 breaths.

Notice:

- The pattern of your inhale and exhale.
- The location of your inhale and exhale.
- The smoothness of your inhale and exhale.

Connecting

Practice each step for 5-10 breaths or until it is easy.

Two Engines

Step 1:

- As you inhale let your stomach rise.
- As you exhale let your stomach fall.
 - Quiet shoulders, quiet chest.
 - Jaw released, teeth apart.
 - Tongue off the roof of the mouth.

Step 2:

- Inhale through your nose.
 - Filling your lungs from the bottom up.
 - Imagine air filling your lungs, like water fills a pitcher.
 - The water fills the pitcher from the bottom up.
 - Then exhale, imagine letting the pitcher tip and gently empty.
- Exhale through your nose or mouth, releasing the air.

Step 3:

- Inhale air through your nose
 - letting your stomach rise
 - at the end of the inhale pause for a moment.
- Then exhale slowly and smoothly.

Step 4:

- Inhale air through your nose
 - letting your stomach rise.
 - At the end of inhale, pause for a moment.
- Then exhale slowly.
 - At the end of exhale press a little more air out
 - Tightening your lower stomach muscles gently.

Practice this diaphragmatic breathing at least 3-4 times a day for 5-7 breaths each time.

Advanced Exercise

The advanced breathing exercise restores breathing balance in relation to other body functions. Add each step as the previous one is easy to do.

- Find a comfortable, supported position and focus on low, slow diaphragmatic breathing.
- add: arch low back slightly with inhale, flatten low back with exhale.
- add: roll legs out slightly with inhale, roll legs in with exhale.
- add: roll palms up with inhale, roll palms down with exhale.
- add: rock chin up slightly with inhale, rock chin down with exhale.

Practice 5-10 of these total body breaths in the morning before you get up and 5-10 as you go to sleep at night.

Q-Core Control

Research supports blood flow as one accurate clue - piece of evidence - indicating the body's state of health. The PhysioQ is a device that measures blood flow in the form of temperature. Using the PhysioQ can indicate the nervous system balance, heart ease, circulation and breathing efficiency.

Circulation to muscles, nerves, internal organs, and the brain is often significantly decreased in chronic pelvic and low back pain due to ANS imbalance that leads to blood vessel constriction. Some individuals describe being core cold, not being able to warm up. Their hands and feet are cold, their buttocks feel cold, even their internal organs feel cold. Often a cold feeling is a cardinal sign of worsening pain and

fatigue symptoms within the next 6-8 hours.

The PhysioQ device gives clues about how easy it is for the core control systems to keep functioning. It can indicate how the inner engines (the nervous systems) are doing. Are they humming, sputtering or racing double time? Ask the question: “How are my engines running”.

The Q number from the PhysioQ indicates how balanced and humming the nervous systems are. A score of 90 or above on the PhysioQ indicates balance in the body control systems. A score of 80-90 indicates vulnerability and a beginning imbalance in the body control systems. A score below 80 indicates the body is experiencing imbalance episodes that can lead to pain, fatigue or anxiety. The body is having to work harder in all daily activities since there is significant imbalance in the body control systems.

If your engines are fine-tuned and humming you are on “easy street” driving this year’s model of car or truck. The street is paved and smooth. The truck is under warranty. It needs few if any repairs except for scheduled maintenance. It has automatic shift which smoothly changes gears. The battery starts the engine in any temperature.

If your engines are running rough the analogy is that life is like driving a 1950’s truck down a street called “pothole heaven”. The street is covered with large potholes. The 1950’s truck has no warranty. It needs constant repairs and it is hard to find parts for repair. It has a manual shift and the gears stick so the ride is jerky. The battery has to be jump-started in cold weather and the truck over-heats in hot weather.

What do you want? We want to sleep well, work, play and socialize without pain, fatigue or anxiety. Most of us want effective and unconscious control of our body functions including our heart, lungs, bladder and bowel. Most of us want “easy street” in this year’s car or truck.

Decreased circulation means blood vessel constriction. Blood vessel walls have three layers, one of which is muscular. The muscular layer is controlled by the sympathetic nervous system. An active sympathetic system causes constriction of the blood vessel wall, a quieting sympathetic system causes dilation or relaxation of the blood vessel wall, allowing more blood flow. When more blood flows through the vessels there is increased heat from the increased blood volume which results in hands, feet and other body parts warming. Sympathetic system is a global system so if one part of the body experiences increased blood flow then there

will be increased circulation to all muscles and organs. Bringing in food and oxygen and carrying away waste products is essential so muscles can function with greater energy and less pain and fatigue.

Restore the body balance and connect the two body engines to have them work smoothly and return the body to its best temperature. Q-Core Control is a technique to increase blood volume to body parts. Mental imaging and frequently repeated thoughts transfer to nerve activity that quiets the sympathetic nervous system activity resulting in dilation of blood vessels. To accomplish this:

Awareness

- Focus on your right and left hands.
- Notice if they are warm or cold.
- Notice if they are the same temperature or different.

Connecting

- Practice each step for 1-2 minutes before going to the next step.

The Two Engines

Step 1:

- Imagine the warmest color.
- Surround your hands with that color.
- Let that color flow from your fingertips through your palms into your wrists while your hands get warmer and warmer.

Step 2:

- Imagine the warmest safest place.
- Feel the warmth of that warm safe place being absorbed into your hands.
- Your hands feel warmer and warmer from your finger tips to your wrists.

Step 3:

- Imagine flowing warmth and think,
- “My hands are warmer and warmer”
- “Warmth is flowing into my hands warmer and warmer.”

Record your Q number at the beginning and end of this exercise. Did your Q number go up, stay the same, or go down? Practice these techniques 3-4 times a day to change your baseline Q number and return your engines to humming health.

To accomplish a resetting of the ANS, to slow the high idle, it is necessary to practice the techniques that quiet the sympathetic system frequently for short periods. The instructions are:

“Practice hourly for 30-60 seconds, wherever you are. No one will know you are doing it.” Put colored dots up around your work and home or buy a watch that buzzes every hour to remind you. Then hourly do:

- 7-8 slow, low diaphragmatic breaths
- Release jaw, quiet shoulders quiet chest
- 7-8 repetitions of Q-Core Control

Body/Mind Balance

Balancing the body control centers (ANS including enteric) with the head control centers (CNS) facilitates optimal organ and muscle function. The head is used to bossing the body around. It is not used to listening to what the body needs and has to say. Females with chronic pain were deficient in the ability to integrate proprioceptive sensations with concurrent thoughts. There is a loss of conscious contact with parts of the body. Somatic dissociation, disconnection from normal somatic feedback leads to poor regulation of muscle tone, breathing and movement patterns and postural alignment.⁵ Initially it will take conscious practice to reconnect the body to head brain message systems.

With practice PQ Body/Mind Balance can become automatic. The body to head feedback loop will be as strong as the head to body loop (figure 17-3). In a Mensendieck-specific study a group of 20 women with CPP experienced 50% improvement compared to a control group after practicing body awareness training for 10 sessions.⁶

Body/mind Balance serves many important functions in helping individuals with chronic pain. Excessive muscle resting tone and internal organ activity can be decreased through PQ body/mind awareness. Abnormal sleep patterns are improved and the immune system returns to an optimal function.

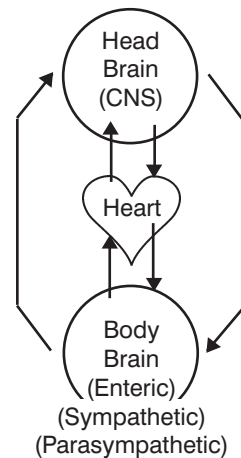


Figure 17-3: Body-Mind Feedback Loop

To accomplish PQ Body/Mind Balance:

Find a quiet, warm room with a chair or bed that gives complete support from head to feet. Use pillows for support of your neck, low back, arms, and knees.

- Focus on your breathing, feel the pattern of breathing, let your abdomen rise with inhale, fall with exhale.
- Feel the warmth or coolness of your hands and feet, left side and right. Let your hands and feet feel warm, feel warmer and warmer.
- Feel the support of the bed or chair and release into that support, let your feet, legs, hips, back, shoulders, arms, neck and head sink deeper and deeper into that support.
- Focus on your face and neck. Notice where there is any tension or tightness, where there is quiet, calmness in each part of your face and neck muscles your forehead, eyes, cheeks, tongue, throat, neck. Then say to yourself 3-4 times slowly, “My face and neck muscles are quiet and calm, my face and neck muscles are calmer and calmer.”
- Proceed from head to toe in the same manner, focusing on head and neck, back (upper, middle and lower), shoulders and arms, hips and legs, chest and abdomen.
- Focus again on diaphragmatic breathing and hand warming.

One to two 20 minute body/mind balance sessions a day provide optimal changes. Try doing it 20 minutes before you get out of bed in the morning and 20 minutes before going to sleep at night using the Physiological Quieting® CD/download.

Getting Started, Making It Happen

Plan ahead and schedule 3-4 times each day when you can take 3-5 minutes for yourself. It may be when you go to bed. It might be at meal times. Take it one day at a time. Record your Q Core numbers before and after a practice session at least once a day.

Integrate Physiological Quieting® throughout the day as an essential aspect of self-care in CPP and LBP management.

Nutrition and Chronic Pain

You are what you eat is a common saying. There is some truth to the saying in relation to chronic pelvic pain and low back pain. Vitamins, minerals, protein, fats and carbohydrates are used to provide energy and repair/replacement substance for body cells. Dysfunction of nutritional utilization can be an important factor in chronic pain.

Proteins and Amino Acids

Protein is essential to pain-free function. However, the truth is women only need about 30-40 grams of protein a day which is the weight of 10 pennies. Men need about 50 grams. Protein is broken down into eight essential amino acids that are found in a wide variety of plants.

Disturbances of amino acid metabolism can be a factor in chronic pain.¹ There are often decreased chemical messengers like serotonin and norepinephrine which are composed of amino acid chains. Most amino acid chains are formed in the gut so when there is an enteric nervous system dysfunction the amino acid chains are affected. There are several ways to potentially increase the levels of these chemical messengers. These include:

- boost their production through vitamin and mineral supplements
- increase the consumption of protein
- add amino acids supplements to the diet.

No one vitamin, mineral or amino acid can function on its own. It takes a group process to accomplish the manufacture and distribution of the chemical messengers that regulate the body. The most important amino acids that help to form the chemical messengers include:

- L-tyrosine,
- L-phenylalanine, and
- L-tryptophan.

The precursor to serotonin is L-tryptophan. The precursors to

norepinephrine are L-tyrosine and L-phenylalanine. Vitamin B6 is especially important because it directs development of the chemical messenger necklaces of amino acids. Sugar is important to avoid because it competes with amino acids for absorption in the intestines. Increased sugar intake can result in decreased amino acid absorption for use in the chemical messengers' necklaces.

There are many kinds and brands of amino acids on the market. Pharmaceutical grade “free form” type of amino acid supplement is high quality and ready to be used by the body without complicated digestion processes. Amino acid supplements can be taken in powder or capsule form.

Fats and Essential Fatty Acids

Fats are essential to pain-free function. Two essential fatty acids (EFAs) come from the food we eat and cannot be produced by the body. The Western diet is high in saturated fats and does not supply the needed fats for Omega-6 and Omega-3 fatty acids.

Fatty acids play important roles in healthy function, including energy production, oxygen transfer, red blood cell production, cell division, sexual function and brain development.

The type and amount of fatty acid in the diet can affect pain patterns. Metabolism of saturated fats leads to formation of inflammatory prostaglandins. Omega-3 oils reduce inflammation by competing with inflammatory fats at the cell wall.² Food sources for Omega-3 fatty acids include flaxseed, walnuts, canola and grape seed oil, dark green leafy vegetables, pumpkin seeds and oily fish.³ The ratio of Omega-6 and Omega-3 fatty acids may be important in pain relief.⁴ A ratio of 3 or 4 to 1, three parts Omega-6 to 1 part Omega-3 brought relief for patients with arthritis. A nutritionist can test for fatty acid ratio.

Vitamins and Minerals

Vitamins and minerals are essential to pain free function. Vitamins and minerals cannot be used by the body in their elemental form. Minerals that can be used by the body are combined with enzymes in food. Vitamins are combined with other micronutrients in the plants so the body can use them effectively.⁵ Vitamin and mineral supplements do not have those combining properties. Vitamins and minerals are important in a daily dietary plan for CPP and LBP. They include:

- Vitamin B Complex – 25-50 mg/day
- Calcium – 800-1000 mg/day for females premenopause, 1200-1500 mg/day menopause or post menopause (300 mg = 8 oz. milk or 1 slice cheese)
- Vitamin E – 200-400 IU/day
- Vitamin D – 20 minutes of sunlight/day
- Malic Acid – 1200-1400 mg/day
- Magnesium – 500-800 mg/day
(See Vitamin/Mineral Chart on this page.)
- Six to eight glasses of water daily! (decaffeinated fluids)

Vitamin/Mineral	Symptoms	Food Source
Vitamin B1	Fatigue Irritability Memory Loss Insomnia Muscle Weakness Numbness Tingling Headaches Increased Sensitivity to Pain Heart Palpitations	Wheat Germ Brewer's Yeast Soybeans Nuts Poultry Milk
Vitamin B5	Fatigue Muscle Weakness Muscle Cramps Hypoglycemia Constipation Diarrhea	Organ Meats Peanuts Wheat Germ Eggs Beans Peas
Vitamin B6	Irritability Insomnia Dizziness PMS Muscle Weakness Numbness Tingling Hair Loss Hypoglycemia	Brewer's Yeast Liver Salmon Nuts Brown Rice Meats Fish Soybeans
Vitamin B12	Mental Apathy Muscle Weakness Fatigue Depression Memory Loss Noise and Light Sensitivity Chest Pain	Liver Egg Yolk Sardines Salmon Crab

Vitamin C	Muscle Weakness Fatigue Confusion Joint Aches Bruising Poor Digestion Infections	Broccoli Brussel Sprouts Kale Parsley Green Peppers Rose Hips Lemons, Oranges.
Vitamin D	Muscle Pain	Sunlight Tomatoes, Spinach, Cauliflower
Vitamin E	Muscle Pain Muscle Weakness PMS Decreased Circulation Infections Leg Pain Incoordination	Vegetable Oils Cottonseed Corn Soybean, Nuts Legumes
Magnesium	Fatigue Insomnia Anxiety Hyperactivity Anger Tremors Numbness Tingling Rapid Pulse High Blood Pressure Heart Irregularities	Wheat Germ Almonds Cashews Brazil Nuts Soybeans Parsnips Oats Rye Corn
Calcium	High Blood Pressure Osteoporosis Muscle Pain Muscle Spasms Insomnia Nervousness Hyperactivity PMS	Milk Products Cheese Yogurt Canned Salmon Green Leafy Vegetables
Malic Acid	Muscle Pain Stiffness	Apples Fruits

Vitamin C is present in citrus fruits and functions as an antioxidant. It may have antibiotic-like qualities at higher doses, and assists the intestines in normal functioning. Vitamin B complex, present in green leafy vegetables, is essential for nerve transmission and healthy functioning of the liver. It affects sleep, mental capacity, heart and lung functions. Vitamin B12, if deficient, can cause fatigue and anemia. Vitamin E, present in brown rice, kale, apricots, sunflower and pumpkin seeds, can improve circulation and cellular function. Vitamin D, converted by the skin from

sunlight, is associated with decreased levels of pelvic muscle dysfunction.⁶ Magnesium, present in green leafy vegetables, legumes and nuts, is essential for muscle and heart functioning. It inhibits action of excitatory amino acids that lead to increased pain and discomfort. Magnesium levels are inversely related to pain/tenderness levels. The higher the magnesium levels in muscle cells, the lower the pain complaints. Calcium, present in milk products, is essential for muscle function as well as bone strength. Calcium-magnesium combination is an effective muscle relaxant and sleep inducer. Malic acid is a food acid present in apples and other fruits. It is important for cell function and energy production in cells. It can be obtained as magnesium malate.

Herbs and Spices

Herbs and spices have pain relieving properties both in direct action and indirectly changing the health status of the bladder and bowel.⁷ Beneficial herbs and spices include:

- Aloe vera - soothe gut lining and irritation
- Birch - reduce inflammation and relieve pain
- Licorice - natural not synthetic form; increase blood volume and blood pressure, decrease muscle spasm, cleanse colon and increase its circulation
- Cinnamon - relieve diarrhea, aid digestion and blood sugar levels
- Turmeric - relieve pain
- Cranberry - prevent bacteria from adhering to bladder
- Fennel - relieve abdominal pain, colon spasm
- Melatonin - set the sleep/wake cycle
- Valerian - facilitate sleep
- Echinacea - decrease pain, decrease inflammation
- Calms Forte - improve sleep and anxiety
- Ginger - cleanse colon, decrease spasm and cramps
- Cayenne - improve circulation and digestion, decrease pain
- Peppermint - improve digestion and decrease intestinal cramping
- Chamomile - improve sleep and decrease intestinal cramping and inflammation
- Slippery Elm - sooth inflamed membranes of the bowel and urinary tract

Note: herbals are not FDA controlled. Follow label instructions for amounts to use.

Inflammation and Nutrients

There is evidence that inflammatory processes are changed through various nutrients. Nutrients can increase pain symptoms in painful bladder and bowel syndromes. Other nutrients may change activity of the enteric nervous system and the hormones it produces in the gut.

Inflammation leads to changes in peripheral and central sensitization thresholds. Dietary changes have been shown to change inflammation. Herbs such as tumeric and nutmeg contain properties that can decrease the amount of inflammatory chemicals produced in the body.⁸ Olive oil has anti-inflammatory properties. Three and a half tablespoons of extra virgin olive oil has the same effect as 200 mg of ibuprofen.⁹ Weight loss is an effective anti-inflammatory method since fat is an active inflammatory structure.¹⁰

Grapes and red wines with resveratrol have been cited as more potent an anti-inflammatory agent than aspirin or Ibuprofen.¹¹ Oregano and thyme contain essential oils that have anti inflammation properties.¹² Pomegranate and blueberry extracts contain properties that inhibit inflammation processes in connective tissue.¹³ Pineapple contains bromelain which has anti-inflammatory properties.¹⁴

Gluten Sensitivity

Gluten sensitivity leads to an inflammatory immune response in the small intestine when gluten from wheat, rye, barley and oats are consumed. The inflammatory response can spread to other organs and muscle systems.¹⁵ Not everyone with gluten sensitivity has full blown celiac disease which destroys the intestinal lining and significantly alters absorption of nutrients. Symptoms of gluten sensitivity include abdominal pain, muscle cramping and weakness, joint and bone pain, diarrhea or constipation, and fatigue,

Eliminating hidden sources of gluten as well as that in wheat is the primary intervention for gluten sensitivity. Hidden sources include modified food starch, caramel coloring, MSG, malted milk, soy sauce, hydrolyzed vegetable protein, prepared meats, bouillon cubes, processed cheeses, and ice cream.

Lactose Intolerance

Lactose intolerance, also known as lactose malabsorption, is the inability of the body to break down lactose into glucose and galactose.¹⁶ Lactase, normally manufactured in the small intestine lining, is absent so the protein lactose is not broken down. It is not an allergic reaction to lactose. Symptoms include mild to severe abdominal cramps, gas, bloating, diarrhea and nausea.

Eliminating primary and hidden sources of lactose is the primary intervention for lactose intolerance. Hidden sources include hot dogs, lunch meats, dairy and non-dairy creamers, pancake, biscuit and cookie mixes, protein powder drinks, salad dressings, bread and baked goods, margarine, butter, and anything that contains casein, lactose, curds, whey, and sodium caseinate. Lactose enzyme supplements used with dairy ingestion is adequate for some individuals. Fermented dairy products such as yogurt, kefir, sour cream, hard cheeses and buttermilk are tolerated in small amounts.

Diverticulitis

Diverticulitis, inflammation of small herniations or protrusions that out-pouch from the colon, leads to pain, tenderness and cramping in the lower left abdominal area, constipation or diarrhea, and nausea. At the extreme perforation of the protrusion occurs with resulting peritonitis (infection in the abdominal cavity) and septicemia (infection of the bloodstream).¹⁷ A low fiber diet and eating seeds and nuts are contributing factors for some individuals.

Improving tone and normal peristalsis of the colon through a high fiber diet and a daily walking routine are beneficial since the out-pouching occurs through a weakened intestinal wall. The American Dietetic Association recommends 20-35 grams of fiber a day. It is best to take fiber in fruits and vegetables instead of pills. Foods high in fiber include cooked beans, carrots, broccoli, chard, cabbage, yams, apples, oranges, peaches, pears and plums. Avoiding nuts and seeds unless they are ground up in a coffee grinder may be of help. Realigning the colon using inversion on the Wonder W⁷edge[®] can also be helpful.

Constipation and Fecal Impaction

Constipation and fecal impaction lead to abdominal, pelvic and low back pain, rectal spasm, weakness and mental confusion. Constipation has many potential causes. Insufficient fiber, excessive fat and refined foods are important factors.¹⁸

Decreasing unhealthy fats, white bread, pasta and rice can change colon activity. Increasing high fiber foods in fruits, vegetables and cooked beans facilitates stool consistency and colon activity. Increasing healthy fluids-water, diluted fruit juice, herbal teas and decreasing caffeinated fluids, drinks with artificial sweeteners and colors and alcohol improves stool consistency.

A simple approach is to add a fresh pear a day and a fresh spinach salad with a tablespoon of extra virgin olive oil as dressing to the daily food intake. Drink two glasses of water or tea with each meal and one glass between each meal. Realigning the colon using inversion on the Wonder W'edge® can also be helpful.

Diarrhea

Diarrhea, frequent passage of watery stools, leads to abdominal, back and pelvic discomfort and cramping. There are many causes of diarrhea including incomplete digestion of food, food allergies or sensitivities, excessive use of alcohol or caffeine. In these cases, eliminating the offending food or drink will change stool consistency.

Antibiotics can cause diarrhea from an overgrowth of bacterium *Clostridium difficile*. Acid-suppressing medications, especially proton pump inhibitors can also lead to diarrhea.¹⁹ In both cases eliminating the medication and reconfiguring the healthy bacteria in the colon will change stool consistency.

The BRAT diet is often adequate to change diarrhea to a more normal stool. The diet includes bananas, white rice, applesauce, and tea or white bread toast. Bananas and apples have a fiber type that slows the gut motility so more fluid is absorbed before the stool is eliminated. Adding a half cup of Greek yogurt or probiotics in pill or liquid form to replenish healthy bacteria can be helpful especially after use of antibiotics.

Nutrition and Sub Category Tendencies

Effective intervention for hypoglycemia, hypothyroid, and neurally mediated hypotension tendencies includes nutritional management. Nutritional changes should be discussed with the physician.

General Hypoglycemic Tendency

Symptoms of General Hypoglycemia decrease with the elimination of simple sugars and an increase in complex carbohydrates in the diet. Simple sugar is found in white and brown sugar and high fructose corn syrup and honey. Fruit juice, white flour products such as white bread and pasta and white potatoes act like simple sugars. Complex carbohydrates including whole grains and bright colored vegetables help to stabilize blood sugar. Whole fruits like apples can be consumed in moderation – 1-2 a day. Avocados tend to stabilize insulin production so hypoglycemic tendency can be improved with the consumption of avocados. Cinnamon also helps stabilize blood sugar. Additional information is available under Enteric Nervous System and Gut Function, page 237.

Consuming complex carbohydrates every 3 hours can provide a more stable blood glucose level so 6 small meals a day, or 3 meals and 3 snacks, is a better plan than 3 meals a day spaced 4-5 hours apart. The final snack is eaten just before bedtime. Eating a small carbohydrate and protein snack before going to bed at night helps prevent hypoglycemia during the night.

Vitamins and minerals can be helpful in hypoglycemia regulation. Chromium picolinate 300-600 mcg, vitamin B complex 50-100 mg, and coenzyme Q can all assist in stabilizing blood sugar levels. Zinc, 50 mg daily, is needed for insulin release from the pancreas. Herbs that may help hypoglycemic tendencies include bilberry and wild yam.

Self-Care for General Hypoglycemic Tendency

- Blood glucose testing multiple times/day
- Nutritional changes:
 - eat small meals every 2-3 hours
 - increase complex carbohydrates

- eliminate refined sugars, fruit juice, white flour
- add avocado and cinnamon
- consider vitamin/mineral boosters
 - chromium picolinate 300-600mcg
 - vitamin B complex 50-100mg
 - coenzyme Q 25-50mg
 - zinc 50mg
- consider herb boosters
 - bilberry
 - wild yam

Reactive Hypoglycemic Tendency

Symptoms of Reactive Hypoglycemic Tendency decrease with the elimination of simple sugars and an increase in fat and protein. Protein and fat intake slows the release of insulin in Reactive Hypoglycemia. Proteins break down into amino acids in the gut. It takes a much longer time to break down protein to amino acids than it takes to break down carbohydrates to glucose/sugar molecules. Amino acids stimulate different enteric nervous system responses than carbohydrates and glucose. Therefore, eating a relatively high protein and fat breakfast could prevent the reactive hypoglycemic symptoms of fatigue, confusion, agitation, and pain. Instead the individual feels energized for the rest of the day.

Fat, similar to protein, slows the release of insulin. Fats break down into fatty acids in the gut. It takes longer to break down fat into fatty acids than it does to break down carbohydrates to glucose/sugar. Fatty acids stimulate different enteric nervous system responses than carbohydrates and glucose. Therefore eating a relatively high fat diet can prevent the reactive hypoglycemic symptoms of fatigue, confusion, agitation, and pain.

Both protein and fat tend to set the enteric brake “on” so the pancreas and gut release nutrients into the blood stream in a more graded, gradual fashion.

Combining carbohydrate, protein, and fat in each meal in a 40%, 30%, 30% ratio provides the enteric nervous system of the gut with the needed balance for more normal insulin release throughout the day. There is a need to eat frequently, usually every 2 hours. The first mouthful of the first meal and the first mouthful of the day sets the mood for the rest of the day. Eat protein and fat with the first mouthful.

Just as Mary felt better when she ate a breakfast of eggs and bacon most individuals with Reactive Hypoglycemic Tendency are better regulated the rest of the day if they have fat and protein for breakfast. Still others with Reactive Hypoglycemic Tendency do better if there is an emphasis on fat with a serving of fruit to start the day. For example, a smoothie made of full fat yogurt, heavy cream and fruit with no added sugar can set the enteric brake “on” at the beginning of the day and influence the rest of the day compared to eating cereal for breakfast which can set the enteric brake “off” and influence the rest of the day detrimentally.

It is important to eat soon after getting up so blood glucose doesn't drop while you are getting ready for the day. A bedtime snack containing some fat slows the absorption levels of glucose into the blood stream during the night which helps maintain adequate glucose levels throughout the sleeping time.

The same vitamins, minerals and herbs can be helpful in reactive hypoglycemia regulation as are helpful in general hypoglycemia. Additional information is available under Enteric Nervous System and Gut Function, page 237.

Specific suggestions given by patients include:

- Yams and asparagus are good to eat when I am having problems with my intestines shutting down. They seem to respond within 24 hours in a comfortable way not an explosive over response that I would get with other foods or medications I tried.
- Smoothie made of fruit and cream has helped me get the day started on the right foot. I have a blueberry/ strawberry/ raspberry with cream smoothie in the morning, about 6-8 ounces for breakfast and then 3-4 ounce snack 2 hours later. My energy remains good and my blood glucose readings are stable and normal.
- Pizza made with white sauce, some meat and hard cheese along with a salad of veggies and greens provides a good dinner or lunch.
- At dinner I have chicken, fish or beef with veggies and a small portion of potato, rice or pasta. I fix a cream sauce using cream and butter to put over the protein and veggies, just a small amount is necessary. That can keep me stabilized for 2-4 hours depending how active I am in the evening.

- When I have a craving for sweets I have real ice cream, a dark chocolate-nut candy, or butter cookie. These have a high ratio of fat to sugar so my gut tolerates the sugar a little better. I also eat the sweets after a meal so my gut is already set with good foods. Soft drinks, cakes and frosting, candy without fat will set my blood glucose dropping quickly and radically. My personality goes down the toilet too.
- The key to using fats is small portions of healthy fats.

Self-Care for Reactive Hypoglycemia Tendency

- Blood glucose testing multiple times/day
- Nutritional changes:
 - small meals every 2 hours
 - fat/protein to carbohydrate ratio increased
 - 40% carbohydrate, 30% protein, 30% fat
 - fat/protein at breakfast to set the enteric brake
 - refined sugars, fruit juice, white flour eliminated
 - vitamin/mineral boosters
 - chromium picolinate 300-600 mcg
 - vitamin B complex 50-100 mg
 - coenzyme Q 25-50 mg
 - zinc 50 mg
 - amino acid complex
 - herb booster
 - bilberry
 - wild yam

In comparing General Hypoglycemic Tendency with Reactive Hypoglycemic Tendency it is noted that both cases exhibit imbalance between insulin and glucose in the bloodstream. In the case of General Hypoglycemic Tendency, increased complex carbohydrate intake is a major factor in stimulating the appropriate insulin-glucose ratio in the bloodstream. In the case of Reactive Hypoglycemic Tendency, an increased protein and fat ratio to carbohydrates is a major factor in balancing the insulin-glucose ratio in the bloodstream. Each individual must use trial and error to determine his/her individual needs.

Hypothyroid Tendency

Tyrosine and iodine are components necessary to form thyroxine, the thyroid hormone. If the amino acid tyrosine is low it may cause hypothyroid tendency.

Individuals with cell level hypothyroid tendency type symptoms may be helped by taking 2000-3000 mg Kelp daily for iodine and L-Tyrosine 500 mg 2 times daily for essential amino acid with water or juice, not with milk or other protein. For better absorption take the tyrosine with 50 mg B6 and 100 mg vitamin C. The tyrosine and iodine combine to form the active thyroid hormone T3.

Food sources of tyrosine include almonds, avocados, bananas, dairy products, lima beans, pumpkin seed and sesame seeds. Supplements of L tyrosine should be taken at bedtime or with a carbohydrate meal so it does not competing for absorption with other amino acids.

Adding phytoestrogen and/or progesterone in cream or food form may improve the symptoms of cell level hypothyroid tendency in individuals with CPP and LBP.

Fatty acids are also needed by the thyroid system to function effectively. Fatty acids are the building blocks of some messenger chemicals and come from the breakdown of fats and oils. Essential fatty acids (EFAs) cannot be produced in the body and must be supplied through the diet and broken down into fatty acid form in the gut. Fatty acids are needed for rebuilding and producing all cells in the body. Sources of essential fatty acids include fish oils, flaxseeds and flaxseed oil, grape seed oil and primrose oil. Amounts will vary depending on the supplement.

Vitamin B complex including Vitamin B12 is essential for cellular oxygenation and energy production. It is also needed for proper digestion of proteins into amino acids and fats into fatty acids. Fifty to 100 mg of vitamin B complex and 15-45 mg of vitamin B12 may be beneficial in facilitating cell metabolism and reducing “hypothyroid” symptoms.

The stomach digests apples and other fruits converting the fruit into malic acid along with other components. Malic acid is an essential acid for energy or ATP production at the cell level. Malic acid has the ability to increase utilization of needed substances including sugars for ATP production even under low oxygen conditions. It is part of the

efficient metabolism process in every body cell. Suggested malic acid intake is 1200-1400 mg/day.

The stomach and small intestine digests green leafy vegetables, legumes and nuts to obtain magnesium. Magnesium is the fourth most abundant mineral in the body. It is the number one stress mineral. ATP production is dependent on adequate magnesium levels at the cellular level. Magnesium facilitates enzyme function for metabolic action in each cell. It lights the spark (the enzyme) that lights the fire or starts the motor (metabolism) of each cell. It facilitates ATP energy into physical and mental function. Suggested magnesium intake is 500-800 mg/day.

Fluoride and chlorine are chemically related to iodine. These chemicals interfere with the body's ability to absorb iodine from food. They can block iodine receptors in the thyroid gland resulting in reduced iodine available in the thyroid and thus reduced iodine combined with tyrosine to form T4. Avoiding chlorinated water and fluoride toothpastes, may help decrease chronic pain symptoms.

Self Care for Hypothyroid Tendency

- Basal body temperature testing
- Nutritional changes:
 - kelp 1000-3000 mg
 - amino acids – L-tyrosine 1000 mg
 - vitamin B12 15-45 mg
 - vitamin B6 50 mg
 - magnesium 400-600 mg
 - malic acid 1200-1400 mg
 - essential fatty acids
 - avoid chlorine and fluoride
- Phytoestrogen and progesterone

Neurally Mediated Hypotension Tendency (NMH)

Neurally Mediated Hypotension Tendency includes low blood pressure and high resting heart rate. In addition to the primary symptoms chronic abdominal, pelvic and low back pain, bowel dysfunction, fatigue and generalized weakness are also common symptoms. Initial treatment for NMH tendency involves a self-care routine including diet and exercise. If the self-care routine is not adequate to alleviate symptoms then a cardiologist

can perform a tilt test and specific medications are recommended.

Since a sodium chloride deficiency is one of the primary considerations in NMH the first step is to increase salt intake. This includes adding salt when cooking, using bullion cubes in gravies and soups and taking salt tablets when exercising or perspiring in hot weather.

Individuals with low blood pressure need to monitor the amount of magnesium they take since magnesium is an effective smooth muscle relaxant. That means high levels of magnesium could potentially lower blood pressure by relaxing the blood vessel walls. Since magnesium is low in some individuals with CPP and LBP there is a tendency to supplement at high levels. For individuals with low blood pressure, moderate levels of magnesium supplementation, 300-400 mg/day, is more often recommended. Blood pressure should be monitored several times a day when adding magnesium.

Another step in self-care for NMH is to assist the enteric nervous system (ENS) in its normal function. The ENS stimulates the production of important chemical messengers in the digestive system that affect blood pressure and heart rate. These chemical messengers are formed from amino acid combinations present in the gut. Producing normal amino acid hormones is essential in normalizing blood pressure and heart rate while minimizing pain and fatigue. Sometimes increasing protein and/or amino acid intake can be beneficial. A variety of meat and fish are needed because each contains different levels of the various amino acids. Another way to obtain the needed amino acids is through supplements containing amino acids with complementing vitamins and minerals. The herb licorice increases blood pressure so may be a sweet taste and good occasional snack.

Pelvic congestion drainage is another important consideration to improve NMH symptoms. Inversion on the Wonder W'edge[®] for five minutes 2-3 times a day facilitates blood and lymph flow return from the pelvic vessels to the heart. Accumulation of blood and lymph in relaxed pelvic vessels and tissues can significantly increase pelvic, abdominal and back pain.

Pool exercise in shoulder height water is also effective in improving blood and lymph flow from the lower body to the heart. Exercising twenty to thirty minutes 3 times a week can improve blood pressure and decrease pain and fatigue.

Self-Care for Neurally Mediated Hypotension

- Blood pressure and heart rate monitoring
- Nutritional changes:
 - increase salt, sodium chloride
 - monitor magnesium levels
 - eliminate caffeine, refined sugars, alcohol
 - increase protein, amino acid complex
 - increase gut (enteric) normalizing foods
 - turkey, rice, applesauce, bananas
 - herb: licorice
- Pelvic varicosity drainage
 - Wonder W'edge® inversion

Reproductive Hormone Deregulation Tendency

Supplementing with phytoestrogens and/or progesterones in food or cream form or using hormone replacement therapy on a temporary or permanent basis may assist the organ systems in balanced function. Self care treatment can include using phytoestrogen and phytoprogestrone on a cyclical basis. Over-the-counter creams can be used. Phytoestrogens are available in foods such as soy, flax seed, and green tea. Many vegetables have natural estrogen components - green beans, carrots, peas, and beets are a few. Some fruits have estrogen components – these include cherries, apples and rhubarb. Phytoprogestrones are in soybeans and yams. Prescription hormone replacement therapy is also available. In a clinical trial, pain and fatigue, bowel, bladder and menstrual cycle dysfunction improved in a small group of women who used phytoestrogen and progesterone during the winter and spring months.

Relaxin is available in nonprescription form as a nutritional supplement. Oxytocin is available in prescription form only.

DHEA is available in prescription or nonprescription forms. It also can be restored and maintained by joy, sexual activity, physical exercise, positive thinking and sunshine. Vitamin C (2000 mg/day) and Methyl Sulfonyl Methane (1000 mg/day) may be of benefit in raising the DHEA levels. Yams, used in manufacturing DHEA, cannot be used by the body to convert to DHEA. Topical progesterone cream (UPS grade 3%), 1/4 teaspoon twice daily has sometimes facilitated

increased DHEA levels and improved reproductive hormone levels, skin integrity, energy levels and mood stability.

Self-Care for Reproductive Hormone Dysfunction

- Hormonal tests and monthly symptom diary
- Nutritional changes:
 - estrogen/progesterone rich foods
 - soy, flax seed, green tea
 - caffeine, refined sugars eliminated
 - vitamin C 250-1000 mg
- Nonprescriptive creams or supplements:
 - phytoestrogen cream
 - phytoprogestosterone cream
 - DHEA
 - phytoestrogen/progesterone supplements
- Fun, laughter, joy

Enteric Nervous System, Gut Function and Nutrition

The enteric nervous system controls gut function and production of pain relieving as well as pain exacerbating chemicals. Some food products stabilize and are beneficial to the enteric nervous system production of “feel good” chemical messengers and others increase “feel pain and fatigue” chemical messengers. Eating the right foods for enteric nervous system and gut health can improve chronic pain symptoms significantly. You are what you eat. Garbage in, garbage out.

Protein and Amino Acids

Most of the chemical messengers flowing throughout the body in the blood stream are hormones made from amino acids. Amino acids come from the breakdown of proteins. Proteins taken into the digestive system take longer for the enteric nervous system to break down than sugars and carbohydrates. The proteins tend to slow the enteric system’s action and quiet the system as a whole. The quieting effect of protein is not as great as the quieting effect of fat.

Turkey, wild Alaska salmon and milk products contain high levels of the amino acid tryptophan which is the precursor to serotonin. Serotonin is a “feel good” hormone so turkey will likely stimulate the ENS in a positive way for reduced pain and fatigue. Tryptophan can also be useful in

facilitating sleep and normalizing most body functions. Substance P is an amino acid hormone known to increase the perception of pain. It is produced primarily in the gut so increased production can result in gut pain and dysfunction as well as muscle pain and fatigue. Protein with artificial colors, added hormones and other chemicals can potentially increase Substance P. It is important to minimize production of hormones like Substance P and maximize production of hormones like serotonin.

Fats

Fats taken into the digestive system slow intestinal peristalsis. In the most drastic situation the enteric brake stops peristalsis all together until the fats are broken down by the bile salts into smaller molecules. Therefore fat intake can be used as an inhibitor of enteric nervous system activation of peristalsis. At the same time fat has a quieting effect on many other organs, i.e. bladder, uterus, heart and brain.

Sugar and Carbohydrates

Sugar (glucose) in the stomach and small intestine stimulates enteric nerve messages to the pancreas. This can cause the pancreas to release excessive insulin into the bloodstream leading to hypoglycemia. Sugar types include white and brown sugar, high fructose corn syrup and honey. Carbohydrates, such as white flour, low fat milk and white pasta, are treated like sugar in the body. The result can be low blood sugar levels with symptoms of incoordination, weakness, confusion, and agitation. Sugars ingested by a sugar sensitive individual can set off a cascade of events initiated by the enteric nervous system. Using the same rationale, eliminating simple sugars and consuming complex carbohydrates with fats and protein could potentially prevent the hypersensitive reaction.

Applesauce, bananas, and rice have been known by every mother whose child has diarrhea to quiet and slow the enteric system. When the ENS is sluggish, foods high in fiber stimulate peristaltic action. Pears, plums and peaches as well as fresh spinach are effective colon stimulation foods when there is constipation.

The symptoms of fatigue, weakness, confusion, and personality change can be significantly decreased or eliminated when gut and enteric nervous system function is normalized. We have a saying that, “you are what you eat”. Another important saying to remember is, “your bowel

tells the story of your overall health.”

Eliminate Food Sensitivity

Eliminating food products that destabilize the ENS improves chemical messenger production and function. Elimination of nicotine, caffeine and alcohol can be helpful in reducing ENS irritability. Hypersensitivity to certain foods can play a role in ENS dysfunction. When bloating, gas, alternating diarrhea and constipation is present, food hypersensitivity may play a role in NMH tendencies. Lactose intolerance is the sensitivity to milk products. Wheat intolerance is the sensitivity to breads, pastas, and cereals containing wheat. Gluten intolerance is sensitivity to a broader range of grains containing gluten. Even the thickening in gravies and stews or soups may contain wheat or gluten. Monosodium glutamate (MSG) intolerance is the sensitivity to an additive found in many prepared foods. The symptoms to food sensitivities can be varied but pain, fatigue and bowel dysfunction are primary symptoms.

Essential Oils and Teas

Essential oils are the distillates from leaves and flowers. Essential oils can be used for pain relief as a tea. Essential oils are the essence of the teas we drink. The enteric nervous system is quieted with peppermint and chamomile teas. Lavender is a calming oil when used in food or tea.

Dehydration

Dehydration is a major factor in enteric and gut dysfunction, causing constipation, fecal impaction and inflammation. Water in adequate amounts is a stimulus to gut peristalsis. Drinking 6-8 glasses of non-caffeinated fluid is the general recommendation. Individuals will state that they drink 6-8 glasses of fluid per day but if the majority of that is caffeinated or alcohol, both diuretics, the result is dehydration. Another guideline is to drink enough non-caffeinated fluid so the individual is toileting every 3-4 hours for 10-20 seconds with light yellow urine.

CHAPTER 19

Roll for Control® Exercise and Chronic Pain

An effective management program for chronic pelvic pain and low back pain must focus on realigning and re-educating the entire musculoskeletal system from head to toe. Roll for Control® Exercises, Wonder W'edge® Inversion and In-Balance Postural Alignment, are the foundation. The exercise series facilitates skeletal realignment, muscle and fascial support, internal organ alignment and function and circulation to the pelvic region. It restores normal resting tone and coordinated strength of essential muscles. Roll for Control® exercises develop coordinated synergistic sequencing of pelvic muscles in conjunction with obturator internus and adductors to restore midline, midrange rotation around the sacroiliac, lumbosacral and hip joints. Wonder W'edge® inversion facilitates organ realignment and pelvic circulation.¹ In-Balance Postural Alignment exercises restore the automatic dynamic upright stability from head to toe. Together they relieve pain, restore axial rotation, and improve musculo-fascial-organ-skeletal alignment for normal daily function. The goal is always pain-free normal daily function.

Start with the Core Exercises and Wonder W'edge® inversion if that is helpful. They are easy to do and have a powerful effect on pain. When these exercises become easy and comfortable add the advanced Roll for Control® and In-Balance Postural Alignment exercises.²

Core Exercise

Roll for Control® - Active

The core exercise is called Roll for Control® - Active. The movement is alternating midrange hip internal and external rotation. This exercise is performed initially in supine with knees bent or straight. Progress to doing the exercises in sitting, and standing. Perform the exercises in supine before getting out of bed in the morning and in the evening at bedtime.

Position: Reclining comfortably on the bed or another supportive surface. Knees can be straight or bent. Feet are together, heels touching. Roll for Control® exercises can be done on the Wonder W'edge® for additional improvement. See figure 19-1.

Action: Roll your knees out slowly and smoothly 3-4 inches during inhale. Keep the heels touching while the toes and knees rotate outward. The movement comes from the hips. Then exhale while rolling the knees and toes inward. Repeat 3-10 repetitions 2-3 times a day.

Rationale: Rolling hips, knees and toes outward activates small hip rotator muscles (obturator internus) that assist pelvic muscles in support of internal organs and stabilization of the sacrum and coccyx. Rolling hips, knees and toes inward uses the adductor muscles that also assist the pelvic muscles in support and stabilization. Alternating the roll in and roll out action facilitates normal muscle tone while improving blood and lymph circulation.

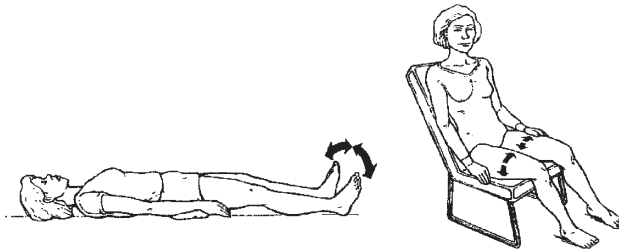


Figure 19-1: Roll for Control® Exercise Active

When active exercise is easy and pain is decreased, resistance in the form of resistive balls and bands can be added. When resistance is added, initially begin with 1-3 repetitions and gradually increase to 8-10 repetitions over a 7-14 day period.

Rolling the hips in and out automatically activates the pelvic muscles to align the lumbosacral and sacroiliac joints and support internal organs.

Wonder W'edge® Inversion

Inversion on the Wonder W'edge® is an important part of the Roll for Control® exercises if there is any neurological or muscle dysfunction in relation to back pain, pregnancy, delivery, aging, surgical procedures, chronic coughing, repetitive lifting, jumping or running. Symptoms from pelvic congestion, neurally mediated hypotension, pelvic organ descent

or prolapse, bladder urgency and frequency, constipation or diarrhea are often improved using Roll for Control® exercises on the Wonder W'edge®. When the pelvic muscle support system descends or releases for any reason the position of internal organs and sacrum is altered. Circulation and nerve innervation to the pelvic and low back region are altered. Wonder W'edge® inversion can realign the internal organs and sacrum as well as unweight the pelvic muscles so normal function without pain can return (figure 19-2).

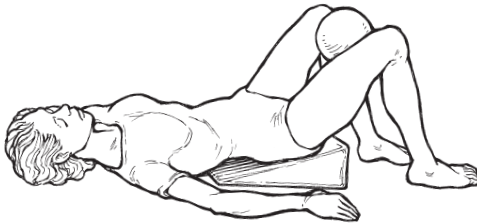


Figure 19-2: Wonder W'edge® Inversion

Position: To align for inversion on the Wonder W'edge® place the wedge on the floor or on your bed. Sit next to the wedge and then lift the hips on to the high end of the wedge while the shoulders and head are off the wedge. Find a position that is comfortable with the hips as high on the wedge as possible. Place the feet on the floor with the knees bent or on the wall with the knees straight or bent.

Action: Once you are comfortable on the Wonder W'edge® begin with 6-8 diaphragmatic breaths. First notice your natural breathing pattern. Notice your inhale and exhale. Then notice where your breathing occurs. Is there movement in your abdomen, chest, shoulders, back, neck or jaw? Now think, “Inhale, let my abdomen rise. exhale, let my abdomen fall”. Next as you inhale and exhale think, “Quiet shoulders, quiet chest”. Next think, “Jaw released, teeth apart, tongue at the bottom of my mouth”. Let your breath come naturally thinking, “Slow and low, my breathing is slow and low”.

After completing the breathing exercises on the Wonder W'edge® add the Roll for Control® exercises as described above.

Advanced Roll for Control® Exercises

- Level 1 – Breathing diaphragm and transverse abdominus action
- Level 2 – Lower leg and foot muscle action
- Level 3 – Head, neck and shoulder muscle action
- Level 4 – Whole body facilitation

Once the core Roll for Control® exercises are easy the advanced PRC exercises can be initiated. These advanced exercises integrate the breathing diaphragm, transverse abdominus, lower leg and foot musculature, shoulder and forearm musculature with the PRC. They integrate cranial movements and craniosacral rhythm with PRC function. There are five levels of Advanced Roll for Control® Exercises for CPP and LBP.

Advanced Roll for Control® Exercise – Level 1

Breathing Diaphragm and Transverse Abdominus Action

Level 1 – Advanced Roll for Control® Exercise includes integrating the breathing diaphragm and abdominal muscles with action of the PRC. Inhale as the hips externally rotate and relax the abdominal muscles. Exhale through pursed lips and pull the belly button gently towards the spine as the hips internally rotate (figure 19-3).

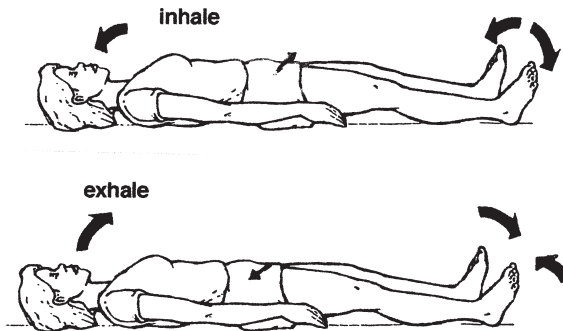


Figure 19-3: Advanced Roll for Control® exercises

During inhale the breathing diaphragm descends into the abdominal region, the abdominal musculature allows the abdominal contents to expand into the relaxed space. During exhale, the breathing diaphragm ascends, synergistically facilitating action of the transverse abdominus. The transverse abdominus and PRC synergistically act together.

Advanced Roll for Control® Exercise – Level 2

Lower Leg and Foot Muscle Action

Level 2 – Advanced Roll for Control® Exercise integrates foot and ankle muscles with action of the PRC. As the hips roll out with inhale, lift the foot up and spread the toes. As the hips roll in with exhale, bend the foot down and squeeze the toes together.

The chain of interconnected fascia extends from the PRC to the toes. The obturator internus and its fascia share fibers with the sacrotuberous and sacrospinous ligaments which share fibers with the biceps femoris which attaches to the head of the fibula and is associated with the fascial and ligamentous connections of the distal tibiofibular joint, navicular and fifth metatarsal. Foot and ankle movements through this fascial bridge affect the length-tension relationship of the PRC and thus bladder, bowel, sacroiliac and lumbosacral position and function.

The distal nerves of the lumbosacral plexus (2, 3, 4) innervate the intrinsic muscles of the toes and also innervate the PRC and the bowel and bladder. Spreading and squeezing the toes facilitates PRC action through interneuron connections at the spinal cord level and through retrograde stimulation of the common nerve roots.

Advanced Roll for Control® Exercise - Level 3

Head, Neck and Shoulder Muscles

Level 3 – Advanced Roll for Control® Exercise includes integrating the head, neck and shoulder muscles with action of the PRC. Tip the chin up several degrees and roll the shoulders out during hip outward rotation. Drop the chin and roll the shoulders in during hip inward rotation. The head rocks on the upper cervical vertebrae in a small, slow motion. With elbows straight, palms roll up with hip outward rotation and roll down with hip inward rotation. Incorporate these motions with Levels 1 and 2 actions of breathing, abdominal and foot motions.

The nerve roots of the parasympathetic division of the ANS exit from cranial and sacral locations. Facilitating optimal function of this division encourages more normal PRC function. It assists in the balance of sympathetic and parasympathetic action affecting body functions.

Shoulder girdle motion and shoulder rotation facilitate synergistic action of the PRC through fascial connections. Shoulder girdle fascia

interconnects with the fascia of ribs and breathing diaphragm which integrates with abdominal and visceral fascia as well as the endopelvic fascia of the PRC.

Advanced PRC Exercise – Level 4

Whole Body Facilitation of PRC

Level 4 - Whole Body Facilitation of PRC incorporates the core exercise with levels 1-3 muscle activities.

- Inhale with
 - External Rotation of Shoulders and Hips
 - Head Extension (O/A)
 - Abdominal Release
 - Foot Dorsiflexion, Toe Abduction (spreading)
- Exhale with
 - Internal Rotation of Shoulders and Hips
 - Head Flexion (O/A)
 - Abdominal Tightening
 - Foot Plantar Flexion, Toe Adduction (squeezing)

In-Balance Posture Exercises

Standing and sitting posture is the base from which most movement occurs in adults. In CPP and LBP during standing it is common to see forward head, elevated, rounded shoulders, torqued pelvis, extended knees and weight acceptance on one leg more than another. Shoulder and neck muscles are over-active and seem to hold the body up. The head and shoulders often lead during walking. There is stiffness in any motion or posture and a lack of rotation throughout the spine, shoulders and hips.

In-Balance Standing

It is important to understand that normal standing posture is maintained primarily by the bony skeleton and ligaments, not muscle action. There is minimal activity of the ankle muscles to maintain balance; the shoulder muscles, the abdominal and buttocks muscles should be relaxed. To stand in the most effective pain-free posture:

- Take weight equally on both feet with the toes pointed slightly outward.
- Unlock both knees.

- Lift the top back of the head towards the clouds. Let the chin drop slightly as the spine lengthens.
- Release the shoulders, thinking of the shoulder and neck muscles as a velvet cloak resting on a hanger (the skeleton).
- Release the jaw, let the teeth separate, lips lightly touch, tongue is released from the roof of the mouth.
- Breathe using slow, low diaphragmatic breathing (figure 19-4).

Practice this posture first standing against a wall. Head, shoulders and hips touch the wall and the heels are 3”-4” away from the wall. When that is easy to achieve then walk away from the wall and maintain the posture.



Figure 19-4:
In-Balance Standing

In-Balance Standing Weight Shift

Once standing balance is easy and comfortable, progress to weight shift exercises.

- Weight shift in small amplitudes in a figure-of-eight.
- Weight shifts from left heel to outside of foot, then to the left big toe.
- Weight shift transfers to right heel to outside of foot, then across to the right big toe.

Repeat the slow smooth figure-of-eight weight shift 3 to 5 times keeping the knees unlocked and maintaining slow low breathing. Lead with the hips, keeping the shoulders and neck released and relaxed.

Standing Plié

Standing Plié exercises are small knee bends while maintaining postural alignment.² There are three Standing Plié exercises using different foot and arm positions.

Standing Plié One

Stand with heels together and toes pointing out 45 degrees, arms at sides



Fig 19-5: Standing Plié One

forming gentle arcs with the trunk. Inhale and bend knees slowly 3"-4", so there is a weight shift to the lateral border of your feet. On exhale first roll the knees in until there is a weight shift to the big toe and medial heel bilaterally, then slowly straighten the knees (figure 19-5).

Standing Plié Two

Stand with heels about hip width apart and toes pointing out 45 degrees and arms outstretched like a cross. Inhale and bend knees slowly 3"-4", so there is a weight shift to the lateral border of the feet. On exhale first roll the knees in until there is a weight shift to the big toes and medial heel, then slowly straighten the knees (figure 19-6).



Fig 19-6: Standing Plié Two and Three

Standing Plié Three

Stand with your heels touching and toes pointing out 45 degrees and arms overhead forming a circle. Inhale and bend knees slowly 3"-4", so there is a weight shift to the lateral border of the feet. On exhale first roll the knees in until there is a weight shift to the big toes and medial heels. Then slowly straighten the knees.

Standing Rotation Facilitation of PRC

When standing posture and weight shifts are easily accomplished this exercise can be done to improve sacroiliac, lumbosacral stability, standing balance, and gait.

- Stand with feet no more than hip width apart and toes pointed out a few degrees.
- Unlock the knees and maintain them in slight flexion throughout the exercise.
- Bring both hands to the right hip with exhale, then back to center of abdomen with inhale.
- Bring both hands to the left hip with exhale, then back to center with inhale.

This rotates the trunk on the pelvis and activates the transverse abdominus and PRC.

- Pivot the right foot on the heel.
- Rotate the right foot out with inhale and in with exhale.
- Rotate the left foot out with inhale and in with exhale.

This rotates the lower extremity on the pelvis and activates the PRC. Combine the two exercises into one (figure 19-7).

- Bring both hands to the right hip while rotating the right foot in with exhale.
- Bring both hands to the center of the abdomen while rotating the right foot out with inhale.
- Repeat 3-5 times.
- Bring both hands to the left hip while rotating the left foot in with exhale.
- Bring both hands to the center of the abdomen while rotating the left foot out with inhale.
- Repeat 3-5 times.

This exercise facilitates action of the breathing diaphragm, transverse abdominus and PRC in standing balance and gait pattern. It facilitates lumbar and sacral dynamic balance during functional activities.



Figure 19-7:
Standing Rotation

Stretching Exercises

The goal of stretching is to increase the ease of pain-free movement. For the individual with CPP and LBP the technique for stretching a tight muscle is different than a “feel good” full motion stretch. Stretching is most effective when the body is warm and relaxed. This can be accomplished in a hot shower, after a warm bath, after 5-10 minutes of heat application, or following active exercise. Muscles need to be stretched slowly just until the beginning of discomfort is noted, concentrating on avoiding pain. Breathe into the stretch for 15-30 seconds. Think slow, small, soft, smooth, sensitive stretch. The breath is low and slow, use

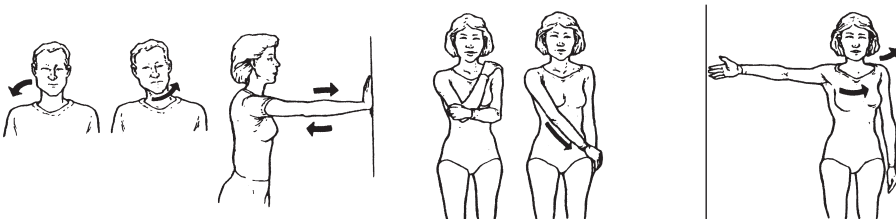


Figure 19-8: Shower Stretches

diaphragmatic breathing. Stretching to “pull out” the tightness doesn’t work. It can set off more muscle tightening. Return to neutral slowly and smoothly to avoid rebound tightening. One to three repetitions is enough. The typical stretch to the end of range with overpressure sets off the already overactive stretch reflex and feeds into the high resting tone (gamma bias) present in affected muscles. Figure 19-8 shows appropriate shower stretches.

The goals of stretching can be accomplished through positional stretches. Positional stretches are each held for 2-3 minutes while resting on a mat or bed (figure 19-9). Yoga positions of Child’s Pose, Prayer Squat and Downward Dog can be very beneficial if used on a daily basis during wake-up morning and slow-down evening routines.³

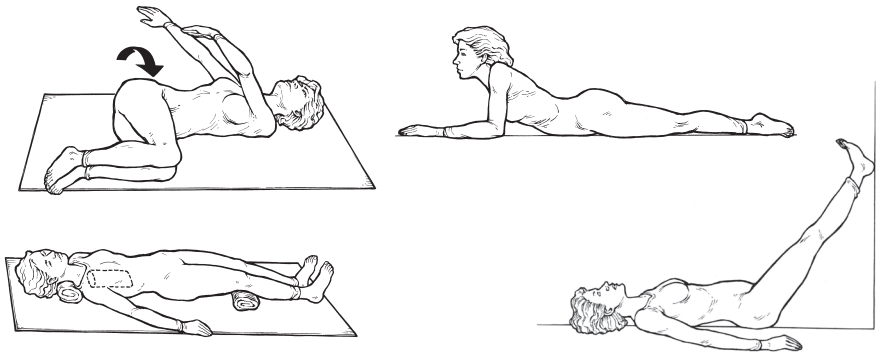


Figure 19-9: Positional Stretches

Child’s Pose

Start Position: On hands and knees.

Stretch Position: Bring buttocks towards heels while maintaining hands on the floor. Stretch hands forward gently so arms are lengthened. Breathe low and slow for 1-2 minutes while holding this position (figure 19-10).



Figure 19-10: Child’s Pose

Prayer Squat

Start Position: Squat with feet hip width apart and buttocks behind heels. Buttocks will be close to the floor.

Stretch Position: Place elbows against inside of knees and hands in



Figure 19-11: Prayer Squat

prayer position. Breathe diaphragmatically for 1-3 minutes allowing the knees to separate and hips to sink closer to the floor (figure 19-11).

Downward Dog

Start Position: Start on hands and knees. Hands and feet hip width apart.

Stretch Position: Raise buttocks into the air pushing through the hands and heels. Push heels to the ground and align arms and back into a straight line. Adjust distance between hands and feet so you can't quite get heels on the ground to maximize stretch (figure 19-12).

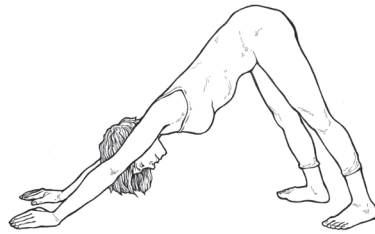


Figure 19-12: Downward Dog

Midline Stretch

This technique is effective for CPP and LBP that is characterized by tender points and/or is suspected to be visceral referred pain and/or muscle spasm. Use heat for 1-3 minutes in the area of symptoms, for example the lower abdomen or groin. A thermophore (institutional moist heat pad) is an effective and light weight form of heat. Focus on slow, diaphragmatic breathing. With inhale, rotate the hips or trunk slowly and smoothly just 3°-5° to one side. Rest in that position for 2 to 3 slow, low breaths releasing any muscle tightness with each exhale. Return slowly to the midline position with the next breath. Rest for a slow breath. Repeat three times to one side, then three times to the other side. Then assess the pain-free-range available that previously was limited by the tender point musculature. This “midline stretch” resets the gamma bias of the muscle spindle resulting in improved range of motion and decreased pain.

A few stretches or exercises at lunch and coffee breaks help relax the muscles that have been used during work and increase blood flow to the area while decreasing tension. Another good time for the individual to take a few minutes for him/herself is after work and before completing the evening activities. Taking 15-20 minutes between work and dinner to recline using positional stretches can help. When not working outside the home, it is important to develop a daily routine. In addition to bed and shower stretches, doing some stretches and exercises after

breakfast, mid-morning, after lunch and before dinner helps with pain and stiffness. Another approach is to set a timer and do exercises every two hours for 3-5 minutes.

Therapeutic Ball Exercises

Therapeutic ball exercises are often beneficial for CPP and LBP due to sensory and proprioceptive feedback that ball pressure and gentle movement provide to the central and peripheral nervous system. Equilibrium reactions in conjunction with joint approximation and reflex inhibition of pelvic muscles can significantly improve pelvic and low back muscle function while facilitating normal breathing patterns and improving circulation. Using the therapeutic ball for a chair can improve posture and prevent increased pain during desk work.

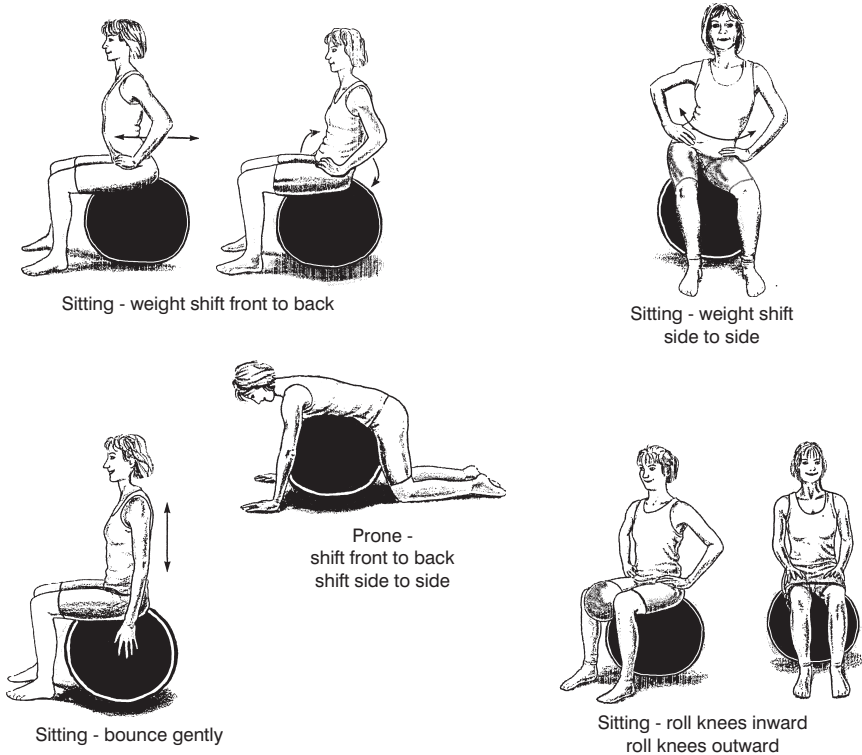


Figure 19-13: Therapeutic Ball Exercises

Therapeutic ball exercises include (figure 19-13):

- Sitting: weight shifts front to back and side to side.
- Sitting: bounce gently into the ball..
- Prone: shift front to back and side to side.
- Sitting: roll knees out with inhale and in with exhale.

Pool Exercises

Exercise can be accomplished with less pain and faster progression if done in a warm pool. Aerobic exercise is also very effective in shoulder level warm water. Water temperature between 87° and 92° F increases circulation and improves muscle relaxation. Shoulder height water eliminates 80% of gravity's pull on the body so movement can be most efficient and pain-free. Water pressure is greatest at the deepest depth and decreases as the water is at the surface so there is a natural upward pressure that improves circulation from lower extremities to the heart. Target heart rate in water is approximately 20% less than recommended target heart rate for aerobic exercise on land.

Aerobic endurance improves gradually. Begin with 3-5 minutes of exercise when acute pain and fatigue are dominant. Gradually increase exercise to 45 minutes with 1-2 rest periods when the pain and fatigue decreases. There should be no pain during pool exercise. Pain and fatigue should be improved at the end of the session even though there is a tired feeling. It is common for an individual to comment that "these exercises seem so easy" in the pool but it is important not to overdo initially. Build up gradually over 4 weeks. Always keep warm, using a hot tub or sauna and warm shower before and after the exercises.

Warm Up Stretches

(Remember to breathe.)

- Neck – forward/back to neutral, side bend, rotation
- Shoulders – hand to opposite shoulder
- Wrist – forward/back, circles each direction, turn palms up/down
- Leg/hip – hamstring stretch, Achilles stretch, roll knees out and in

Exercises in Standing

- Standing arm exercises while marching
 - Arms forward/backward
 - Hand circles
 - Hands to opposite shoulders
 - Arms forward and back - hand to face height
 - One hand on abdomen, one hand on low back, then reverse
 - Elbows to shoulder height, then down
 - Bend elbows, push down
- Standing leg exercises
 - Marching
 - Weight shift side to side, feet apart
 - Rock forward (elbows back), rock back (arms forward)
 - Leg out to side
 - Leg back and forward
 - Leg circles
- Arm and leg exercises
 - Hand to opposite knee
 - Hand toward opposite foot
 - Hand to inside heel
 - Hand to outside heel
 - Hands to right, legs to left – twist, then reverse
- Water walking - forward, backward, side crossovers

To be effective an exercise program needs to be completed multiple times a day for short periods and over weeks and months with gradually more intensive progression. “Slow and steady wins the race” is the motto rather than ‘Shock and Awe.’ Walking should be a part of any exercise program. It may start out as short bouts around the house but gradually move outside and go for longer and more interesting travels. Practice breathing and floating through the walk rather than using power walking techniques. Walking can be done in the pool as well as on land.

Plan the week’s exercise program. Vary the routine with different stretches, aerobic and Roll for Control® components. It should be relaxing, fun and relieve pain not increase pain (figure 19-14).

My Exercise Plan

	Roll for Control [®] Exercises	In-Balance Postural Stretches	Walking/Pool
Monday			
a.m.	o	o	o
noon	o	o	o
p.m.	o	o	o
Tuesday			
a.m.	o	o	o
noon	o	o	o
p.m.	o	o	o
Wednesday			
a.m.	o	o	o
noon	o	o	o
p.m.	o	o	o
Thursday			
a.m.	o	o	o
noon	o	o	o
p.m.	o	o	o
Friday			
a.m.	o	o	o
noon	o	o	o
p.m.	o	o	o
Saturday			
a.m.	o	o	o
noon	o	o	o
p.m.	o	o	o
Sunday			
a.m.	o	o	o
noon	o	o	o
p.m.	o	o	o

Figure 19-14: My Exercise Plan

Trauma and Post-Traumatic Stress Disorder

in Relation to Chronic Pain

CHRONIC PELVIC PAIN AND Low Back Pain occur frequently with trauma and Post-Traumatic Stress Disorder (PTSD). In a study of 713 females referred to a pelvic pain clinic 46.8% reported sexual or physical abuse and 31.3% screened positive for PTSD.¹ In a study of 1259 female veterans who received care through the Veterans Administration it was found that 22% screened positive for PTSD and that 33.5% of those reported chronic pelvic pain.² In several studies of traumatic childbirth with extreme pain PTSD was diagnosed and affected the women in their daily lives. Walker et. al. found women with chronic pelvic pain had significantly higher prevalence of sexual abuse than the non-pain control group.³ Women with chronic pelvic pain demonstrate hypothalamic-pituitary-adrenal axis alterations that are similar in some ways to PTSD neuroendocrine changes.⁴

Post-Traumatic Stress Disorder has the defining characteristic of the occurrence of a traumatic event that provokes fear, helplessness or horror in response to threat of injury or death. Three distinct types of symptoms occur as the result of the traumatic event: re-experiencing the event, avoidance of reminders, and hyperarousal of emotion systems. Reawakening the consciousness to the event can take the form of nightmares, disturbing images or flashbacks. Avoidance can take the form of attempting to avoid reminders of the event, of persons, places or thoughts associated with the incident. Hyperarousal can take the form of insomnia, irritability, impaired concentration, hypervigilance and increased startle response. Exposure to traumatic events can help explain nonspecific symptoms of palpitations, shortness of breath at rest, tremor, nausea, unexplained pain, mood swings, reluctance to under-go certain types of evaluation or treatment. Nonadherence to treatment is often a response to avoiding buried emotions that will be released during treatment for chronic pain.

In the Meltzer-Brody study those with a trauma history reported worse daily physical function due to poor health, more dysfunction due to pain and more days spent in bed compared to the women without PTSD but with chronic pelvic pain.¹

Coping behaviors in PTSD can include dissociative, sexualized, physiologic defense, cognitive defense, and internal control behaviors.

Dissociative Behavior

In dissociative behavior, touch may recreate the abuse stimulus which sets off the body separation from the mind. The individual is not able to give accurate information about his physical being because the message system between the body and mind is blocked. The mind is not receiving accurate information about the body. The individual is unable to have internal controls for exercise duration or intensity when there is no feedback to the mind about pain, fatigue or energy level.

Therapeutic intervention instruction needs to be consistent with words, format, and behavior at each session. Explain the anatomy, the desired activity and the expected result clearly and simply. Obtain permission for each new step, give choices and let the individual make the decisions. Empower the individual. Always observe body language and compare to the verbal information the client gives. The individual with PTSD needs no distraction for learning to occur. The environment must be quiet and safe.

Sexualized Behavior

The individual using sexualized behavior may exhibit inappropriate sexual behavior or misinterpret the clinician's behavior as being sexually attracting. Off hand jokes or remarks of a sexual nature may be interpreted as attraction by the client. Friendship or social interaction outside the therapy setting may be interpreted as an intimate message.

The clinician can initially clearly define herself as a helping professional rather than as a friend. Always have eye contact while working with the individual. Be calm, respond in a professional manner to any overt sexual behavior. Use objective directions as to what is necessary for you to be able to interact effectively in a therapeutic environment.

Physiologic Defense Behavior

The individual using physiologic defense behavior may exhibit inaccurate perception to sensory input. For example there can be hypersensitivity to touch or movement. There may be numbness in certain body parts. In either instance there is inaccurate feedback between the body and mind.

The clinician initially needs to develop activities for body and mind connections. Association techniques can include use of biofeedback EMG using visual feedback about muscle activity at rest and during physical exertion. Association techniques can include perceiving the color, texture, and temperature of each body part. External measurement tools such as EMG and temperature can help determine appropriate levels of exercise when the individual is unable to limit activities based on accurate internal feedback.

Begin by instructing the individual with releasing and relaxing, then describing how that released muscle tone feels. Begin with breathing and feeling the inhale and exhale. Then describe the feeling of each breath. Begin with perceiving left and right hand temperature, then learn to warm the hands. When those exercises have become easy it is possible to progress to slow, easy, minimal levels of exercise, floating through the small movements as slowly and smoothly as possible while maintaining a regular breathing pattern.

In the home environment begin with the basic self care loop which includes sleep protocol, nutrition, and positive self statements.

Cognitive Defense Behavior

The individual using cognitive defense behavior may exhibit low self esteem, poor self-care and sometimes self-abuse. This leads to problems carrying out a therapy program. She cannot carry through with a home program because she feels such hate or shame. The feeling of shame is constant and infects all daily life accomplishments.

The individual feels unworthy of success so he or she may sabotage physical activities. She feels unworthy of the effort it takes to do exercise consistently. She may use therapy tools for self-abuse.

The clinician's offhand remarks about weakness, softness, or anything remotely negative or less than perfect may be amplified by the individual, taken as "bad" which can bring out shame and powerless-

ness. Clinician's comments such as "why didn't you....." bring on the shame feelings. The denial of stated client feelings, such as "No, you don't feel that way...." or "That's no way to feel....." brings on the shame feelings. Instead of asking "why?" which brings on increased shame, ask "could you tell me a little more about that?"

The clinician can give consistent affirmations at appropriate developmental levels. During treatment active listening and eye contact help to validate the client and empower the individual to positive action. The clinician can direct small steps for self-care that are not overwhelming and actively involve the individual in decision making.

Internal Control – Limit Setting Behavior

The individual using internal control-limit setting behavior may exhibit physical disorientation, an inability to set internal limits and an inability to carry through with self-care in any consistent manner. Nutrition, exercise and work limits are often erratic and eccentric, going from one extreme to another. The individual either overdoes an activity or does nothing. Clinicians can encourage and help to structure self-care strategies with a balance of work and rest, to develop cycles of sleep, nutrition, exercise, work and leisure. The role of the clinician is to tailor pacing of exercise, activities of daily living, and work to the needs of the individual as a whole and integrated person. Sometimes that involves eliminating activities or going back to a blank slate and then adding one or two new steps carried out consistently for a period of time before adding another activity. Other times changing one activity in the daily life of the individual will be the best approach to developing internal control and limit setting behavior. Still other times it means interjecting a new behavior multiple times into the day to reconnect body and mind and interrupt running on automatic pilot. In each of these cases the therapist helps the individual to learn new skills as a substitute for inappropriate ones.

While the assessment and treatment procedures may be similar for any individual, the methods, techniques and interpersonal communications used during assessment or treatment will be different for someone with trauma or PTSD.

Psychosocial Impact

The presence of trauma and PTSD in women and men with pelvic pain makes it important to assess psychosocial aspects as well as physical aspects during a complete evaluation. The more an individual perceives control being outside of herself the greater is the frequency and severity of depression and pelvic pain.

The impact on daily life is significant. Extremes are often prevalent. Self-care, moderation and homeostasis are not present. Chaos is used as a valuable tool to keep “dis ease” at bay. Smooth sailing for a period of time will nearly always be actively disrupted by one crisis or another. Symptoms can include low self-esteem, secrecy, compulsions, addictions, self-mutilation, fears, phobias, panic attacks, shame, self-hate, rage, perfectionism, control, inhibited or exaggerated sexuality, and flashbacks. Coping strategies utilized to survive include minimizing, rationalizing, denying, forgetting, dissociation, controlling, chaos, hyper-alertness, comedic humor, busyness, fantasizing, mental illness, eating disorders, lying, stealing, gambling, religion, and extreme sexual behavior.

Physical Impact

The physical aspects of PTSD and CPP and LBP are important to attend to in assessment and treatment. There can be trigger points, tender points, scar tissue, muscle holding patterns, or muscle spasms resulting from the physical trauma of the abuse. Autonomic nervous system and endocrine system changes alter function of every body system. Muscle resting tone is elevated, and breathing patterns are altered to reflect the hyperarousal state. Heart rate and blood pressure often become chronically elevated. Irritable bowel syndrome and bladder urgency and frequency are prevalent.

These changes are relatively hidden from the public eye. The physical injury aspect of PTSD is not obvious like a broken leg would be. Yet, every minute of the day the individual is coping with the aftermath.

Therapeutic Intervention Strategies

Therapeutic intervention strategies in relation to PTSD involve the usual physical and functional goals as well as psychosocial goals.⁵ The goals for a clinician while interacting with an individual experiencing PTSD include:

- Acknowledge and manage his/her own feelings about PTSD
- Build trust without becoming “hooked” by the individual’s issues
- Define and maintain appropriate boundaries
- Develop effective physical intervention strategies

“Therapist-Patient” Relationship

Trauma and PTSD robs the ability to trust. It is difficult to trust a health care provider. It can be a positive motivator when the relationship is a healthy one. In some cases that distrust extends to being in the same room alone with the “therapist”. Follow-through on a home program may be poor. When the urge to please is dominant then lying about daily routines and practice sessions occurs. Other times there may be obsessive repetitions of an activity. Boundary or limit setting can be difficult. Shame, secrecy, and dissociation can make it difficult to accurately inform a health care professional as to the true symptoms and how needs can best be met. Part of his/her body has been incredibly hurt yet it is not visible to anyone. There is often denial that abuse ever happened which leads to physiological numbing and disconnection of that body part from the brain. Over time a separation of body information from the head brain occurs. The longer the time-frame of secrecy, the more involved the dissociation becomes.

Creating an Environment Where Trauma and PTSD Can Be Discussed

The safety of a private, comfortable, quiet room is needed during assessment and treatment. Remaining in the same room for each session is optimal. The clinician needs to stay in the room rather than going in and out during the session.

During the initial history and first visit a support person may be helpful to create a “safe” environment. The client should be fully dressed and seated in a comfortable chair, not poised on a treatment table dressed in a paper gown. Walk with the client from the waiting room into the clinic room rather than having him/her sit in the clinic room alone.

Assessment Tools and Techniques

To obtain accurate information, open ended questions and non-judgmental listening are two important assessment techniques. Questions that encourage factual and feeling responses rather than yes or no answers are best. Non-judgmental listening involves the clinician maintaining an open, accepting body posture, sincere eye contact, accepting nods and verbiage. These are all ways of validating the client's experience.

During history-taking the clinician needs to be alert to hints from the client that he/she may have experienced trauma.

Recognize symptoms of possible trauma in body language, verbiage and facts given during the history. If the client brings up trauma once and then stops talking about it, bring it up gently again later. Do not ignore the topic of trauma, don't be afraid of it. If the client discloses abuse, ask questions like "when did it occur," "how does it affect your life now?" Check for drug or alcohol problems. Ask if the client has or is receiving counseling for the abuse. The client is the expert about his/her trauma experience. Believe the story and don't minimize trauma and its effect. Affirming any statement of feelings he/she expresses, is essential.

Observe body language to see if it coincides with the description of the problem. The conscious brain may not have access to the information but the physical body does.

Have the individual draw and describe what she feels in each part of the body. What areas are blank? How does she draw in the body diagram? Is each part hot, cold, what is the color, texture? This can help determine dissociation behavior which is separating from a part of the body that holds memories of trauma.

Assess the duration and intensity of the individual's work and physical activity or exercise. Determine the reasons for each activity in her daily life. Is it for pleasure, stress relief, weight control or habit? Determine nutritional status, fluid consumption, caffeine and typical daily meals.

Always obtain permission before touching, palpating, or moving body parts during assessment, Help the individual remain connected to her body. It is asking her to remain connected to the trauma and treats the whole person. If you notice a sense of being far away, stop what

you are doing and inquire gently about what is happening. Feel and watch body language as you do any testing. Before doing any resistive strength testing or repetitive movement testing the clinician needs to know the individual's ability to give accurate information and limit the assessment appropriate to the ability.

While taking the history observe facial expressions, body language, and age appropriate words and tone of voice. An individual with trauma history may switch into childlike behavior for periods of time. Observe appearance for extremes of posture, dress, perfume, etc. The individual may exaggerate the feminine side or try to deny it with slovenly or manly attire.

The first one or two visits are a time to develop trust and safety for the individual and a time for the clinician to understand her needs. At the end of the assessment it is important to clearly delineate the therapist-client roles and boundaries as well as mutual goals to be worked toward.

Guidelines for Treatment

The following are general guidelines for developing effective therapeutic interventions when PTSD is a factor.

1. Stop at each step, explain and obtain permission for the next step.
2. Check that the individual is staying with his/her body during treatment.
3. If the individual exhibits self-defeating behaviors address them before expecting progress in the therapy program.
4. Start with concreteness, i.e.. EMG to develop trust and interest. The individual is very curious and interested at a conscious and unconscious level.
5. Inform the individual of options for treatment and let her/him choose the next step.
6. Ask how the individual best learns, through sight, verbiage, demonstration. Then use that mode in teaching.
7. Use a private room with definite boundaries such as doors being closed.
8. Define the boundaries of treatment – the therapist is the guide, the individual is the empowered leader to heal.

9. Monitor home program follow-through, one self-care priority at a time.
10. Never shame the individual. “Why didn’t you?” “No, you shouldn’t feel this way.” Instead state, “You survived the best way you could.”
11. Be cautious about setting up unrealistic treatment goals that then end in failure and shame for the individual.
12. Use constant affirmations such as “I’m glad you are here.” “I trust you to take care of yourself.” “I know you had good reasons for your actions.” “I know you did the best thing for you at the time.”
13. Be aware the individual will test you to see if you are really listening, to see if you really care, to see if you are human, to see if you are giving power and control back to them with boundaries or just pretending.
14. Exhibit compassion not loving. Compassion is deep affection, understanding and gentleness.
15. When talking to the individual always face him/her. Turning away indicates abandonment.
16. Many individuals are compartmentalized. Breathing and talking at the same time will be difficult. Breathing and eating may not be possible. Stress is stored and does not move up and out. So outline one activity at a time beginning with the basics of breathing, talking and eating.
17. Believe healing is possible.
18. Be willing to witness emotional pain with empathy not pity.
19. Be willing to believe the unbelievable.
20. Examine your own attitudes. If you have abuse issues in your background that have not been dealt with do not attempt to take on an individual with those issues. Refer them to someone else.

Treatment Considerations by Subcategory

The following subcategory treatment suggestions are intended for use after the self-care management strategies in chapter 15 have been completed. Identifying your subcategory and following these treatment protocols is an important part of treatment but will only be effective when used in conjunction with general self-care strategies.

Levator Ani Syndrome

- Vaginal electrical stimulation
- Bowel program
- Advanced PRC exercise
- Acupressure
- Pelvic warming

Piriformis Syndrome

- Roll for Control[®] Exercises
- Pelvic warming

Coccygodynia

- Anal electrical stimulation
- Bowel program
- Roll for Control[®] Exercises
- Acupressure
- Pelvic warming

Vaginitis

- Hot shower/bath
- P.Q. during penetration
- Roll for Control[®] Exercises
- Extra Virgin Olive Oil cream
- Visceral techniques

- Vaginal dilators
- Massage: desensitizing and trigger point

Dyspareunia

- Hot shower/bath
- P.Q. during penetration
- Roll for Control® exercises
- Estrogen and testosterone cream
- Visceral motility
- Nitroglycerine cream
- Vaginal dilators
- Massage: desensitizing and trigger point

Proctalgia Fugax

- Anal electrical stimulation
- Bowel program
- Roll for Control® Exercises
- Acupressure
- Pelvic warming

Vulvar Vestibulitis – Vulvodynia

- Extra virgin olive oil
- Estrogen and testosterone cream
- Dietary changes
- Desensitizing massage

Pudendal Neuralgia

- Alternate ice and heat
- Stretches
- Deep massage

Pelvic Muscle Relaxation Syndromes

- Wonder W'edge® Inversion
- Roll for Control® Exercises
- Avoid heavy lifting

Urological Syndromes

- Vapocoolant spray and heat
- Acupressure
- Essential oil massage externally
- High voltage galvanic stimulation externally

Interstitial Cystitis

- Vaginal electrical stimulation
- Pelvic warming
- Vapocoolant spray and heat
- Essential oil massage externally
- Visceral motility

Prostatitis

- Vapocoolant spray and heat
- Accupressure
- Essential oil massage externally
- High voltage galvanic stimulation externally
- Pelvic warming

Neurally Mediated Hypotension - Pelvic Congestion

- Dietary salt
- Wonder W'edge® Inversion
- Roll for Control® Exercises
- Essential oil massage externally
- Pool exercises
- Visceral techniques

Post Traumatic Stress Disorder

- Therapeutic ball activities
- Pelvic warming
- Acupressure
- Foot massage
- Essential oil massage
- Advanced P.Q. - imagine space

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About the Author

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